STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PROPOSED AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD

No. WQCC 19-46(R)

New Mexico Environment Department,
Water Protection Division,
Surface Water Quality Bureau

Petitioner.

NEW MEXICO ENVIRONMENT DEPARTMENT'S NOTICE OF INTENT TO PRESENT TECHNICAL TESTIMONY IN THE MATTER OF 20.6.4 NMAC, ESTABLISHING A NUTRIENT TEMPORARY STANDARD

Pursuant to the Notice of Hearing and Appointment of a Hearing Officer filed on November 20, 2019 and section 20.1.6.202 NMAC, the Surface Water Quality Bureau ("Bureau") within the Water Protection Division ("Division") of the New Mexico Environment Department ("Department") files this Notice of Intent to Present Technical Testimony for the hearing in this matter currently scheduled for March 10, 2020, and continuing if necessary for additional dates, and submits to the Commission the following:

1. **Entity for whom the witnesses will testify:** The New Mexico Environment Department.

2. **Identity of witnesses:**

A. Jennifer Fullam, Bureau Standards, Planning and Reporting Team Supervisor. Her resume is attached as NMED Exhibit 2. A copy of Ms. Fullam's written direct testimony is attached as NMED Exhibit 3.

B. Shelly Lemon, Bureau Chief. Her resume is attached as NMED Exhibit 4. A copy of Ms. Lemon's written direct testimony is attached as NMED Exhibit 5.

3. **Estimated duration of direct oral testimony of witnesses:**

   A. Shelly Lemon 45 minutes

   B. Jennifer Fullam 25 minutes

4. **List of Exhibits:** A complete list of exhibits the Department intends to offer into evidence in this matter is attached to this Notice. The Department reserves the right to introduce and move for admission of any other exhibit in support of rebuttal or additional direct testimony at the hearing.

Respectfully submitted,

NEW MEXICO ENVIRONMENT DEPARTMENT
OFFICE OF GENERAL COUNSEL

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing *Notice of Intent to Present Technical Testimony* was served on the following party on this the 19th day of February 2020 by email and hand delivery:

Cody Barnes, Hearing Officer Administrator
Room S-2104, Runnels Building
1190 St. Francis Dr.
Santa Fe, New Mexico 87505

Chris Vigil
Assistant General Counsel

WQCC 19-46(R) EXHIBIT LIST

NMED EXHIBIT 1	Proposed Amendment, 20.6.4.318 NMAC
NMED EXHIBIT 1A	Amended 20.6.4 NMAC
NMED EXHIBIT 2	Resume – Jennifer Fullam
NMED EXHIBIT 3	Written Direct Testimony – Jennifer Fullam
NMED EXHIBIT 4	Resume – Shelly Lemon
NMED EXHIBIT 5	Written Direct Testimony – Shelly Lemon
NMED EXHIBIT 6	Public Notice of Proposed Rulemaking in both English and Spanish
NMED EXHIBIT 7	Public Notice of Proposed Rulemaking in both English and Spanish Published in the *Taos News*, December 26, 2019
NMED EXHIBIT 8	Affidavit of Publication in the *Taos News*
NMED EXHIBIT 9	Public Notice of Proposed Rulemaking in both English and Spanish Published in the *Santa Fe New Mexican*, December 30, 2019
NMED EXHIBIT 10	Affidavit of Publication in the *Santa Fe New Mexican*
NMED EXHIBIT 11	Public Notice of Proposed Rulemaking in both English and Spanish Published in the New Mexico Register, December 31, 2019
NMED EXHIBIT 12	Affidavit of Publication in the New Mexico Register
NMED EXHIBIT 13	Screenshot of Notice of Proposed Rulemaking in Both English and Spanish Posted on the *Sunshine Portal*, December 17, 2019
NMED EXHIBIT 14	Email sent to distribute Notice of Proposed Rulemaking in Both English and Spanish to the Legislative Counsel Service, December 6, 2019
NMED EXHIBIT 15	Screenshot of Notice of Proposed Rulemaking in English and Spanish on the Public Notices Page of the Department's Website, January 7, 2020
NMED EXHIBIT 16	Screenshot of Notice of Proposed Rulemaking in English and Spanish on the SWQB/Temporary Standard Raton WWTP Page of the Department's Website, October 29, 2019

NMED EXHIBIT 17	NMED's Notice of Compliance with the Small Business Regulatory Relief Act and Related Correspondence
NMED EXHBIT 18	Email Notice to Interested Persons of Proposed Rulemaking and Public Comment Period, October 1, 2019
NMED EXHIBIT 19	Relevant Sections of the Clean Water Act, 33 U.S.C. §§ 1250 *et seq*.
NMED EXHIBIT 20	Relevant Sections of the Federal Water Quality Standards, 40 C.F.R. § 131
NMED EXHIBIT 21	Federal Continuing Planning Process, 40 C.F.R. 130.5
NMED EXHIBIT 22	Federal Water Quality Management Plans, 40 C.F.R. 130.6
NMED EXHIBIT 23	NMED's Public Involvement Plan for WQCC-16-46(R)
NMED EXHIBIT 24	Nutrient Temporary Standards for the City of Raton WWTP
NMED EXHIBIT 25	New Mexico Nutrient Thresholds for Perennial Wadeable Streams
NMED EXHIBIT 26	Refinement of Stream Nutrient Impairment Thresholds in New Mexico
NMED EXHIBIT 27	2018-2020 New Mexico CWA Integrated Report
NMED EXHIBIT 28	2015-2016 Nutrient and Phosphorus Data for Doggett Creek
NMED EXHIBIT 29	Dissolved Oxygen Data for Doggett Creek, May 2016
NMED EXHIBIT 30	Streamflow Data for Doggett Creek
NMED EXHIBIT 31	EPA Interim Economic Guidance for Water Quality Standards
NMED EXHIBIT 32	Raton WWTP Permit
NMED EXHIBIT 33	City of Raton Nutrient Removal Schedule
NMED EXHIBIT 34	Proposed Statement of Reasons and Order

These are amendments to 20.6.4 NMAC, Section 318, effective XX/XX/XXXX.

20.6.4.318 CANADIAN RIVER BASIN: Doggett creek.

A. Designated uses: Warm water aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

C. Discharger-specific temporary standard:

(1) Discharger: City of Raton wastewater treatment plant

(2) NPDES permit number: NM0020273, Outfall 001

(3) Receiving waterbody: Doggett creek, 20.6.4.318 NMAC

(4) Discharge latitude/longitude: 36° 52' 13.91" N / 104° 25' 39.18" W

(5) Pollutant(s): nutrients; total nitrogen and total phosphorus

(6) Factor of issuance: substantial and widespread economic and social impacts (40 CFR 131.10(g)(6))

(7) Highest attainable condition: interim effluent condition of 8.0 mg/L total nitrogen and 1.6 mg/L total phosphorus as 30-day averages. The highest attainable condition shall be either the highest attainable condition identified at the time of the adoption, or any higher attainable condition later identified during any reevaluation, whichever is more stringent (40 CFR 131.14(b)(1)(iii)).

(8) Effective date of temporary standard: This temporary standard becomes effective for Clean Water Act purposes on the date of EPA approval.

(9) Expiration date of temporary standard: no later than 20 years from the effective date.

(10) Reevaluation period: at each succeeding review of water quality standards and at least once every five years from the effective date of the temporary standard (20.6.4.10.F(8) NMAC, 40 CFR 131.14(b)(1)(v)). If the discharger cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard. If the reevaluation is not completed at the frequency specified or the Department does not submit the reevaluation to EPA within 30 days of completion, the underlying designated use and criterion will be the applicable water quality standard for Clean Water Act purposes until the Department completes and submits the reevaluation to EPA. Public input on the reevaluation will be invited during NPDES permit renewals or triennial reviews, as applicable, in accordance with the State's most current approved water quality management plan and continuing planning process.

(11) Timeline for proposed actions. Tasks and target completion dates are listed in the most recent, WQCC-approved version of the New Mexico Environment Department, Surface Water Quality Bureau's "Nutrient Temporary Standards for City of Raton Wastewater Treatment Plant, NPDES No. NM0020273 to Doggett Creek."

[20.6.4.318 NMAC - N, XX/XX/XXXX]

TITLE 20 ENVIRONMENTAL PROTECTION
CHAPTER 6 WATER QUALITY
PART 4 STANDARDS FOR INTERSTATE AND INTRASTATE SURFACE WATERS

20.6.4.1 ISSUING AGENCY: Water Quality Control commission.
[20.6.4.1 NMAC - Rp 20 NMAC 6.1.1001, 10/12/2000]

20.6.4.2 SCOPE: Except as otherwise provided by statute or regulation of the water quality control commission, this part governs all surface waters of the state of New Mexico, which are subject to the New Mexico Water Quality Act, Sections 74-6-1 through 74-6-17 NMSA 1978.
[20.6.4.2 NMAC - Rp 20 NMAC 6.1.1002, 10/12/2000; A, 5/23/2005]

20.6.4.3 STATUTORY AUTHORITY: This part is adopted by the water quality control commission pursuant to Subsection C of Section 74-6-4 NMSA 1978.
[20.6.4.3 NMAC - Rp 20 NMAC 6.1.1003, 10/12/2000]

20.6.4.4 DURATION: Permanent.
[20.6.4.4 NMAC - Rp 20 NMAC 6.1.1004, 10/12/2000]

20.6.4.5 EFFECTIVE DATE: October 12, 2000, unless a later date is indicated in the history note at the end of a section.
[20.6.4.5 NMAC - Rp 20 NMAC 6.1.1005, 10/12/2000]

20.6.4.6 OBJECTIVE:

A. The purpose of this part is to establish water quality standards that consist of the designated use or uses of surface waters of the state, the water quality criteria necessary to protect the use or uses and an antidegradation policy.

B. The state of New Mexico is required under the New Mexico Water Quality Act (Subsection C of Section 74-6-4 NMSA 1978) and the federal Clean Water Act, as amended (33 U.S.C. Section 1251 *et seq.*) to adopt water quality standards that protect the public health or welfare, enhance the quality of water and are consistent with and serve the purposes of the New Mexico Water Quality Act and the federal Clean Water Act. It is the objective of the federal Clean Water Act to restore and maintain the chemical, physical and biological integrity of the nation's waters, including those in New Mexico. This part is consistent with Section 101(a)(2) of the federal Clean Water Act, which declares that it is the national goal that wherever attainable, an interim goal of water quality that provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by July 1, 1983. Agricultural, municipal, domestic and industrial water supply are other essential uses of New Mexico's surface water; however, water contaminants resulting from these activities will not be permitted to lower the quality of surface waters of the state below that required for protection and propagation of fish, shellfish and wildlife and recreation in and on the water, where practicable.

C. Pursuant to Subsection A of Section 74-6-12 NMSA 1978, this part does not grant to the water quality control commission or to any other entity the power to take away or modify property rights in water.
[20.6.4.6 NMAC - Rp 20 NMAC 6.1.1006, 10/12/2000; A, 5/23/2005]

20.6.4.7 DEFINITIONS: Terms defined in the New Mexico Water Quality Act, but not defined in this part will have the meaning given in the Water Quality Act.

A. Terms beginning with numerals or the letter "A," and abbreviations for units.

(1) "4T3 temperature" means the temperature not to be exceeded for four or more consecutive hours in a 24-hour period on more than three consecutive days.

(2) "6T3 temperature" means the temperature not to be exceeded for six or more consecutive hours in a 24-hour period on more than three consecutive days.

(3) Abbreviations used to indicate units are defined as follows:

(a) "cfu/100 mL" means colony-forming units per 100 milliliters; the results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN), depending on the analytical method used;

(b) "cfs" means cubic feet per second;

(c) **"µg/L"** means micrograms per liter, equivalent to parts per billion when the specific gravity of the solution equals 1.0;

(d) **"µS/cm"** means microsiemens per centimeter; one µS/cm is equal to one µmho/cm;

(e) **"mg/kg"** means milligrams per kilogram, equivalent to parts per million;

(f) **"mg/L"** means milligrams per liter, equivalent to parts per million when the specific gravity of the solution equals 1.0;

(g) **"MPN/100 mL"** means most probable number per 100 milliliters; the results for *E. coli* may be reported as either CFU or MPN, depending on the analytical method used;

(h) **"NTU"** means nephelometric turbidity unit;

(i) **"pCi/L"** means picocuries per liter;

(j) **"pH"** means the measure of the acidity or alkalinity and is expressed in standard units (su).

(4) **"Acute toxicity"** means toxicity involving a stimulus severe enough to induce a response in 96 hours of exposure or less. Acute toxicity is not always measured in terms of lethality, but may include other toxic effects that occur within a short time period.

(5) "**Adjusted gross alpha**" means the total radioactivity due to alpha particle emission as inferred from measurements on a dry sample, including radium-226, but excluding radon-222 and uranium. Also excluded are source, special nuclear and by-product material as defined by the Atomic Energy Act of 1954.

(6) **"Aquatic life"** means any plant or animal life that uses surface water as primary habitat for at least a portion of its life cycle, but does not include avian or mammalian species.

(7) "**Attainable"** means achievable by the imposition of effluent limits required under sections 301(b) and 306 of the Clean Water Act and implementation of cost-effective and reasonable best management practices for nonpoint source control.

B. Terms beginning with the letter "B".

(1) **"Best management practices" or "BMPs":**

(a) for national pollutant discharge elimination system (NPDES) permitting purposes means schedules of activities, prohibitions of practices, maintenance procedures and other management practices to prevent or reduce the pollution of "waters of the United States;" BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or waste disposal or drainage from raw material storage; or

(b) for nonpoint source pollution control purposes means methods, measures or practices selected by an agency to meet its nonpoint source control needs; BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures; BMPS can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters; BMPs for nonpoint source pollution control purposes shall not be mandatory except as required by state or federal law.

(2) **"Bioaccumulation"** refers to the uptake and retention of a substance by an organism from its surrounding medium and food.

(3) **"Bioaccumulation factor"** is the ratio of a substance's concentration in tissue versus its concentration in ambient water, in situations where the organism and the food chain are exposed.

(4) **"Biomonitoring"** means the use of living organisms to test the suitability of effluents for discharge into receiving waters or to test the quality of surface waters of the state.

C. Terms beginning with the letter "C".

(1) "**CAS number**" means an assigned number by chemical abstract service (CAS) to identify a substance. CAS numbers index information published in chemical abstracts by the American chemical society.

(2) **"Chronic toxicity"** means toxicity involving a stimulus that lingers or continues for a relatively long period relative to the life span of an organism. Chronic effects include, but are not limited to, lethality, growth impairment, behavioral modifications, disease and reduced reproduction.

(3) **"Classified water of the state"** means a surface water of the state, or reach of a surface water of the state, for which the commission has adopted a segment description and has designated a use or uses and applicable water quality criteria in 20.6.4.101 through 20.6.4.899 NMAC.

(4) **"Closed basin"** is a basin where topography prevents the surface outflow of water and water escapes by evapotranspiration or percolation.

(5) "Coldwater" in reference to an aquatic life use means a surface water of the state where the water temperature and other characteristics are suitable for the support or propagation or both of coldwater aquatic life.

(6) "Coolwater" in reference to an aquatic life use means the water temperature and other characteristics are suitable for the support or propagation of aquatic life whose physiological tolerances are intermediate between and may overlap those of warm and coldwater aquatic life.

(7) "Commission" means the New Mexico water quality control commission.

(8) "Criteria" are elements of state water quality standards, expressed as constituent concentrations, levels or narrative statements, representing a quality of water that supports a use. When criteria are met, water quality will protect the designated use.

D. Terms beginning with the letter "D".

(1) "**DDT and derivatives**" means 4,4'-DDT (CAS number 50293), 4,4'-DDE (CAS number 72559) and 4,4'-DDD (CAS number 72548).

(2) "Department" means the New Mexico environment department.

(3) "Designated use" means a use specified in 20.6.4.97 through 20.6.4.899 NMAC for a surface water of the state whether or not it is being attained.

(4) "Dissolved" refers to the fraction of a constituent of a water sample that passes through a 0.45-micrometer pore-size filter. The "dissolved" fraction is also termed "filterable residue."

(5) "Domestic water supply" means a surface water of the state that could be used for drinking or culinary purposes after disinfection.

E. Terms beginning with the letter "E".

(1) "E. coli" means the bacteria Escherichia coli.

(2) "Ephemeral" when used to describe a surface water of the state means the water body contains water briefly only in direct response to precipitation; its bed is always above the water table of the adjacent region.

(3) "Existing use" means a use actually attained in a surface water of the state on or after November 28, 1975, whether or not it is a designated use.

F. Terms beginning with the letter "F".

(1) "Fish culture" means production of coldwater or warmwater fishes in a hatchery or rearing station.

(2) "**Fish early life stages**" means the egg and larval stages of development of fish ending when the fish has its full complement of fin rays and loses larval characteristics.

G. Terms beginning with the letter "G". [RESERVED]

H. Terms beginning with the letter "H".

(1) "High quality coldwater" in reference to an aquatic life use means a perennial surface water of the state in a minimally disturbed condition with considerable aesthetic value and superior coldwater aquatic life habitat. A surface water of the state to be so categorized must have water quality, stream bed characteristics and other attributes of habitat sufficient to protect and maintain a propagating coldwater aquatic life population.

(2) "Human health-organism only" means the health of humans who ingest fish or other aquatic organisms from waters that contain pollutants.

I. Terms beginning with the letter "I".

(1) "Industrial water supply" means the use or storage of water by a facility for process operations unless the water is supplied by a public water system. Industrial water supply does not include irrigation or other agricultural uses.

(2) "Intermittent" when used to describe a surface water of the state means the water body contains water for extended periods only at certain times of the year, such as when it receives seasonal flow from springs or melting snow.

(3) "Interstate waters" means all surface waters of the state that cross or form a part of the border between states.

(4) "Intrastate waters" means all surface waters of the state that are not interstate waters.

(5) "Irrigation" means application of water to land areas to supply the water needs of beneficial plants.

(6) "Irrigation storage" means storage of water to supply the needs of beneficial plants.

J. Terms beginning with the letter "J". [RESERVED]

K. Terms beginning with the letter "K". [RESERVED]

L. Terms beginning with the letter "L".

(1) "LC-50" means the concentration of a substance that is lethal to fifty percent of the test organisms within a defined time period. The length of the time period, which may vary from 24 hours to one week or more, depends on the test method selected to yield the information desired.

(2) "**Limited aquatic life**" as a designated use, means the surface water is capable of supporting only a limited community of aquatic life. This subcategory includes surface waters that support aquatic species selectively adapted to take advantage of naturally occurring rapid environmental changes, ephemeral or intermittent water, high turbidity, fluctuating temperature, low dissolved oxygen content or unique chemical characteristics.

(3) "Livestock watering" means the use of a surface water of the state as a supply of water for consumption by livestock.

M. Terms beginning with the letter "M".

(1) "Marginal coldwater" in reference to an aquatic life use means that natural intermittent or low flows, or other natural habitat conditions severely limit maintenance of a coldwater aquatic life population or historical data indicate that the temperature in the surface water of the state may exceed 25°C (77°F).

(2) "Marginal warmwater" in reference to an aquatic life use means natural intermittent or low flow or other natural habitat conditions severely limit the ability of the surface water of the state to sustain a natural aquatic life population on a continuous annual basis; or historical data indicate that natural water temperature routinely exceeds 32.2°C (90°F).

(3) "Maximum temperature" means the instantaneous temperature not to be exceeded at any time.

(4) "Minimum quantification level" means the minimum quantification level for a constituent determined by official published documents of the United States environmental protection agency.

N. Terms beginning with the letter "N".

(1) "Natural background" means that portion of a pollutant load in a surface water resulting only from non-anthropogenic sources. Natural background does not include impacts resulting from historic or existing human activities.

(2) "Natural causes" means those causal agents that would affect water quality and the effect is not caused by human activity but is due to naturally occurring conditions.

(3) "Nonpoint source" means any source of pollutants not regulated as a point source that degrades the quality or adversely affects the biological, chemical or physical integrity of surface waters of the state.

O. Terms beginning with the letter "O".

(1) "**Organoleptic**" means the capability to produce a detectable sensory stimulus such as odor or taste.

(2) "Oversight agency" means a state or federal agency, such as the United States department of agriculture forest service, that is responsible for land use or water quality management decisions affecting nonpoint source discharges where an outstanding national resource water is located.

P. Terms beginning with the letter "P".

(1) "**Playa**" means a shallow closed basin lake typically found in the high plains and deserts.

(2) "Perennial" when used to describe a surface water of the state means the water body typically contains water throughout the year and rarely experiences dry periods.

(3) "Point source" means any discernible, confined and discrete conveyance from which pollutants are or may be discharged into a surface water of the state, but does not include return flows from irrigated agriculture.

(4) "**Practicable**" means that which may be done, practiced or accomplished; that which is performable, feasible, possible.

(5) "Primary contact" means any recreational or other water use in which there is prolonged and intimate human contact with the water, such as swimming and water skiing, involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard. Primary contact also means any use of surface waters of the state for cultural, religious or ceremonial purposes in which there is intimate human contact with the water, including but not limited to ingestion or immersion, that could pose a significant health hazard.

(6) "Public water supply" means the use or storage of water to supply a public water system as defined by New Mexico's Drinking Water Regulations, 20.7.10 NMAC. Water provided by a public water system may need to undergo treatment to achieve drinking water quality.

Q. Terms beginning with the letter "Q". [RESERVED]

R. Terms beginning with the letter "R". [RESERVED]

S. Terms beginning with the letter "S".

(1) "Secondary contact" means any recreational or other water use in which human contact with the water may occur and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing, wading, commercial and recreational boating and any limited seasonal contact.

(2) "Segment" means a classified water of the state described in 20.6.4.101 through 20.6.4.899 NMAC. The water within a segment should have the same uses, similar hydrologic characteristics or flow regimes, and natural physical, chemical and biological characteristics and exhibit similar reactions to external stresses, such as the discharge of pollutants.

(3) "**Specific conductance**" is a measure of the ability of a water solution to conduct an electrical current.

(4) "State" means the state of New Mexico.

(5) "Surface water(s) of the state" means all surface waters situated wholly or partly within or bordering upon the state, including lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, reservoirs or natural ponds. Surface waters of the state also means all tributaries of such waters, including adjacent wetlands, any manmade bodies of water that were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state, and any "waters of the United States" as defined under the Clean Water Act that are not included in the preceding description. Surface waters of the state does not include private waters that do not combine with other surface or subsurface water or any water under tribal regulatory jurisdiction pursuant to Section 518 of the Clean Water Act. Waste treatment systems, including treatment ponds or lagoons designed and actively used to meet requirements of the Clean Water Act (other than cooling ponds as defined in 40 CFR Part 423.11(m) that also meet the criteria of this definition), are not surface waters of the state, unless they were originally created in surface waters of the state or resulted in the impoundment of surface waters of the state.

T. Terms beginning with the letter "T".

(1) "TDS" means total dissolved solids, also termed "total filterable residue."

(2) "Toxic pollutant" means those pollutants, or combination of pollutants, including disease-causing agents, that after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will cause death, shortened life spans, disease, adverse behavioral changes, reproductive or physiological impairment or physical deformations in such organisms or their offspring.

(3) "**Tributary**" means a perennial, intermittent or ephemeral waterbody that flows into a larger waterbody, and includes a tributary of a tributary.

(4) "Turbidity" is an expression of the optical property in water that causes incident light to be scattered or absorbed rather than transmitted in straight lines.

U. Terms beginning with the letter "U". [RESERVED]

V. Terms beginning with the letter "V". [RESERVED]

W. Terms beginning with the letter "W".

(1) "Warmwater" with reference to an aquatic life use means that water temperature and other characteristics are suitable for the support or propagation or both of warmwater aquatic life.

(2) "Water contaminant" means any substance that could alter if discharged or spilled the physical, chemical, biological or radiological qualities of water. "Water contaminant" does not mean source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, but may include all other radioactive materials, including but not limited to radium and accelerator-produced isotopes.

(3) "Water pollutant" means a water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or to unreasonably interfere with the public welfare or the use of property.

(4) "Wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions in New Mexico. Wetlands that are constructed outside of a surface water of the state for the purpose of providing wastewater treatment and that do not impound a surface water of the state are not included in this definition.

(5) "Wildlife habitat" means a surface water of the state used by plants and animals not considered as pathogens, vectors for pathogens or intermediate hosts for pathogens for humans or domesticated livestock and plants.

X. Terms beginning with the letters "X" through "Z". [RESERVED]

[20.6.4.7 NMAC - Rp 20 NMAC 6.1.1007, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 7/17/2005; A, 8/1/2007; A, 12/1/2010; A, 1/14/2011; A, 3/2/2017]

20.6.4.8 ANTIDEGRADATION POLICY AND IMPLEMENTATION PLAN:

A. Antidegradation Policy: This antidegradation policy applies to all surface waters of the state.

(1) Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected in all surface waters of the state.

(2) Where the quality of a surface water of the state exceeds levels necessary to support the propagation of fish, shellfish, and wildlife, and recreation in and on the water, that quality shall be maintained and protected unless the commission finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic and social development in the area in which the water is located. In allowing such degradation or lower water quality, the state shall assure water quality adequate to protect existing uses fully. Further, the state shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable BMPs for nonpoint source control. Additionally, the state shall encourage the use of watershed planning as a further means to protect surface waters of the state.

(3) No degradation shall be allowed in waters designated by the commission as outstanding national resource waters (ONRWs), except as provided in Subparagraphs (a) through (e) of this paragraph and in Paragraph (4) of this Subsection A.

(a) After providing a minimum 30-day public review and comment period, the commission determines that allowing temporary and short-term degradation of water quality is necessary to accommodate public health or safety activities in the area in which the ONRW is located. Examples of public health or safety activities include but are not limited to replacement or repair of a water or sewer pipeline or a roadway bridge. In making its decision, the commission shall consider whether the activity will interfere with activities implemented to restore or maintain the chemical, physical or biological integrity of the water. In approving the activity, the commission shall require that:

(i) the degradation shall be limited to the shortest possible time and shall not exceed six months;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate; all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized;

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use in the ONRW; and

(iv) the degradation shall not alter the essential character or special use that makes the water an ORNW.

(b) Prior to the commission making a determination, the department or appropriate oversight agency shall provide a written recommendation to the commission. If the commission approves the activity, the department or appropriate oversight agency shall oversee implementation of the activity.

(c) Where an emergency response action that may result in temporary and short-term degradation to an ONRW is necessary to mitigate an immediate threat to public health or safety, the emergency response action may proceed prior to providing notification required by Subparagraph (a) of this paragraph in accordance with the following:

(i) only actions that mitigate an immediate threat to public health or safety may be undertaken pursuant to this provision; non-emergency portions of the action shall comply with the requirements of Subparagraph (a) of this paragraph;

(ii) the discharger shall make best efforts to comply with requirements (i) through (iv) of Subparagraph (a) of this paragraph;

(iii) the discharger shall notify the department of the emergency response action in writing within seven days of initiation of the action;

(iv) within 30 days of initiation of the emergency response action, the discharger shall provide a summary of the action taken, including all actions taken to comply with requirements (i) through (iv) of Subparagraph (a) of this paragraph.

(d) Preexisting land-use activities, including grazing, allowed by federal or state law prior to designation as an ONRW, and controlled by best management practices (BMPs), shall be allowed to continue so long as there are no new or increased discharges resulting from the activity after designation of the ONRW.

(e) Acequia operation, maintenance, and repairs are not subject to new requirements because of ONRW designation. However, the use of BMPs to minimize or eliminate the introduction of pollutants into receiving waters is strongly encouraged.

(4) This antidegradation policy does not prohibit activities that may result in degradation in surface waters of the state when such activities will result in restoration or maintenance of the chemical, physical or biological integrity of the water.

(a) For ONRWs, the department or appropriate oversight agency shall review on a case-by-case basis discharges that may result in degradation from restoration or maintenance activities, and may approve such activities in accordance with the following:

(i) the degradation shall be limited to the shortest possible time;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate, and all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized;

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use of the surface water; and

(iv) the degradation shall not alter the essential character or special use that makes the water an ORNW.

(b) For surface waters of the state other than ONRWs, the department shall review on a case-by-case basis discharges that may result in degradation from restoration or maintenance activities, and may approve such activities in accordance with the following:

(i) the degradation shall be limited to the shortest possible time;

(ii) the degradation shall be minimized and controlled by best management practices or in accordance with permit requirements as appropriate, and all practical means of minimizing the duration, magnitude, frequency and cumulative effects of such degradation shall be utilized; and

(iii) the degradation shall not result in water quality lower than necessary to protect any existing use of the surface water.

(5) In those cases where potential water quality impairment associated with a thermal discharge is involved, this antidegradation policy and implementing method shall be consistent with Section 316 of the federal Clean Water Act.

(6) In implementing this section, the commission through the appropriate regional offices of the United States environmental protection agency will keep the administrator advised and provided with such information concerning the surface waters of the state as he or she will need to discharge his or her responsibilities under the federal Clean Water Act.

B. **Implementation Plan:** The department, acting under authority delegated by the commission, implements the water quality standards, including the antidegradation policy, by describing specific methods and procedures in the continuing planning process and by establishing and maintaining controls on the discharge of pollutants to surface waters of the state. The steps summarized in the following paragraphs, which may not all be applicable in every water pollution control action, list the implementation activities of the department. These implementation activities are supplemented by detailed antidegradation review procedures developed under the state's continuing planning process. The department:

(1) obtains information pertinent to the impact of the effluent on the receiving water and advises the prospective discharger of requirements for obtaining a permit to discharge;

(2) reviews the adequacy of existing data and conducts a water quality survey of the receiving water in accordance with an annually reviewed, ranked priority list of surface waters of the state requiring total maximum daily loads pursuant to Section 303(d) of the federal Clean Water Act;

(3) assesses the probable impact of the effluent on the receiving water relative to its attainable or designated uses and numeric and narrative criteria;

(4) requires the highest and best degree of wastewater treatment practicable and commensurate with protecting and maintaining the designated uses and existing water quality of surface waters of the state;

(5) develops water quality based effluent limitations and comments on technology based effluent limitations, as appropriate, for inclusion in any federal permit issued to a discharger pursuant to Section 402 of the federal Clean Water Act;

(6) requires that these effluent limitations be included in any such permit as a condition for state certification pursuant to Section 401 of the federal Clean Water Act;

(7) coordinates its water pollution control activities with other constituent agencies of the commission, and with local, state and federal agencies, as appropriate;

(8) develops and pursues inspection and enforcement programs to ensure that dischargers comply with state regulations and standards, and complements EPA's enforcement of federal permits;

(9) ensures that the provisions for public participation required by the New Mexico Water Quality Act and the federal Clean Water Act are followed;

(10) provides continuing technical training for wastewater treatment facility operators through the utility operators training and certification programs;

(11) provides funds to assist the construction of publicly owned wastewater treatment facilities through the wastewater construction program authorized by Section 601 of the federal Clean Water Act, and through funds appropriated by the New Mexico legislature;

(12) conducts water quality surveillance of the surface waters of the state to assess the effectiveness of water pollution controls, determines whether water quality standards are being attained, and proposes amendments to improve water quality standards;

(13) encourages, in conjunction with other state agencies, implementation of the best management practices set forth in the New Mexico statewide water quality management plan and the nonpoint source management program, such implementation shall not be mandatory except as provided by federal or state law;

(14) evaluates the effectiveness of BMPs selected to prevent, reduce or abate sources of water pollutants;

(15) develops procedures for assessing use attainment as required by 20.6.4.15 NMAC and establishing site-specific standards; and

(**16)** develops list of surface waters of the state not attaining designated uses, pursuant to Sections 305(b) and 303(d) of the federal Clean Water Act.

[20.6.4.8 NMAC - Rp 20 NMAC 6.1.1101, 10/12/2000; A, 5/23/2005; A, 8/1/2007; A, 1/14/2011]

20.6.4.9 OUTSTANDING NATIONAL RESOURCE WATERS:

A. Procedures for nominating an ONRW: Any person may nominate a surface water of the state for designation as an ONRW by filing a petition with the commission pursuant to the guidelines for water quality control commission regulation hearings. A petition to designate a surface water of the state as an ONRW shall include:

(1) a map of the surface water of the state, including the location and proposed upstream and downstream boundaries;

(2) a written statement and evidence based on scientific principles in support of the nomination, including specific reference to one or more of the applicable ONRW criteria listed in Subsection B of this section;

(3) water quality data including chemical, physical or biological parameters, if available, to establish a baseline condition for the proposed ONRW;

(4) a discussion of activities that might contribute to the reduction of water quality in the proposed ONRW;

(5) any additional evidence to substantiate such a designation, including a discussion of the economic impact of the designation on the local and regional economy within the state of New Mexico and the benefit to the state; and

(6) affidavit of publication of notice of the petition in a newspaper of general circulation in the affected counties and in a newspaper of general statewide circulation.

B. Criteria for ONRWs: A surface water of the state, or a portion of a surface water of the state, may be designated as an ONRW where the commission determines that the designation is beneficial to the state of New Mexico, and:

(1) the water is a significant attribute of a state special trout water, national or state park, national or state monument, national or state wildlife refuge or designated wilderness area, or is part of a designated wild river under the federal Wild and Scenic Rivers Act; or

(2) the water has exceptional recreational or ecological significance; or

(3) the existing water quality is equal to or better than the numeric criteria for protection of aquatic life and contact uses and the human health-organism only criteria, and the water has not been significantly modified by human activities in a manner that substantially detracts from its value as a natural resource.

C. Pursuant to a petition filed under Subsection A of this section, the commission may classify a surface water of the state or a portion of a surface water of the state as an ONRW if the criteria set out in Subsection B of this section are met.

D. **Waters classified as ONRWs:** The following waters are classified as ONRWs:

(1) Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness; and

(2) the waters within the United States forest service Valle Vidal special management unit including:

(a) Rio Costilla, including Comanche, La Cueva, Fernandez, Chuckwagon, Little Costilla, Powderhouse, Holman, Gold, Grassy, LaBelle and Vidal creeks, from their headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit;

(b) Middle Ponil creek, including the waters of Greenwood Canyon, from their headwaters downstream to the boundary of the Elliott S. Barker wildlife management area;

(c) Shuree lakes;

(d) North Ponil creek, including McCrystal and Seally Canyon creeks, from their headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit; and

(e) Leandro creek from its headwaters downstream to the boundary of the United States forest service Valle Vidal special management unit.

(3) the named perennial surface waters of the state, identified in Subparagraph (a) below, located within United States department of agriculture forest service wilderness. Wilderness are those lands designated by the United States congress as wilderness pursuant to the Wilderness Act. Wilderness areas included in this designation are the Aldo Leopold wilderness, Apache Kid wilderness, Blue Range wilderness, Chama River Canyon wilderness, Cruces Basin wilderness, Dome wilderness, Gila wilderness, Latir Peak wilderness, Pecos wilderness, San Pedro Parks wilderness, Wheeler Peak wilderness, and White Mountain wilderness.

(a) The following waters are designated in the Rio Grande basin:

(i) in the Aldo Leopold wilderness: Byers Run, Circle Seven creek, Flower canyon, Holden Prong, Indian canyon, Las Animas creek, Mud Spring canyon, North Fork Palomas creek, North Seco creek, Pretty canyon, Sids Prong, South Animas canyon, Victorio Park canyon, Water canyon;

(ii) in the Apache Kid wilderness Indian creek and Smith canyon;

(iii) in the Chama River Canyon wilderness: Chavez canyon, Ojitos canyon, Rio Chama;

(iv) in the Cruces Basin wilderness: Beaver creek, Cruces creek, Diablo creek, Escondido creek, Lobo creek, Osha creek;

(v) in the Dome wilderness: Capulin creek, Medio creek, Sanchez canyon/creek;

(vi) in the Latir Peak wilderness: Bull creek, Bull Creek lake, Heart lake, Lagunitas Fork, Lake Fork creek, Rito del Medio, Rito Primero, West Latir creek;

(vii) in the Pecos wilderness: Agua Sarca, Hidden lake, Horseshoe lake (Alamitos), Jose Vigil lake, Nambe lake, Nat lake IV, No Fish lake, North Fork Rio Quemado, Rinconada, Rio Capulin, Rio de las Trampas (Trampas creek), Rio de Truchas, Rio Frijoles, Rio Medio, Rio Molino, Rio Nambe, Rio San Leonardo, Rito con Agua, Rito Gallina, Rito Jaroso, Rito Quemado, San Leonardo lake, Santa Fe lake, Santa Fe river, Serpent lake, South Fork Rio Quemado, Trampas lake (East), Trampas lake (West);

(viii) in the San Pedro Parks wilderness: Agua Sarca, Cañon Madera, Cave creek, Cecilia Canyon creek, Clear creek (North SPP), Clear creek (South SPP), Corralitos creek, Dove creek, Jose Miguel creek, La Jara creek, Oso creek, Rio Capulin, Rio de las Vacas, Rio Gallina, Rio Puerco de Chama, Rito Anastacio East, Rito Anastacio West, Rito de las Palomas, Rito de las Perchas, Rito de los Pinos, Rito de los Utes, Rito Leche, Rito Redondo, Rito Resumidero, San Gregorio lake;

(ix) in the Wheeler Peak wilderness: Black Copper canyon, East Fork Red river, Elk lake, Horseshoe lake, Lost lake, Sawmill creek, South Fork lake, South Fork Rio Hondo, Williams lake.

(b) The following waters are designated in the Pecos River basin:

(i) in the Pecos wilderness: Albright creek, Bear creek, Beatty creek, Beaver creek, Carpenter creek, Cascade canyon, Cave creek, El Porvenir creek, Hollinger creek, Holy Ghost creek, Horsethief creek, Jack's creek, Jarosa canyon/creek, Johnson lake, Lake Katherine, Lost Bear lake, Noisy brook, Panchuela creek, Pecos Baldy lake, Pecos river, Rio Mora, Rio Valdez, Rito Azul, Rito de los Chimayosos, Rito de los Esteros, Rito del Oso, Rito del Padre, Rito las Trampas, Rito Maestas, Rito Oscuro, Rito Perro, Rito Sebadilloses, South Fork Bear creek, South Fork Rito Azul, Spirit lake, Stewart lake, Truchas lake (North), Truchas lake (South), Winsor creek;

(ii) in the White Mountain wilderness: Argentina creek, Aspen creek, Bonito creek, Little Bonito creek, Mills canyon/creek, Rodamaker creek, South Fork Rio Bonito, Turkey canyon/creek.

(c) The following waters are designated in the Gila River basin:

(i) in the Aldo Leopold wilderness: Aspen canyon, Black Canyon creek, Bonner canyon, Burnt canyon, Diamond creek, Falls canyon, Fisherman canyon, Running Water canyon, South Diamond creek;

(ii) in the Gila wilderness: Apache creek, Black Canyon creek, Brush canyon, Canyon creek, Chicken Coop canyon, Clear creek, Cooper canyon, Cow creek, Cub creek, Diamond creek, East Fork Gila river, Gila river, Gilita creek, Indian creek, Iron creek, Langstroth canyon, Lilley canyon, Little creek, Little Turkey creek, Lookout canyon, McKenna creek, Middle Fork Gila river, Miller Spring canyon, Mogollon creek, Panther canyon, Prior creek, Rain creek, Raw Meat creek, Rocky canyon, Sacaton creek, Sapillo creek, Sheep Corral canyon, Skeleton canyon, Squaw creek, Sycamore canyon, Trail canyon, Trail creek, Trout creek, Turkey creek, Turkey Feather creek, Turnbo canyon, West Fork Gila river, West Fork Mogollon creek, White creek, Willow creek, Woodrow canyon.

(d) The following waters are designated in the Canadian River basin: in the Pecos wilderness Daily creek, Johns canyon, Middle Fork Lake of Rio de la Casa, Middle Fork Rio de la Casa, North Fork Lake of Rio de la Casa, Rito de Gascon, Rito San Jose, Sapello river, South Fork Rio de la Casa, Sparks creek (Manuelitas creek).

(e) The following waters are designated in the San Francisco River basin:

(i) in the Blue Range wilderness: Pueblo creek;

(ii) in the Gila wilderness: Big Dry creek, Lipsey canyon, Little Dry creek, Little Whitewater creek, South Fork Whitewater creek, Spider creek, Spruce creek, Whitewater creek.

(f) The following waters are designated in the Mimbres Closed basin: in the Aldo Leopold wilderness Corral canyon, Mimbres river, North Fork Mimbres river, South Fork Mimbres river.

(g) The following waters are designated in the Tularosa Closed basin: in the White Mountain wilderness Indian creek, Nogal Arroyo, Three Rivers.

(h) The wetlands designated are identified on the *Maps and List of Wetlands Within United States Forest Service Wilderness Areas Designated as Outstanding National Resource Waters* published at the New Mexico state library and available on the department's website.

[20.6.4.9 NMAC - Rn, Subsections B, C and D of 20.6.4.8 NMAC, 5/23/2005; A, 5/23/2005; A, 7/17/2005; A, 2/16/2006; A, 12/1/2010; A, 1/14/2011]

20.6.4.10 REVIEW OF STANDARDS; NEED FOR ADDITIONAL STUDIES:

A. Section 303(c)(1) of the federal Clean Water Act requires that the state hold public hearings at least once every three years for the purpose of reviewing water quality standards and proposing, as appropriate, necessary revisions to water quality standards.

B. It is recognized that, in some cases, numeric criteria have been adopted that reflect use designations rather than existing conditions of surface waters of the state. Narrative criteria are required for many constituents because accurate data on background levels are lacking. More intensive water quality monitoring may identify surface waters of the state where existing quality is considerably better than the established criteria. When justified by sufficient data and information, the water quality criteria will be modified to protect the attainable uses.

C. It is also recognized that contributions of water contaminants by diffuse nonpoint sources of water pollution may make attainment of certain criteria difficult. Revision of these criteria may be necessary as new information is obtained on nonpoint sources and other problems unique to semi-arid regions.

D. Site-specific criteria.

(1) The commission may adopt site-specific numeric criteria applicable to all or part of a surface water of the state based on relevant site-specific conditions such as:

(a) actual species at a site are more or less sensitive than those used in the national criteria data set;

(b) physical or chemical characteristics at a site such as pH or hardness alter the biological availability and/or toxicity of the chemical;

(c) physical, biological or chemical factors alter the bioaccumulation potential of a chemical;

(d) the concentration resulting from natural background exceeds numeric criteria for aquatic life, wildlife habitat or other uses if consistent with Subsection E of 20.6.4.10 NMAC; or

(e) other factors or combination of factors that upon review of the commission may warrant modification of the default criteria, subject to EPA review and approval.

(2) Site-specific criteria must fully protect the designated use to which they apply. In the case of human health-organism only criteria, site-specific criteria must fully protect human health when organisms are consumed from waters containing pollutants.

(3) Any person may petition the commission to adopt site-specific criteria. A petition for the adoption of site-specific criteria shall:

(a) identify the specific waters to which the site-specific criteria would apply;

(b) explain the rationale for proposing the site-specific criteria;

(c) describe the methods used to notify and solicit input from potential stakeholders and from the general public in the affected area, and present and respond to the public input received;

(d) present and justify the derivation of the proposed criteria.

(4) A derivation of site-specific criteria shall rely on a scientifically defensible method, such as one of the following:

(a) the recalculation procedure, the water-effect ratio for metals procedure or the resident species procedure as described in the water quality standards handbook (EPA-823-B-94-005a, 2nd edition, August 1994);

(b) the streamlined water-effect ratio procedure for discharges of copper (EPA-822-R-01-005, March 2001);

(c) the biotic ligand model as described in aquatic life ambient freshwater quality criteria - copper (EPA-822-R-07-001, February 2007);

(d) the methodology for deriving ambient water quality criteria for the protection of human health (EPA-822-B-00-004, October 2000) and associated technical support documents; or

(e) a determination of the natural background of the water body as described in Subsection E of 20.6.4.10 NMAC.

E. **Site-specific criteria based on natural background.** The commission may adopt site-specific criteria equal to the concentration resulting from natural background where that concentration protects the designated use. The concentration resulting from natural background supports the level of aquatic life and wildlife habitat expected to occur naturally at the site absent any interference by humans. Domestic water supply, primary or secondary contact, or human health-organism only criteria shall not be modified based on natural background. A determination of natural background shall:

(1) consider natural spatial and seasonal to interannual variability as appropriate;

(2) document the presence of natural sources of the pollutant;

(3) document the absence of human sources of the pollutant or quantify the human contribution; and

(4) rely on analytical, statistical or modeling methodologies to quantify the natural background.

F. **Temporary standards:**

(1) Any person may petition the commission to adopt a temporary standard applicable to all or part of a surface water of the state as provided for in this section and applicable sections in 40 CFR Part 131, Water Quality Standards; specifically, Section 131.14. The commission may adopt a proposed temporary standard if the petitioner demonstrates that:

(a) attainment of the associated designated use may not be feasible in the short term due to one or more of the factors listed in 40 CFR 131.10(g), or due to the implementation of actions necessary to facilitate restoration such as through dam removal or other significant wetland or water body reconfiguration activities as demonstrated by the petition and supporting work plan requirements in Paragraphs (4) and (5) of Subsection F of 20.6.4.10 NMAC;

(b) the proposed temporary standard represents the highest degree of protection feasible in the short term, limits the degradation of water quality to the minimum necessary to achieve the original standard by the expiration date of the temporary standard, and adoption will not cause the further impairment or loss of an existing use;

(c) for point sources, existing or proposed discharge control technologies will comply with applicable technology-based limitations and feasible technological controls and other management alternatives, such as a pollution prevention program; and

(d) for restoration activities, nonpoint source or other control technologies shall limit downstream impacts, and if applicable, existing or proposed discharge control technologies shall be in place consistent with Subparagraph (c) of Paragraph (1) of Subsection F of 20.6.4.10 NMAC.

(2) A temporary standard shall apply to specific designated use(s), pollutant(s), or permittee(s), and to specific water body segment(s). The adoption of a temporary standard does not exempt dischargers from complying with all other applicable water quality standards or control technologies.

(3) Designated use attainment as reported in the federal Clean Water Act, Section 305(b)/303(d) Integrated Report shall be based on the original standard and not on a temporary standard.

(4) A petition for a temporary standard shall:

(a) identify the currently applicable standard(s), the proposed temporary standard for the specific pollutant(s), the permittee(s), and the specific surface water body segment(s) of the state to which the temporary standard would apply;

(b) include the basis for any factor(s) specific to the applicability of the temporary standard (for example critical flow under Subsection B of 20.6.4.11 NMAC);

(c) demonstrate that the proposed temporary standard meets the requirements in this subsection;

(d) present a work plan with timetable of proposed actions for achieving compliance with the original standard in accordance with Paragraph (5) of Subsection F of 20.6.4.10 NMAC;

(e) include any other information necessary to support the petition.

(5) As a condition of a petition for a temporary standard, in addition to meeting the requirements in this Subsection, the petitioner shall prepare a work plan in accordance with Paragraph (4) of Subsection F of 20.6.4.10 NMAC and submit the work plan to the department for review and comment. The work plan shall identify the factor(s) listed in 40 CFR 131.10(g) or Subparagraph (a) of Paragraph (1) of Subsection F of 20.6.4.10 NMAC affecting attainment of the standard that will be analyzed and the timeline for proposed actions to be taken to achieve the uses attainable over the term of the temporary standard, including baseline water quality, and any investigations, projects, facility modifications, monitoring, or other measures necessary to achieve compliance with the original standard. The work plan shall include provisions for review of progress in accordance with Paragraph (8) of Subsection F of 20.6.4.10 NMAC, public notice and consultation with appropriate state, tribal, local and federal agencies.

(6) The commission may condition the approval of a temporary standard by requiring additional monitoring, relevant analyses, the completion of specified projects, submittal of information, or any other actions.

(7) Temporary standards may be implemented only after a public hearing before the commission, commission approval and adoption pursuant to Subsection F of 20.6.4.10 NMAC for all state purposes, and the federal Clean Water Act Section 303 (c) approval for any federal action.

(8) All temporary standards are subject to a required review during each succeeding review of water quality standards conducted in accordance with Subsection A of 20.6.4.10 NMAC. The petitioner shall provide a written report to the commission documenting the progress of proposed actions, pursuant to a reporting schedule stipulated in the approved temporary standard. The purpose of the review is to determine progress consistent with the original conditions of the petition for the duration of the temporary standard. If the petitioner cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard.

(9) The commission may consider a petition to extend a temporary standard. The effective period of a temporary standard shall be extended only if demonstrated to the commission that the factors precluding attainment of the underlying standard still apply, that the petitioner is meeting the conditions required for approval of the temporary standard, and that reasonable progress towards meeting the underlying standard is being achieved.

(10) A temporary standard shall expire no later than the date specified in the approval of the temporary standard. Upon expiration of a temporary standard, the original standard becomes applicable.

(11) Temporary standards shall be identified in 20.6.4.97-899 NMAC as appropriate for the surface water affected.

(12) "Temporary standard" means a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the temporary standard.
[20.6.4.10 NMAC - Rp 20 NMAC 6.1.1102, 10/12/2000; Rn, 20.6.4.9 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.11 APPLICABILITY OF WATER QUALITY STANDARDS:

A. [RESERVED]

B. Critical low flow: The critical low flow of a stream at a particular site shall be used in developing point source discharge permit requirements to meet numeric criteria set in 20.6.4.97 through 20.6.4.900 NMAC and Subsection F of 20.6.4.13 NMAC.

(1) For human health-organism only criteria, the critical low flow is the harmonic mean flow; "harmonic mean flow" is the number of daily flow measurements divided by the sum of the reciprocals of the flows; that is, it is the reciprocal of the mean of reciprocals. For ephemeral waters the calculation shall be based upon the nonzero flow intervals and modified by including a factor to adjust for the proportion of intervals with zero flow. The equations are as follows:

$$\text{Harmonic Mean} = \frac{n}{\sum 1/Q}$$

where n = number of flow values
and Q = flow value

$$\text{Modified Harmonic Mean} = \left[\frac{\sum_{i=1}^{Nt-N_0} \frac{1}{Qi}}{Nt - N_0} \right]^{-1} x \left[\frac{Nt - N_0}{Nt} \right]$$

where Qi = nonzero flow
Nt = total number of flow values
and N_0 = number of zero flow values

(2) For all other narrative and numeric criteria, the critical low flow is the minimum average four consecutive day flow that occurs with a frequency of once in three years (4Q3). The critical low flow may be determined on an annual, a seasonal or a monthly basis, as appropriate, after due consideration of site-specific conditions.

C. Guaranteed minimum flow: The commission may allow the use of a contractually guaranteed minimum streamflow in lieu of a critical low flow determined under Subsection B of this section on a case-by-case basis and upon consultation with the interstate stream commission. Should drought, litigation or any other reason interrupt or interfere with minimum flows under a guaranteed minimum flow contract for a period of at least 30 consecutive days, such permission, at the sole discretion of the commission, may then be revoked. Any minimum flow specified under such revoked permission shall be superseded by a critical low flow determined under Subsection B of this section. A public notice of the request for a guaranteed minimum flow shall be published in a newspaper of general circulation by the department at least 30 days prior to scheduled action by the commission. These water quality standards do not grant to the commission or any other entity the power to create, take away or modify property rights in water.

D. Mixing zones: A limited mixing zone, contiguous to a point source wastewater discharge, may be allowed in any stream receiving such a discharge. Mixing zones serve as regions of initial dilution that allow the application of a dilution factor in calculations of effluent limitations. Effluent limitations shall be developed that will protect the most sensitive existing, designated or attainable use of the receiving water.

E. Mixing zone limitations: Wastewater mixing zones, in which the numeric criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC or 20.6.4.900 NMAC may be exceeded, shall be subject to the following limitations:

(1) Mixing zones are not allowed for discharges to lakes, reservoirs, or playas; these effluents shall meet all applicable criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC and 20.6.4.900 NMAC at the point of discharge.

(2) The acute aquatic life criteria, as set out in Subsection I, Subsection J, and Subsection K of 20.6.4.900 NMAC, shall be attained at the point of discharge for any discharge to a surface water of the state with a designated aquatic life use.

(3) The general criteria set out in Subsections A, B, C, D, E, G, H and J of 20.6.4.13 NMAC, and the provision set out in Subsection D of 20.6.4.14 NMAC are applicable within mixing zones.

(4) The areal extent and concentration isopleths of a particular mixing zone will depend on site-specific conditions including, but not limited to, wastewater flow, receiving water critical low flow, outfall design, channel characteristics and climatic conditions and, if needed, shall be determined on a case-by-case basis. When the physical boundaries or other characteristics of a particular mixing zone must be known, the methods presented in Section 4.4.5, "Ambient-induced mixing," in "Technical support document for water quality-based toxics control" (March 1991, EPA/505/2-90-001) shall be used.

(5) All applicable water quality criteria set under Subsection F of 20.6.4.13 NMAC, 20.6.4.97 through 20.6.4.899 NMAC and 20.6.4.900 NMAC shall be attained at the boundaries of mixing zones. A continuous zone of passage through or around the mixing zone shall be maintained in which the water quality meets all applicable criteria and allows the migration of aquatic life presently common in surface waters of the state with no effect on their populations.

F. **Multiple uses:** When a surface water of the state has more than a single designated use, the applicable numeric criteria shall be the most stringent of those established for such water.

G. Human health-organism only criteria in Subsection J of 20.6.4.900 NMAC apply to those waters with a designated, existing or attainable aquatic life use. When limited aquatic life is a designated use, the human health-organism only criteria apply only if adopted on a segment-specific basis. The human health-organism only criteria for persistent toxic pollutants, as identified in Subsection J of 20.6.4.900 NMAC, also apply to all tributaries of waters with a designated, existing or attainable aquatic life use.

H. **Unclassified waters of the state:** Unclassified waters of the state are those surface waters of the state not identified in 20.6.4.101 through 20.6.4.899 NMAC. An unclassified surface water of the state is presumed to support the uses specified in Section 101(a)(2) of the federal Clean Water Act. As such, it is subject to 20.6.4.98 NMAC if nonperennial or subject to 20.6.4.99 NMAC if perennial. The commission may include an ephemeral unclassified surface water of the state under 20.6.4.97 NMAC only if a use attainability analysis demonstrates pursuant to 20.6.4.15 NMAC that attainment of Section 101(a)(2) uses is not feasible.

I. **Exceptions:** Numeric criteria for temperature, dissolved solids, dissolved oxygen, sediment or turbidity adopted under the Water Quality Act do not apply when changes in temperature, dissolved solids, dissolved oxygen, sediment or turbidity in a surface water of the state are attributable to:

(1) natural causes (discharges from municipal separate storm sewers are not covered by this exception.); or

(2) the reasonable operation of irrigation and flood control facilities that are not subject to federal or state water pollution control permitting; major reconstruction of storage dams or diversion dams except for emergency actions necessary to protect health and safety of the public are not covered by this exception.
[20.6.4.11 NMAC - Rp 20 NMAC 6.1.1103, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.10 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010]

20.6.4.12 COMPLIANCE WITH WATER QUALITY STANDARDS: The following provisions apply to determining compliance for enforcement purposes; they do not apply for purposes of determining attainment of uses. The department has developed assessment protocols for the purpose of determining attainment of uses that are available for review from the department's surface water quality bureau.

A. Compliance with acute water quality criteria shall be determined from the analytical results of a single grab sample. Acute criteria shall not be exceeded.

B. Compliance with chronic water quality criteria shall be determined from the arithmetic mean of the analytical results of samples collected using applicable protocols. Chronic criteria shall not be exceeded more than once every three years.

C. Compliance with water quality standards for total ammonia shall be determined by performing the biomonitoring procedures set out in Subsections D and E of 20.6.4.14 NMAC, or by attainment of applicable ammonia criteria set out in Subsections K, L and M of 20.6.4.900 NMAC.

NMED EXHIBIT 1A

D. Compliance with the human health-organism only criteria shall be determined from the analytical results of representative grab samples, as defined in the water quality management plan. Human health-organism only criteria shall not be exceeded.

E. The commission may establish a numeric water quality criterion at a concentration that is below the minimum quantification level. In such cases, the water quality standard is enforceable at the minimum quantification level.

F. For compliance with hardness-dependent numeric criteria, dissolved hardness (as mg $CaCO_3$/L) shall be determined from a sample taken at the same time that the sample for the contaminant is taken.

G. **Compliance schedules**: It shall be the policy of the commission to allow on a case-by-case basis the inclusion of a schedule of compliance in a NPDES permit issued to an existing facility. Such schedule of compliance will be for the purpose of providing a permittee with adequate time to make treatment facility modifications necessary to comply with water quality based permit limitations determined to be necessary to implement new or revised water quality standards or wasteload allocation. Compliance schedules may be included in NPDES permits at the time of permit renewal or modification and shall be written to require compliance at the earliest practicable time. Compliance schedules shall also specify milestone dates so as to measure progress towards final project completion (e.g., design completion, construction start, construction completion, date of compliance).

H. It is a policy of the commission to allow a temporary standard approved and adopted pursuant to Subsection F of 20.6.4.10 NMAC to be included in the applicable federal Clean Water Act permit as enforceable limits and conditions. The temporary standard and any schedule of actions may be included at the earliest practicable time, and shall specify milestone dates so as to measure progress towards meeting the original standard.
[20.6.4.12 NMAC - Rp 20 NMAC 6.1.1104, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.11 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.13 GENERAL CRITERIA: General criteria are established to sustain and protect existing or attainable uses of surface waters of the state. These general criteria apply to all surface waters of the state at all times, unless a specified criterion is provided elsewhere in this part. Surface waters of the state shall be free of any water contaminant in such quantity and of such duration as may with reasonable probability injure human health, animal or plant life or property, or unreasonably interfere with the public welfare or the use of property.

A. **Bottom deposits and suspended or settleable solids:**

(1) Surface waters of the state shall be free of water contaminants including fine sediment particles (less than two millimeters in diameter), precipitates or organic or inorganic solids from other than natural causes that have settled to form layers on or fill the interstices of the natural or dominant substrate in quantities that damage or impair the normal growth, function or reproduction of aquatic life or significantly alter the physical or chemical properties of the bottom.

(2) Suspended or settleable solids from other than natural causes shall not be present in surface waters of the state in quantities that damage or impair the normal growth, function or reproduction of aquatic life or adversely affect other designated uses.

B. **Floating solids, oil and grease:** Surface waters of the state shall be free of oils, scum, grease and other floating materials resulting from other than natural causes that would cause the formation of a visible sheen or visible deposits on the bottom or shoreline, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life.

C. **Color:** Color-producing materials resulting from other than natural causes shall not create an aesthetically undesirable condition nor shall color impair the use of the water by desirable aquatic life presently common in surface waters of the state.

D. **Organoleptic quality:**

(1) **Flavor of fish:** Water contaminants from other than natural causes shall be limited to concentrations that will not impart unpalatable flavor to fish.

(2) **Odor and taste of water:** Water contaminants from other than natural causes shall be limited to concentrations that will not result in offensive odor or taste arising in a surface water of the state or otherwise interfere with the reasonable use of the water.

E. **Plant nutrients:** Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.

F. **Toxic pollutants:**

(1) Except as provided in 20.6.4.16 NMAC, surface waters of the state shall be free of toxic pollutants from other than natural causes in amounts, concentrations or combinations that affect the propagation of fish or that are toxic to humans, livestock or other animals, fish or other aquatic organisms, wildlife using aquatic environments for habitation or aquatic organisms for food, or that will or can reasonably be expected to bioaccumulate in tissues of fish, shellfish and other aquatic organisms to levels that will impair the health of aquatic organisms or wildlife or result in unacceptable tastes, odors or health risks to human consumers of aquatic organisms.

(2) Pursuant to this section, the human health-organism only criteria shall be as set out in 20.6.4.900 NMAC. When a human health-organism only criterion is not listed in 20.6.4.900 NMAC, the following provisions shall be applied in accordance with 20.6.4.11, 20.6.4.12 and 20.6.4.14 NMAC.

(a) The human health-organism only criterion shall be the recommended human health criterion for "consumption of organisms only" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act. In determining such criterion for a cancer-causing toxic pollutant, a cancer risk of 10^{-5} (one cancer per 100,000 exposed persons) shall be used.

(b) When a numeric criterion for the protection of human health for the consumption of organism only has not been published by the U.S. environmental protection agency, a quantifiable criterion may be derived from data available in the U.S. environmental protection agency's Integrated Risk Information System (IRIS) using the appropriate formula specified in *Methodology For Deriving Ambient Water Quality Criteria For The Protection Of Human Health (2000)*, EPA-822-B-00-004.

(3) Pursuant to this section, the chronic aquatic life criteria shall be as set out in 20.6.4.900 NMAC. When a chronic aquatic life criterion is not listed in 20.6.4.900 NMAC, the following provisions shall be applied in sequential order in accordance with 20.6.4.11, 20.6.4.12 and 20.6.4.14 NMAC.

(a) The chronic aquatic life criterion shall be the "freshwater criterion continuous concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act;

(b) If the U.S. environmental protection agency has not published a chronic aquatic life criterion, a geometric mean LC-50 value shall be calculated for the particular species, genus or group that is representative of the form of life to be preserved, using the results of toxicological studies published in scientific journals.

(i) The chronic aquatic life criterion for a toxic pollutant that does not bioaccumulate shall be ten percent of the calculated geometric mean LC-50 value; and

(ii) The chronic aquatic life criterion for a toxic pollutant that does bioaccumulate shall be: the calculated geometric mean LC-50 adjusted by a bioaccumulation factor for the particular species, genus or group representative of the form of life to be preserved, but when such bioaccumulation factor has not been published, the criterion shall be one percent of the calculated geometric mean LC-50 value.

(4) Pursuant to this section, the acute aquatic life criteria shall be as set out in 20.6.4.900 NMAC. When an acute aquatic life criterion is not listed in 20.6.4.900 NMAC, the acute aquatic life criterion shall be the "freshwater criterion maximum concentration" published by the U.S. environmental protection agency pursuant to Section 304(a) of the federal Clean Water Act.

(5) Within 90 days of the issuance of a final NPDES permit containing a numeric criterion selected or calculated pursuant to Paragraph 2, Paragraph 3 or Paragraph 4 of Subsection F of this section, the department shall petition the commission to adopt such criterion into these standards.

G. Radioactivity: The radioactivity of surface waters of the state shall be maintained at the lowest practical level and shall in no case exceed the criteria set forth in the New Mexico Radiation Protection Regulations, 20.3.1 and 20.3.4 NMAC.

H. Pathogens: Surface waters of the state shall be free of pathogens from other than natural causes in sufficient quantity to impair public health or the designated, existing or attainable uses of a surface water of the state.

I. Temperature: Maximum temperatures for surface waters of the state have been specified in 20.6.4.97 through 20.6.4.900 NMAC. However, the introduction of heat by other than natural causes shall not increase the temperature, as measured from above the point of introduction, by more than 2.7°C (5°F) in a stream, or more than 1.7°C (3°F) in a lake or reservoir. In no case will the introduction of heat be permitted when the maximum temperature specified for the reach would thereby be exceeded. These temperature criteria shall not apply to impoundments constructed offstream for the purpose of heat disposal. High water temperatures caused by unusually high ambient air temperatures are not violations of these criteria.

J. Turbidity: Turbidity attributable to other than natural causes shall not reduce light transmission to the point that the normal growth, function or reproduction of aquatic life is impaired or that will cause substantial visible contrast with the natural appearance of the water. Activities or discharges shall not cause turbidity to increase more than 10 NTU over background turbidity when the background turbidity, measured at a point immediately upstream of the activity, is 50 NTU or less, nor to increase more than twenty percent when the background turbidity is more than 50 NTU. However, limited-duration turbidity increases caused by dredging, construction or other similar activities may be allowed provided all practicable turbidity control techniques have been applied and all appropriate permits, certifications and approvals have been obtained.

K. **Total dissolved solids (TDS):** TDS attributable to other than natural causes shall not damage or impair the normal growth, function or reproduction of animal, plant or aquatic life. TDS shall be measured by either the "calculation method" (sum of constituents) or the filterable residue method. Approved test procedures for these determinations are set forth in 20.6.4.14 NMAC.

L. **Dissolved gases:** Surface waters of the state shall be free of nitrogen and other dissolved gases at levels above one hundred ten percent saturation when this supersaturation is attributable to municipal, industrial or other discharges.

M. **Biological integrity:** Surface waters of the state shall support and maintain a balanced and integrated community of aquatic organisms with species composition, diversity and functional organization comparable to those of natural or minimally impacted water bodies of a similar type and region.

[20.6.4.13 NMAC - Rp 20 NMAC 6.1.1105, 10/12/2000; A, 10/11/2002; Rn, 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005; A, 12/1/2010]

20.6.4.14 SAMPLING AND ANALYSIS:

A. Sampling and analytical techniques shall conform with methods described in the following references unless otherwise specified by the commission pursuant to a petition to amend these standards:

(1) "*Guidelines Establishing Test Procedures For The Analysis Of Pollutants Under The Clean Water Act*," 40 CFR Part 136 or any test procedure approved or accepted by EPA using procedures provided in 40 CFR Parts 136.3(d), 136.4, and 136.5;

(2) *Standard Methods For The Examination Of Water And Wastewater*, latest edition, American public health association;

(3) *Methods For Chemical Analysis Of Water And Waste*, and other methods published by EPA office of research and development or office of water;

(4) *Techniques Of Water Resource Investigations Of The U.S. Geological Survey*;

(5) *Annual Book Of ASTM Standards*: volumes 11.01 and 11.02, water (I) and (II), latest edition, ASTM international;

(6) *Federal Register*, latest methods published for monitoring pursuant to Resource Conservation and Recovery Act regulations;

(7) *National Handbook Of Recommended Methods For Water-Data Acquisition*, latest edition, prepared cooperatively by agencies of the United States government under the sponsorship of the U.S. geological survey; or

(8) *Federal Register*, latest methods published for monitoring pursuant to the Safe Drinking Water Act regulations.

B. **Bacteriological Surveys:** The monthly geometric mean shall be used in assessing attainment of criteria when a minimum of five samples is collected in a 30-day period.

C. **Sampling Procedures:**

(1) Streams: Stream monitoring stations below discharges shall be located a sufficient distance downstream to ensure adequate vertical and lateral mixing.

(2) Lakes: Sampling stations in lakes shall be located at least 250 feet from a discharge.

(3) Lakes: Except for the restriction specified in Paragraph (2) of this subsection, lake sampling stations shall be located at any site where the attainment of a water quality criterion is to be assessed. Water quality measurements taken at intervals in the entire water column at a sampling station shall be averaged for the epilimnion, or in the absence of an epilimnion, for the upper one-third of the water column of the lake to determine attainment of criteria, except that attainment of criteria for toxic pollutants shall be assessed during periods of complete vertical mixing, e.g., during spring or fall turnover, or by taking depth-integrated composite samples of the water column.

D. Acute toxicity of effluent to aquatic life shall be determined using the procedures specified in U.S. environmental protection agency "*Methods For Measuring The Acute Toxicity Of Effluents And Receiving Waters To Freshwater And Marine Organisms*" (5th Ed., 2002, EPA 821-R-02-012), or latest edition thereof if adopted by EPA at 40 CFR Part 136, which is incorporated herein by reference. Acute toxicities of substances shall be determined using at least two species tested in whole effluent and a series of effluent dilutions. Acute toxicity due to discharges shall not occur within the wastewater mixing zone in any surface water of the state with an existing or designated aquatic life use.

E. Chronic toxicity of effluent or ambient surface waters of the state to aquatic life shall be determined using the procedures specified in U.S. environmental protection agency "*Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Waters To Freshwater Organisms*" (4th Ed., 2002, EPA 821-R-02-013), or latest edition thereof if adopted by EPA at 40 CFR Part 136, which is incorporated herein by reference. Chronic toxicities of substances shall be determined using at least two species tested in ambient surface water or whole effluent and a series of effluent dilutions. Chronic toxicity due to discharges shall not occur at the critical low flow, or any flow greater than the critical low flow, in any surface water of the state with an existing or designated aquatic life use more than once every three years.

[20.6.4.14 NMAC - Rp 20 NMAC 6.1.1106, 10/12/2000; Rn, 20.6.4.13 NMAC, 5/23/2005 & A, 5/23/2005; A, 12/1/2010]

20.6.4.15 USE ATTAINABILITY ANALYSIS:

A. A use attainability analysis is a scientific study conducted for the purpose of assessing the factors affecting the attainment of a use. Whenever a use attainability analysis is conducted, it shall be subject to the requirements and limitations set forth in 40 CFR Part 131, Water Quality Standards; specifically, Subsections 131.3(g), 131.10(g), 131.10(h) and 131.10(j) shall be applicable.

(1) The commission may remove a designated use specified in Section 101(a)(2) of the federal Clean Water Act or adopt subcategories of a Section 101(a)(2) use requiring less stringent criteria only if a use attainability analysis demonstrates that attaining the use is not feasible because of a factor listed in 40 CFR 131.10(g). Section 101(a)(2) uses, which refer to the protection and propagation of fish, shellfish and wildlife and recreation in and on the water, are also specified in Subsection B of 20.6.4.6 NMAC.

(2) A designated use cannot be removed if it is an existing use unless a use requiring more stringent criteria is designated.

B. A use attainability analysis shall assess the physical, chemical, biological, economic or other factors affecting the attainment of a use. The analysis shall rely on scientifically defensible methods such as the methods described in the following documents:

(1) *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses*, volume I (November 1983) and volume III (November 1984) or latest editions, United States environmental protection agency, office of water, regulations and standards, Washington, D.C., for the evaluation of aquatic life or wildlife uses;

(2) the department's *Hydrology Protocol*, latest edition, approved by the commission, for identifying ephemeral and intermittent waters; or

(3) *Interim Economic Guidance For Water Quality Standards - Workbook*, March 1995, United States environmental protection agency, office of water, Washington, D.C. for evaluating economic impacts.

C. If a use attainability analysis based on the department's *Hydrology Protocol* (latest edition), approved by the commission, demonstrates to the satisfaction of the department that Section 101(a)(2) uses are not feasible in an ephemeral water body, the department shall post the use attainability analysis on its water quality standards website and notify its interested parties list of a 30-day public comment period. After reviewing any comments received, the department may proceed by submitting the use attainability analysis and response to comments to region 6 EPA for technical approval. If technical approval is granted, the water shall be subject to 20.6.4.97 NMAC. The use attainability analysis, the technical approval, and the applicability of 20.6.4.97 NMAC to the water shall be posted on the department's water quality standards website. The department shall periodically petition the commission to list ephemeral waters under Subsection C of 20.6.4.97 NMAC and to incorporate changes to classified segments as appropriate.

D. **Use attainability analysis conducted by an entity other than the department.** Any person may submit notice to the department stating the intent to conduct a use attainability analysis. The proponent shall develop a work plan to conduct the use attainability analysis and shall submit the work plan to the department and region 6 EPA for review and comment. The work plan shall identify the scope of data currently available and the scope of data to be gathered, the factors affecting use attainment that will be analyzed and provisions for public notice and consultation with appropriate state and federal agencies. Upon approval of the work plan by the department, the proponent shall conduct the use attainability analysis in accordance with the approved work plan. The cost of such analysis shall be the responsibility of the proponent. Upon completion of the use attainability analysis, the proponent shall submit the data, findings and conclusions to the department. The department or the

proponent may petition the commission to modify the designated use if the conclusions of the analysis support such action.
[20.6.4.15 NMAC - Rp 20 NMAC 6.1.1107, 10/12/2000; Rn, 20.6.4.14 NMAC, 5/23/2005; A, 5/23/2005; A, 7/17/2005; A, 12/1/2010]

20.6.4.16 PLANNED USE OF A PISCICIDE: The use of a piscicide registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. Section 136 *et seq*., and under the New Mexico Pesticide Control Act (NMPCA), Section 76-4-1 *et seq*. NMSA 1978 (1973) in a surface water of the state, shall not be a violation of Subsection F of 20.6.4.13 NMAC when such use is covered by a federal national pollutant discharge elimination system (NPDES) permit or has been approved by the commission under procedures provided in this section. The use of a piscicide which is covered by a NPDES permit shall require no further review by the commission and the person whose application is covered by the NPDES permit shall meet the additional notification and monitoring requirements outlined in Subsection G of 20.6.4.16 NMAC. The commission may approve the reasonable use of a piscicide under this section if the proposed use is not covered by a NPDES permit to further a Clean Water Act objective to restore and maintain the physical or biological integrity of surface waters of the state, including restoration of native species.

A. Any person seeking commission approval of the use of a piscicide not covered by a NPDES permit shall file a written petition concurrently with the commission and the surface water bureau of the department. The petition shall contain, at a minimum, the following information:

(1) petitioner's name and address;

(2) identity of the piscicide and the period of time (not to exceed five years) or number of applications for which approval is requested;

(3) documentation of registration under FIFRA and NMPCA and certification that the petitioner intends to use the piscicide according to the label directions, for its intended function;

(4) target and potential non-target species in the treated waters and adjacent riparian area, including threatened or endangered species;

(5) potential environmental consequences to the treated waters and the adjacent riparian area, and protocols for limiting such impacts;

(6) surface water of the state proposed for treatment;

(7) results of pre-treatment survey;

(8) evaluation of available alternatives and justification for selecting piscicide use;

(9) documentation of notice requesting public comment on the proposed use within a 30-day period, including information as described in Paragraphs (1), (2) and (6) of Subsection A of 20.6.4.16 NMAC, provided to:

(a) local political subdivisions;

(b) local water planning entities;

(c) local conservancy and irrigation districts; and

(d) local media outlets, except that the petitioner shall only be required to publish notice in a newspaper of circulation in the locality affected by the proposed use.

(10) copies of public comments received in response to the publication of notice and the petitioner's responses to public comments received;

(11) post-treatment assessment monitoring protocol; and

(12) any other information required by the commission.

B. Within 30 days of receipt of the petition, the department shall review the petition and file a recommendation with the commission to grant, grant with conditions or deny the petition. The recommendation shall include reasons, and a copy shall be sent to the petitioner by certified mail.

C. The commission shall review the petition, the public comments received under Paragraphs (9) and (10) of Subsection A of 20.6.4.16 NMAC, the petitioner's responses to public comments and the department's technical recommendations for the petition. A public hearing shall be held if the commission determines there is substantial public interest. The commission shall notify the petitioner and those commenting on the petition of the decision whether to hold a hearing and the reasons therefore in writing.

D. If the commission determines there is substantial public interest a public hearing shall be held within 90 days of receipt of the department's recommendation in the locality affected by the proposed use in accordance with 20.1.3 NMAC, Adjudicatory Procedures - Water Quality Control Commission. Notice of the hearing shall be given in writing by the petitioner to individuals listed under Subsection A of 20.6.4.16 NMAC as well as to individuals who provided public comment under that subsection at least 30 days prior to the hearing.

E. In a hearing provided for in this section or, if no hearing is held, in a commission meeting, the registration of a piscicide under FIFRA and NMPCA shall provide a rebuttable presumption that the determinations of the EPA Administrator in registering the piscicide, as outlined in 7 U.S.C. Section 136a(c)(5), are valid. For purposes of this Section the rebuttable presumptions regarding the piscicide include:

(1) Its composition is such as to warrant the proposed claims for it;

(2) Its labeling and other material submitted for registration comply with the requirements of FIFRA and NMPCA;

(3) It will perform its intended function without unreasonable adverse effects on the environment; and

(4) When used in accordance with all FIFRA label requirements it will not generally cause unreasonable adverse effects on the environment.

(5) "Unreasonable adverse effects on the environment" has the meaning provided in FIFRA, 7 U.S.C. Section 136(bb): "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."

F. After a public hearing, or commission meeting if no hearing is held, the commission may grant the petition in whole or in part, may grant the petition subject to conditions, or may deny the petition. In granting any petition in whole or part or subject to conditions, the commission shall require the petitioner to implement post-treatment assessment monitoring and provide notice to the public in the immediate and near downstream vicinity of the application prior to and during the application.

G. Any person whose application is covered by a NPDES permit shall provide written notice to local entities as described in Subsection A of 20.6.4.16 NMAC and implement post-treatment assessment monitoring within the application area as described in Subsection F of 20.6.4.16 NMAC.

[20.6.4.16 NMAC - Rn, Paragraph (6) of Subsection F of 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005; A, 3/2/2017]

20.6.4.17 - 20.6.4.49 [RESERVED]

20.6.4.50 BASINWIDE PROVISIONS - Special provisions arising from interstate compacts, international treaties or court decrees or that otherwise apply to a basin are contained in 20.6.4.51 through 20.6.4.59 NMAC.

[20.6.4.50 NMAC - N, 5/23/2005]

20.6.4.51 [RESERVED]

20.6.4.52 PECOS RIVER BASIN - In order to protect existing and designated uses, it is a goal of the state of New Mexico to prevent increases in TDS in the Pecos river above the following benchmark values, which are expressed as flow-weighted, annual average concentrations, at three USGS gaging stations: at Santa Rosa 500 mg/L; near Artesia 2,700 mg/L; and near Malaga 3,600 mg/L. The benchmark values serve to guide state action. They are adopted pursuant to the New Mexico Water Quality Act, not the Clean Water Act.

[20.6.4.52 NMAC - N, 12/1/2010]

20.6.4.53 [RESERVED]

20.6.4.54 COLORADO RIVER BASIN - For the tributaries of the Colorado river system, the state of New Mexico will cooperate with the Colorado river basin states and the federal government to support and implement the salinity policy and program outlined in the most current "review, water quality standards for salinity, Colorado river system" or equivalent report by the Colorado river salinity control forum.

A. Numeric criteria expressed as the flow-weighted annual average concentration for salinity are established at three points in the Colorado river basin as follows: below Hoover dam, 723 mg/L; below Parker dam, 747 mg/L; and at Imperial dam, 879 mg/L.

B. As a part of the program, objectives for New Mexico shall include the elimination of discharges of water containing solids in solution as a result of the use of water to control or convey fly ash from coal-fired electric generators, wherever practicable.

[20.6.4.54 NMAC - Rn, Paragraphs (1) through (3) of Subsection K of 20.6.4.12 NMAC, 5/23/2005; A, 5/23/2005]

20.6.4.55 - 20.6.4.96 [RESERVED]

20.6.4.97 EPHEMERAL WATERS: Ephemeral surface waters of the state as identified below and additional ephemeral waters as identified on the department's water quality standards website pursuant to Subsection C of 20.6.4.15 NMAC are subject to the designated uses and criteria as specified in this section. Ephemeral waters classified in 20.6.4.101-899 NMAC are subject to the designated uses and criteria as specified in those sections.

A. Designated uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses.

C. Waters:

(1) the following waters are designated in the Rio Grande basin:

(a) Cunningham gulch from Santa Fe county road 55 upstream 1.4 miles to a point upstream of the Lac minerals mine, identified as Ortiz mine on U.S. geological survey topographic maps;

(b) an unnamed tributary from Arroyo Hondo upstream 0.4 miles to the Village of Oshara water reclamation facility outfall;

(c) an unnamed tributary from San Pedro creek upstream 0.8 miles to the PAA-KO community sewer outfall;

(d) Inditos draw from the crossing of an unnamed road along a power line one-quarter mile west of McKinley county road 19 upstream to New Mexico highway 509;

(e) an unnamed tributary from the diversion channel connecting Blue canyon and Socorro canyon upstream 0.6 miles to the New Mexico firefighters academy treatment facility outfall;

(f) an unnamed tributary from the Albuquerque metropolitan arroyo flood control authority (AMAFCA) Rio Grande south channel upstream of the crossing of New Mexico highway 47 upstream to I-25;

(g) the south fork of Cañon del Piojo from Canon del Piojo upstream 1.2 miles to an unnamed tributary;

(h) an unnamed tributary from the south fork of Cañon del Piojo upstream 1 mile to the Resurrection mine outfall;

(i) Arroyo del Puerto from San Mateo creek upstream 6.8 miles to the Ambrosia Lake mine entrance road;

(j) an unnamed tributary from San Mateo creek upstream 1.5 miles to the Roca Honda mine facility outfall;

(k) San Isidro arroyo, including unnamed tributaries to San Isidro arroyo, from Arroyo Chico upstream to its headwaters;

(l) Arroyo Tinaja, including unnamed tributaries to Arroyo Tinaja, from San Isidro arroyo upstream to 2 miles northeast of the Cibola national forest boundary;

(m) Mulatto canyon from Arroyo Tinaja upstream to 1 mile northeast of the Cibola national forest boundary; and

(n) Doctor arroyo, including unnamed tributaries to Doctor arroyo, from San Isidro arroyo upstream to its headwaters, and excluding Doctor Spring and Doctor arroyo from the spring to its confluence with the unnamed tributary approximately one-half mile downstream of the spring.

(2) the following waters are designated in the Pecos river basin:

(a) an unnamed tributary from Hart canyon upstream 1 mile to South Union road;

(b) Aqua Chiquita from Rio Peñasco upstream to McEwan canyon; and

(c) Grindstone canyon upstream of Grindstone reservoir.

(3) the following waters are designated in the Canadian river basin:

(a) Bracket canyon upstream of the Vermejo river;

(b) an unnamed tributary from Bracket canyon upstream 2 miles to the Ancho mine; and

(c) Gachupin canyon from the Vermejo river upstream 2.9 miles to an unnamed west tributary near the Ancho mine outfall.

(4) in the San Juan river basin an unnamed tributary of Kim-me-ni-oli wash upstream of the mine outfall.

(5) the following waters are designated in the Little Colorado river basin:

(a) Defiance draw from County Road 1 to upstream of West Defiance Road; and

(b) an unnamed tributary of Defiance draw from McKinley county road 1 upstream to New Mexico highway 264.

(6) the following waters are designated in the closed basins:

(a) in the Tularosa river closed basin San Andres canyon downstream of South San Andres canyon; and

(b) in the Mimbres river closed basin San Vicente arroyo from the Mimbres river upstream to Maudes canyon.

[20.6.4.97 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017; A, 12/17/2019]

20.6.4.98 INTERMITTENT WATERS: All non-perennial surface waters of the state, except those ephemeral waters included under section 20.6.4.97 NMAC or classified in 20.6.4.101-899 NMAC.

A. Designated uses: livestock watering, wildlife habitat, marginal warmwater aquatic life and primary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.98 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.99 PERENNIAL WATERS: All perennial surface waters of the state except those classified in 20.6.4.101-899 NMAC.

A. Designated uses: Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.99 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.100 [RESERVED]

20.6.4.101 RIO GRANDE BASIN: The main stem of the Rio Grande from the international boundary with Mexico upstream to one mile downstream of Percha dam.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.

(2) At mean monthly flows above 350 cfs, the monthly average concentration for: TDS 2,000 mg/L or less, sulfate 500 mg/L or less and chloride 400 mg/L or less.

C. Remarks: sustained flow in the Rio Grande below Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.

[20.6.4.101 NMAC - Rp 20 NMAC 6.1.2101, 10/12/2010; A, 12/15/2001; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.102 RIO GRANDE BASIN: The main stem of the Rio Grande from one mile downstream of Percha dam upstream to Caballo dam.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

C. Remarks: sustained flow in the Rio Grande downstream of Caballo reservoir is dependent on release from Caballo reservoir during the irrigation season; at other times of the year, there may be little or no flow.

[20.6.4.102 NMAC - Rp 20 NMAC 6.1.2102, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.103 RIO GRANDE BASIN: - The main stem of the Rio Grande from the headwaters of Caballo reservoir upstream to Elephant Butte dam and perennial reaches of tributaries to the Rio Grande in Sierra and Socorro counties, excluding waters on tribal lands.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, secondary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

C. **Remarks:** flow in this reach of the Rio Grande main stem is dependent upon release from Elephant Butte dam.

[20.6.4.103 NMAC - Rp 20 NMAC 6.1.2103, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.104 RIO GRANDE BASIN: - Caballo and Elephant Butte reservoir.

A. **Designated uses:** irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.104 NMAC - Rp 20 NMAC 6.1.2104, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.105 RIO GRANDE BASIN: - The main stem of the Rio Grande from the headwaters of Elephant Butte reservoir upstream to Alameda bridge (Corrales bridge), excluding waters on Isleta pueblo.

A. **Designated uses**: irrigation, marginal warmwater aquatic life, livestock watering, public water supply, wildlife habitat and primary contact.

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS l,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.105 NMAC - Rp 20 NMAC 6.1.2105, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.106 RIO GRANDE BASIN: - The main stem of the Rio Grande from Alameda bridge (Corrales bridge) upstream to the Angostura diversion works, excluding waters on Santa Ana pueblo, and intermittent water in the Jemez river below the Jemez pueblo boundary, excluding waters on Santa Ana and Zia pueblos, that enters the main stem of the Rio Grande. Portions of the Rio Grande in this segment are under the joint jurisdiction of the state and Sandia pueblo.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Grande.

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 1,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.106 NMAC - Rp 20 NMAC 6.1.2105.1, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.107 RIO GRANDE BASIN: - The Jemez river from the Jemez pueblo boundary upstream to Soda dam near the town of Jemez Springs and perennial reaches of Vallecito creek.

A. **Designated uses:** coldwater aquatic life, primary contact, irrigation, livestock watering and wildlife habitat; and public water supply on Vallecito creek.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F).

[20.6.4.107 NMAC - Rp 20 NMAC 6.1.2105.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.108 RIO GRANDE BASIN: - Perennial reaches of the Jemez river and all its tributaries above Soda dam near the town of Jemez Springs, except San Gregorio lake and Sulphur creek above its confluence with Redondo creek, and perennial reaches of the Guadalupe river and all its tributaries.

A. **Designated uses:** domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less (800 µS/cm or less on Sulphur creek); the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and pH within the range of 2.0 to 8.8 on Sulphur creek.

NMED EXHIBIT 1A

[20.6.4.108 NMAC - Rp 20 NMAC 6.1.2106, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.124 NMAC. The standards for San Gregorio lake are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.109 RIO GRANDE BASIN: - Perennial reaches of Bluewater creek excluding Bluewater lake and waters on tribal lands, Rio Moquino upstream of Laguna pueblo, Seboyeta creek, Rio Paguate upstream of Laguna pueblo, the Rio Puerco upstream of the northern boundary of Cuba, and all other perennial reaches of tributaries to the Rio Puerco, including the Rio San Jose in Cibola county from the USGS gaging station at Correo upstream to Horace springs excluding waters on tribal lands.

A. Designated uses: coldwater aquatic life, domestic water supply, fish culture, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on La Jara creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.109 NMAC - Rp 20 NMAC 6.1.2107, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The standards for Bluewater lake are in 20.6.4.135 NMAC, effective 7/10/2012]

20.6.4.110 RIO GRANDE BASIN: The main stem of the Rio Grande from Angostura diversion works upstream to Cochiti dam, excluding the reaches on San Felipe, Kewa and Cochiti pueblos.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact, coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: pH within the range of 6.6 to 9.0 and temperature 25°C (77°F) or less.

[20.6.4.110 NMAC - Rp 20 NMAC 6.1.2108, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.111 RIO GRANDE BASIN: - Perennial reaches of Las Huertas creek from the San Felipe pueblo boundary to the headwaters.

A. Designated uses: high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.111 NMAC - Rp 20 NMAC 6.1.2108.5, 10/12/2000; A, 7/25/2001; A, 5/23/2005; A-12/1/2010]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.125 NMAC.]

20.6.4.112 [RESERVED]
[20.6.4.112 NMAC - Rp 20 NMAC 6.1.2109, 10/12/2000; A, 5/23/2005; Repealed, 12/1/2010]

20.6.4.113 RIO GRANDE BASIN: - The Santa Fe river and perennial reaches of its tributaries from the Cochiti pueblo boundary upstream to the outfall of the Santa Fe wastewater treatment facility.

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and coolwater aquatic life.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.

[20.6.4.113 NMAC - Rp 20 NMAC 6.1.2110, 10/12/2000; A, 10/11/2002; A, 5/23/2005; A, 12/1/2010; A, 2/14/2013]

20.6.4.114 RIO GRANDE BASIN: - The main stem of the Rio Grande from the Cochiti pueblo boundary upstream to Rio Pueblo de Taos excluding waters on San Ildefonso, Santa Clara and Ohkay Owingeh pueblos, Embudo creek from its mouth on the Rio Grande upstream to the Picuris Pueblo boundary, the Santa Cruz river from the Santa Clara pueblo boundary upstream to the Santa Cruz dam, the Rio Tesuque except waters on the Tesuque and Pojoaque pueblos, and the Pojoaque river from the San

Ildefonso pueblo boundary upstream to the Pojoaque pueblo boundary. Some Rio Grande waters in this segment are under the joint jurisdiction of the state and San Ildefonso pueblo.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life; and public water supply on the main stem Rio Grande.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: 6T3 temperature 22°C (71.6°F) and maximum temperature 25°C (78.8°F). In addition, the following criteria based on a 12-month rolling average are applicable to the public water supply use for monitoring and public disclosure purposes only:

Radionuclide	pCi/L
Americium-241	1.9
Cesium-137	6.4
Plutonium-238	1.5
Plutonium-239/240	1.5
Strontium-90	3.5
Tritium	4,000

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS 500 mg/L or less, sulfate 150 mg/L or less and chloride 25 mg/L or less.
[20.6.4.114 NMAC - Rp 20 NMAC 6.1.2111, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.115 RIO GRANDE BASIN: - The perennial reaches of Rio Vallecitos and its tributaries except Hopewell lake, and perennial reaches of Rio del Oso and perennial reaches of El Rito creek above the town of El Rito.

A. Designated uses: domestic water supply, irrigation, high quality coldwater aquatic life, livestock watering, wildlife habitat and primary contact; public water supply on the Rio Vallecitos and El Rito creek.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.115 NMAC - Rp 20 NMAC 6.1.2112, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The standards for Hopewell lake are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.116 RIO GRANDE BASIN: The Rio Chama from its mouth on the Rio Grande upstream to Abiquiu reservoir, perennial reaches of the Rio Tusas, perennial reaches of the Rio Ojo Caliente, perennial reaches of Abiquiu creek and perennial reaches of El Rito creek downstream of the town of El Rito.

A. Designated uses: irrigation, livestock watering, wildlife habitat, coldwater aquatic life, warmwater aquatic life and secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 31°C (87.8°F) or less.
[20.6.4.116 NMAC - Rp 20 NMAC 6.1.2113, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.117 RIO GRANDE BASIN: - Abiquiu reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact, coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.
[20.6.4.117 NMAC - Rp 20 NMAC 6.1.2114, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.118 RIO GRANDE BASIN: - The Rio Chama from the headwaters of Abiquiu reservoir upstream to El Vado reservoir and perennial reaches of the Rio Gallina and Rio Puerco de Chama north of state highway 96. Some Rio Chama waters in this segment are under the joint jurisdiction of the state and the Jicarilla Apache tribe.

A. Designated uses: irrigation, livestock watering, wildlife habitat, coldwater aquatic life, warmwater aquatic life and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 26°C (78.8°F) or less.
[20.6.4.118 NMAC - Rp 20 NMAC 6.1.2115, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.119 RIO GRANDE BASIN: - All perennial reaches of tributaries to the Rio Chama above Abiquiu dam, except Canjilon lakes a, c, e and f and the Rio Gallina and Rio Puerco de Chama north of state highway 96 and excluding waters on Jicarilla Apache reservation, and the main stem of the Rio Chama from the headwaters of El Vado reservoir upstream to the New Mexico-Colorado line. Some Cañones creek and Rio Chama waters in this segment are under the joint jurisdiction of the state and the Jicarilla Apache tribe.

A. **Designated uses:** domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Brazos and Rio Chama.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less (1,000 µS or less for Coyote creek); the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.119 NMAC - Rp 20 NMAC 6.1.2116, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The standards for Canjilon lakes a, c, e and f are in 20.6.4.134 NMAC, effective 7/10/2012]

20.6.4.120 RIO GRANDE BASIN: - El Vado and Heron reservoirs.

A. **Designated uses:** irrigation storage, livestock watering, wildlife habitat, public water supply, primary contact and coldwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.120 NMAC - Rp 20 NMAC 6.1.2117, 10/12/2000; A. 5/23/2005; A, 12/1/2010]

20.6.4.121 RIO GRANDE BASIN: - Perennial tributaries to the Rio Grande in Bandelier national monument and their headwaters in Sandoval county and all perennial reaches of tributaries to the Rio Grande in Santa Fe county unless included in other segments and excluding waters on tribal lands.

A. **Designated uses:** domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on Little Tesuque creek, the Rio en Medio, and the Santa Fe river.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.121 NMAC - Rp 20 NMAC 6.1.2118, 10/12/2000; A. 5/23/2005; A, 12/1/2010; A, 2/14/2013]
[NOTE: The segment covered by this section was divided effective 5/23/2005. The standards for the additional segments are under 20.6.4.126, 20.6.4.127 and 20.6.4.128 NMAC.]

20.6.4.122 RIO GRANDE BASIN: - The main stem of the Rio Grande from Rio Pueblo de Taos upstream to the New Mexico-Colorado line, the Red river from its mouth on the Rio Grande upstream to the mouth of Placer creek, and the Rio Pueblo de Taos from its mouth on the Rio Grande upstream to the mouth of the Rio Grande del Rancho. Some Rio Grande and Rio Pueblo de Taos waters in this segment are under the joint jurisdiction of the state and Taos pueblo.

A. **Designated uses:** coldwater aquatic life, fish culture, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.122 NMAC - Rp 20 NMAC 6.1.2119, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.123 RIO GRANDE BASIN: - Perennial reaches of the Red river upstream of the mouth of Placer creek, all perennial reaches of tributaries to the Red river, and all other perennial reaches of tributaries to the Rio Grande in Taos and Rio Arriba counties unless included in other segments and excluding waters on Santa Clara, Ohkay Owingeh, Picuris and Taos pueblos.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the Rio Pueblo and Rio Fernando de Taos.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less (500 µS/cm or less for the Rio Fernando de Taos); the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and phosphorus (unfiltered sample) less than 0.1 mg/L for the Red river.

[20.6.4.123 NMAC - Rp 20 NMAC 6.1.2120, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.129 NMAC.]

20.6.4.124 RIO GRANDE BASIN: Perennial reaches of Sulphur creek from its confluence with Redondo creek upstream to its headwaters.

A. Designated uses: limited aquatic life, wildlife habitat, livestock watering and secondary contact.

B. Criteria: the use-specific criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: pH within the range of 2.0 to 9.0, maximum temperature 30ºC (86ºF), and the chronic aquatic life criteria of Subsections I and J of 20.6.4.900 NMAC.

[20.6.4.124 NMAC - N, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.125 RIO GRANDE BASIN: - Perennial reaches of San Pedro creek from the San Felipe pueblo boundary to the headwaters.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.125 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.126 RIO GRANDE BASIN: - Perennial portions of Cañon de Valle from Los Alamos national laboratory (LANL) stream gage E256 upstream to Burning Ground spring, Sandia canyon from Sigma canyon upstream to LANL NPDES outfall 001, Pajarito canyon from Arroyo de La Delfe upstream into Starmers gulch and Starmers spring and Water canyon from Area-A canyon upstream to State Route 501.

A. Designated uses: coldwater aquatic life, livestock watering, wildlife habitat and secondary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.126 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.127 RIO GRANDE BASIN: - Perennial portions of Los Alamos canyon upstream from Los Alamos reservoir and Los Alamos reservoir.

A. Designated uses: coldwater aquatic life, livestock watering, wildlife habitat, irrigation and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.127 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.128 RIO GRANDE BASIN: - Ephemeral and intermittent portions of watercourses within lands managed by U.S. department of energy (DOE) within LANL, including but not limited to: Mortandad canyon, Cañada del Buey, Ancho canyon, Chaquehui canyon, Indio canyon, Fence canyon, Potrillo canyon and portions of Cañon de Valle, Los Alamos canyon, Sandia canyon, Pajarito canyon and Water canyon not specifically identified in 20.6.4.126 NMAC. (Surface waters within lands scheduled for transfer from DOE to tribal, state or local authorities are specifically excluded.)

A. Designated uses: livestock watering, wildlife habitat, limited aquatic life and secondary contact.

B. Criteria: the use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute total ammonia criteria set forth in Subsection K of 20.6.4.900 NMAC (salmonids absent).

[20.6.4.128 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.129 RIO GRANDE BASIN: - Perennial reaches of the Rio Hondo.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact**.**

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less and phosphorus (unfiltered sample) less than 0.1 mg/L.

[20.6.4.129 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.130 RIO GRANDE BASIN: - The Rio Puerco from the Rio Grande upstream to Arroyo Chijuilla, excluding the reaches on Isleta, Laguna and Cañoncito Navajo pueblos. Some waters in this segment are under the joint jurisdiction of the state and Isleta, Laguna or Cañoncito Navajo pueblos.

A. Designated uses: irrigation, warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS l,500 mg/L or less, sulfate 500 mg/L or less and chloride 250 mg/L or less.

[20.6.4.130 NMAC - N, 12/1/2010]

20.6.4.131 RIO GRANDE BASIN: - The Rio Puerco from the confluence of Arroyo Chijuilla upstream to the northern boundary of Cuba.

A. Designated uses: warmwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.131 NMAC - N, 12/1/2010]

20.6.4.132 RIO GRANDE BASIN: - Rio Grande (Klauer) spring

A. Designated uses: domestic water supply, wildlife habitat, livestock watering, coldwater aquatic life use and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.132 NMAC - N, 12/1/2010]

20.6.4.133 RIO GRANDE BASIN: - Bull Creek lake, Cow lake, Elk lake, Goose lake, Heart lake, Hidden lake (Lake Hazel), Horseshoe lake, Horseshoe (Alamitos) lake, Jose Vigil lake, Lost lake, Middle Fork lake, Nambe lake, Nat II lake, Nat IV lake, No Fish lake, Pioneer lake, San Leonardo lake, Santa Fe lake, Serpent lake, South Fork lake, Trampas lakes (east and west) and Williams lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.133 NMAC - N, 7/10/2012]

20.6.4.134 RIO GRANDE BASIN: - Cabresto lake, Canjilon lakes a, c, e and f, Fawn lakes (east and west), Hopewell lake and San Gregorio lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.134 NMAC - N, 7/10/2012]

20.6.4.135 RIO GRANDE BASIN: - Bluewater lake.

A. Designated uses: coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.135 NMAC - N, 7/10/2012]

20.6.4.136 RIO GRANDE BASIN: - The Santa Fe river from the outfall of the Santa Fe wastewater treatment facility to Guadalupe street.

A. Designated uses: limited aquatic life, wildlife habitat, primary contact, livestock watering, and irrigation.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.136 NMAC - N, 2/14/2013]

20.6.4.137 RIO GRANDE BASIN: - The Santa Fe river from Guadalupe street to Nichols reservoir.

A. Designated uses: coolwater aquatic life, wildlife habitat, primary contact, livestock watering, and irrigation.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.137 NMAC - N, 2/14/2013]

20.6.4.138 RIO GRANDE BASIN: - Nichols and McClure reservoirs.

A. Designated uses: high quality coldwater aquatic life, wildlife habitat, primary contact, public water supply and irrigation.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.138 NMAC - N, 2/14/2013]

20.6.4.139 RIO GRANDE BASIN: - Perennial reaches of Galisteo creek and perennial reaches of its tributaries from Kewa pueblo upstream to 2.2 miles upstream of Lamy.

A. Designated uses: coolwater aquatic life, primary contact, irrigation, livestock watering, domestic water supply and wildlife habitat; and public water supply on Cerrillos reservoir.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.139 NMAC - N, 2/14/2013]

20.6.4.140 - 20.6.4.200 [RESERVED]

20.6.4.201 PECOS RIVER BASIN: - The main stem of the Pecos river from the New Mexico-Texas line upstream to the mouth of the Black river (near Loving).

A. Designated uses: irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria:

(l) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: dissolved boron for irrigation use 2,000 µg/L or less.

(2) At all flows above 50 cfs: TDS 20,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 10,000 mg/L or less.

[20.6.4.201 NMAC - Rp 20 NMAC 6.1.2201, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

NMED EXHIBIT 1A

20.6.4.202 PECOS RIVER BASIN: - The main stem of the Pecos river from the mouth of the Black river upstream to lower Tansil dam, including perennial reaches of the Black river, the Delaware river and Blue spring.

A. Designated uses: industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria:

(l) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.

(2) At all flows above 50 cfs: TDS 8,500 mg/L or less, sulfate 2,500 mg/L or less and chloride 3,500 mg/L or less.

C. Remarks: diversion for irrigation frequently limits summer flow in this reach of the main stem Pecos river to that contributed by springs along the watercourse.

[20.6.4.202 NMAC - Rp 20 NMAC 6.1.2202, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Lower Tansil Lake and Lake Carlsbad are under 20.6.4.218 NMAC.]

20.6.4.203 PECOS RIVER BASIN: - The main stem of the Pecos river from the headwaters of Lake Carlsbad upstream to Avalon dam.

A. Designated uses: industrial water supply, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 34°C (93.2°F) or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.203 NMAC - Rp 20 NMAC 6.1.2203, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Lower Tansil Lake and Lake Carlsbad are under 20.6.4.218 and for Avalon Reservoir are under 20.6.4.219 NMAC.]

20.6.4.204 PECOS RIVER BASIN: - The main stem of the Pecos river from the headwaters of Avalon reservoir upstream to Brantley dam.

A. Designated uses: irrigation, livestock watering, wildlife habitat, secondary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.204 NMAC - Rp 20 NMAC 6.1.2204, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for Avalon Reservoir are under 20.6.4.219 NMAC.]

20.6.4.205 PECOS RIVER BASIN: - Brantley reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.205 NMAC - Rp 20 NMAC 6.1.2205, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.206 PECOS RIVER BASIN: The main stem of the Pecos river from the headwaters of Brantley reservoir upstream to Salt creek (near Acme), perennial reaches of the Rio Peñasco downstream from state highway 24 near Dunken, perennial reaches of the Rio Hondo and its tributaries downstream of Bonney canyon and perennial reaches of the Rio Felix.

A. Designated uses: irrigation, livestock watering, wildlife habitat, secondary contact and warmwater aquatic life.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 14,000 mg/L or less, sulfate 3,000 mg/L or less and chloride 6,000 mg/L or less.

[20.6.4.206 NMAC - Rp 20 NMAC 6.1.2206, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.207 PECOS RIVER BASIN: - The main stem of the Pecos river from Salt creek (near Acme) upstream to Sumner dam.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and secondary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 8,000 mg/L or less, sulfate 2,500 mg/L or less and chloride 4,000 mg/L or less.

[20.6.4.207 NMAC - Rp 20 NMAC 6.1.2207, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.208 PECOS RIVER BASIN: - Perennial reaches of the Rio Peñasco and its tributaries above state highway 24 near Dunken, perennial reaches of the Rio Bonito downstream from state highway 48 (near Angus), the Rio Ruidoso downstream of the U.S. highway 70 bridge near Seeping Springs lakes, perennial reaches of the Rio Hondo upstream from Bonney canyon and perennial reaches of Agua Chiquita.

A. Designated uses: fish culture, irrigation, livestock watering, wildlife habitat, coldwater aquatic life and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 30°C (86°F) or less, and phosphorus (unfiltered sample) less than 0.1 mg/L.

[20.6.4.208 NMAC - Rp 20 NMAC 6.1.2208, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.209 PECOS RIVER BASIN: - Perennial reaches of Eagle creek upstream of Alto dam to the Mescalero Apache boundary, perennial reaches of the Rio Bonito and its tributaries upstream of state highway 48 (near Angus) excluding Bonito lake, and perennial reaches of the Rio Ruidoso and its tributaries upstream of the U.S. highway 70 bridge near Seeping Springs lakes, above and below the Mescalero Apache boundary.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 600 µS/cm or less in Eagle creek, 1,100 µS/cm or less in Bonito creek and 1,500 µS/cm or less in the Rio Ruidoso; phosphorus (unfiltered sample) less than 0.1 mg/L; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.209 NMAC - Rp 20 NMAC 6.1.2209, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The standards for Bonito lake are in 20.6.4.223 NMAC, effective 7/10/2012]

20.6.4.210 PECOS RIVER BASIN: - Sumner reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.210 NMAC - Rp 20 NMAC 6.1.2210, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.211 PECOS RIVER BASIN: - The main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Tecolote creek excluding Santa Rosa reservoir.

A. Designated uses: fish culture, irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) At all flows above 50 cfs: TDS 3,000 mg/L or less, sulfate 2,000 mg/L or less and chloride 400 mg/L or less.

[20.6.4.211 NMAC - Rp 20 NMAC 6.1.2211, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The standards for Santa Rosa reservoir are in 20.6.4.225 NMAC, effective 7/10/2012]

20.6.4.212 PECOS RIVER BASIN: - Perennial tributaries to the main stem of the Pecos river from the headwaters of Sumner reservoir upstream to Santa Rosa dam.

A. Designated uses: irrigation, coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.212 NMAC - Rp 20 NMAC 6.1.2211.1, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.213 PECOS RIVER BASIN: - McAllister lake.

A. Designated uses: coldwater aquatic life, secondary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.213 NMAC - Rp 20 NMAC 6.1.2211.3, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.214 PECOS RIVER BASIN: - Storrie lake.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, primary contact, livestock watering, wildlife habitat, public water supply and irrigation storage.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.214 NMAC - Rp 20 NMAC 6.1.2211.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.215 PECOS RIVER BASIN: - Perennial reaches of the Gallinas river and all its tributaries upstream of the diversion for the Las Vegas municipal reservoir, perennial reaches of Tecolote creek upstream of Blue creek, and all perennial tributaries of Tecolote creek.

A. Designated uses: domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, industrial water supply and primary contact; and public water supply on the Gallinas river.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less (450 µS/cm or less in Wright Canyon creek); the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.215 NMAC - Rp 20 NMAC 6.1.2212, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 2/13/2018]

[**NOTE:** This segment was divided effective 2/13/2018. The standards for Tecolote creek from I-25 to Blue creek are under 20.6.4.230 NMAC.]

20.6.4.216 PECOS RIVER BASIN: - The main stem of the Pecos river from Tecolote creek upstream to Cañon de Manzanita.

A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.

(2) At all flows above 10 cfs: TDS 250 mg/L or less, sulfate 25 mg/L or less and chloride 5 mg/L or less.

[20.6.4.216 NMAC - Rp 20 NMAC 6.1.2213, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.217 PECOS RIVER BASIN: - Perennial reaches of Cow creek and all perennial reaches of its tributaries and the main stem of the Pecos river from Cañon de Manzanita upstream to its headwaters, including perennial reaches of all tributaries thereto except lakes identified in 20.6.4.222 NMAC.

A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact; and public water supply on the main stem of the Pecos river.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.217 NMAC - Rp 20 NMAC 6.1.2214, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segments are under 20.6.4.220 and 20.6.4.221 NMAC.]

20.6.4.218 PECOS RIVER BASIN: - Lower Tansil lake and Lake Carlsbad.
A. Designated uses: industrial water supply, livestock watering, wildlife habitat, primary contact and warmwater aquatic life.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 34°C (93.2°F) or less.
[20.6.4.218 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.219 PECOS RIVER BASIN: - Avalon reservoir.
A. Designated uses: irrigation storage, livestock watering, wildlife habitat, secondary contact and warmwater aquatic life.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.219 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.220 PECOS RIVER BASIN: - Perennial reaches of the Gallinas river and its tributaries from its mouth upstream to the diversion for the Las Vegas municipal reservoir, except Pecos Arroyo.
A. Designated uses: irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 30°C (86°F) or less.
[20.6.4.220 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.221 PECOS RIVER BASIN: - Pecos Arroyo.
A. Designated uses: livestock watering, wildlife habitat, warmwater aquatic life and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL, single sample 940 cfu/100 mL.
[20.6.4.221 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.222 PECOS RIVER BASIN: - Johnson lake, Katherine lake, Lost Bear lake, Pecos Baldy lake, Spirit lake, Stewart lake and Truchas lakes (north and south).
A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.
B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.222 NMAC - N, 7/10/2012]

20.6.4.223 PECOS RIVER BASIN: - Bonito lake.
A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering, wildlife habitat and public water supply.
B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 1100 µS/cm or less; phosphorus (unfiltered sample) less than 0.1 mg/L; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.223 NMAC - N, 7/10/2012]

20.6.4.224 PECOS RIVER BASIN: - Monastery lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.224 NMAC - N, 7/10/2012]

20.6.4.225 PECOS RIVER BASIN: - Santa Rosa reservoir.

A. **Designated uses:** coolwater aquatic life, irrigation, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.225 NMAC - N, 7/10/2012]

20.6.4.226 PECOS RIVER BASIN: - Perch lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.226 NMAC - N, 7/10/2012]

20.6.4.227 PECOS RIVER BASIN: - Lea lake.

A. **Designated uses:** warmwater aquatic life, primary contact and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.227 NMAC - N, 7/10/2012]

20.6.4.228 PECOS RIVER BASIN: - Cottonwood lake and Devil's Inkwell.

A. **Designated uses:** coolwater aquatic life, primary contact and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.228 NMAC - N, 7/10/2012]

20.6.4.229 PECOS RIVER BASIN: - Mirror lake.

A. **Designated uses:** warmwater aquatic life, primary contact and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.229 NMAC - N, 7/10/2012]

20.6.4.230 PECOS RIVER BASIN: - Perennial reaches of Tecolote creek from I-25 to Blue creek.

A. **Designated uses:** domestic water supply, coolwater aquatic life, irrigation, livestock watering, wildlife habitat, and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.230 NMAC - N, 2/13/2018]

20.6.4.231 - 20.6.4.300 [RESERVED]

20.6.4.301 CANADIAN RIVER BASIN: - The main stem of the Canadian river from the New Mexico-Texas line upstream to Ute dam, and any flow that enters the main stem from Revuelto creek.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:**

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 6,500 mg/L or less at flows above 25 cfs.

[20.6.4.301 NMAC - Rp 20 NMAC 6.1.2301, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.302 CANADIAN RIVER BASIN: - Ute reservoir.

A. Designated uses: livestock watering, wildlife habitat, public water supply, industrial water supply, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.302 NMAC - Rp 20 NMAC 6.1.2302, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.303 CANADIAN RIVER BASIN: - The main stem of the Canadian river from the headwaters of Ute reservoir upstream to Conchas dam, the perennial reaches of Pajarito and Ute creeks and their perennial tributaries.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.303 NMAC - Rp 20 NMAC 6.1.2303, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.304 CANADIAN RIVER BASIN: - Conchas reservoir.

A. Designated uses: irrigation storage, livestock watering, wildlife habitat, public water supply, primary contact and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.304 NMAC - Rp 20 NMAC 6.1.2304, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.305 CANADIAN RIVER BASIN: The main stem of the Canadian river from the headwaters of Conchas reservoir upstream to the New Mexico-Colorado line, perennial reaches of the Conchas river, the Mora river downstream from the USGS gaging station near Shoemaker, the Vermejo river downstream from Rail canyon and perennial reaches of Raton, Chicorica (except Lake Maloya and Lake Alice) and Uña de Gato creeks.

A. Designated uses: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 3,500 mg/L or less at flows above 10 cfs.

[20.6.4.305 NMAC - Rp 20 NMAC 6.1.2305, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

[**NOTE:** This segment was divided effective 12/1/2010. The standards for Lake Alice and Lake Maloya are under 20.6.4.311 and 20.6.4.312 NMAC, respectively.]

20.6.4.306 CANADIAN RIVER BASIN: - The Cimarron river downstream from state highway 21 in Cimarron to the Canadian river and all perennial reaches of tributaries to the Cimarron river downstream from state highway 21 in Cimarron.

A. Designated uses: irrigation, warmwater aquatic life, livestock watering, wildlife habitat and primary contact; and public water supply on Cimarroncito creek.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

(2) TDS 3,500 mg/L or less at flows above 10 cfs.

[20.6.4.306 NMAC - Rp 20 NMAC 6.1.2305.1, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 12/1/2010]

20.6.4.307 CANADIAN RIVER BASIN: - Perennial reaches of the Mora river from the USGS gaging station near Shoemaker upstream to the state highway 434 bridge in Mora, all perennial reaches of tributaries to the Mora river downstream from the USGS gaging station at La Cueva in San Miguel and Mora counties except lakes identified in 20.6.4.313 NMAC, perennial reaches of Ocate creek and its tributaries downstream of Ocate, and perennial reaches of Rayado creek downstream of Miami lake diversion in Colfax county.

A. Designated uses: marginal coldwater aquatic life, warmwater aquatic life, primary contact, irrigation, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.307 NMAC - Rp 20 NMAC 6.1.2305.3, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

20.6.4.308 CANADIAN RIVER BASIN: - Charette lakes.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, secondary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.308 NMAC - Rp 20 NMAC 6.1.2305.5, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.309 CANADIAN RIVER BASIN: - The Mora river and perennial reaches of its tributaries upstream from the state highway 434 bridge in Mora except lakes identified in 20.6.4.313 NMAC, all perennial reaches of tributaries to the Mora river upstream from the USGS gaging station at La Cueva, perennial reaches of Coyote creek and its tributaries, the Cimarron river and its perennial tributaries above state highway 21 in Cimarron except Eagle Nest lake, all perennial reaches of tributaries to the Cimarron river north and northwest of highway 64 except north and south Shuree ponds, perennial reaches of Rayado creek and its tributaries above Miami lake diversion, Ocate creek and perennial reaches of its tributaries upstream of Ocate, perennial reaches of the Vermejo river upstream from Rail canyon and all other perennial reaches of tributaries to the Canadian river northwest and north of U.S. highway 64 in Colfax county unless included in other segments.

A. Designated uses: domestic water supply, irrigation, high quality coldwater aquatic life, livestock watering, wildlife habitat, and primary contact; and public water supply on the Cimarron river upstream from Cimarron and on perennial reaches of Rayado creek and its tributaries.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.309 NMAC - Rp 20 NMAC 6.1.2306, 10/12/2000; A, 7/19/2001; A, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.310 NMAC. The standards for Shuree ponds are in 20.6.4.314 NMAC and the standards for Eagle Nest lake are in 20.6.4.315 NMAC, effective 7/10/2012]

20.6.4.310 CANADIAN RIVER BASIN: - Perennial reaches of Corrumpa creek.

A. Designated uses: livestock watering, wildlife habitat, irrigation, primary contact and coldwater aquatic life.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 25°C (77°F) or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less, chloride 40 mg/L or less.

[20.6.4.310 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.311 Lake Alice.

A. Designated uses: marginal coldwater aquatic life, irrigation, livestock watering, wildlife habitat, primary contact and public water supply.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.311 NMAC - N, 12/1/2010]

20.6.4.312 Lake Maloya.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat, primary contact and public water supply.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.312 NMAC - N, 12/1/2010]

20.6.4.313 CANADIAN RIVER BASIN: - Encantada lake, Maestas lake, Middle Fork lake of Rio de la Casa, North Fork lake of Rio de la Casa and Pacheco lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.313 NMAC - N, 7/10/2012]

20.6.4.314 CANADIAN RIVER BASIN: - Shuree ponds (north and south).

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.314 NMAC - N, 7/10/2012]

20.6.4.315 CANADIAN RIVER BASIN: - Eagle Nest lake.

A. Designated uses: high quality coldwater aquatic life, irrigation, domestic water supply, primary contact, livestock watering, wildlife habitat and public water supply.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.315 NMAC - N, 7/10/2012]

20.6.4.316 CANADIAN RIVER BASIN: - Clayton lake.

A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

[20.6.4.316 NMAC - N, 7/10/2012]

20.6.4.317 CANADIAN RIVER BASIN: Springer lake.

A. Designated uses: coolwater aquatic life, irrigation, primary contact, livestock watering, wildlife habitat, and public water supply.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.

[20.6.4.317 NMAC - N, 07-10-2012; A, 3/2/2017]

20.6.4.318 CANADIAN RIVER BASIN: Doggett creek.

A. Designated uses: Warm water aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

C. Discharger-specific temporary standard:

(1) Discharger: City of Raton wastewater treatment plant

(2) NPDES permit number: NM0020273, Outfall 001

(3) Receiving waterbody: Doggett creek, 20.6.4.318 NMAC
(4) Discharge latitude/longitude: 36° 52' 13.91" N / 104° 25' 39.18" W
(5) Pollutant(s): nutrients; total nitrogen and total phosphorus
(6) Factor of issuance: substantial and widespread economic and social impacts (40 CFR 131.10(g)(6))
(7) Highest attainable condition: interim effluent condition of 8.0 mg/L total nitrogen and 1.6 mg/L total phosphorus as 30-day averages. The highest attainable condition shall be either the highest attainable condition identified at the time of the adoption, or any higher attainable condition later identified during any reevaluation, whichever is more stringent (40 CFR 131.14(b)(1)(iii)).
(8) Effective date of temporary standard: This temporary standard becomes effective for Clean Water Act purposes on the date of EPA approval.
(9) Expiration date of temporary standard: no later than 20 years from the effective date.
(10) Reevaluation period: at each succeeding review of water quality standards and at least once every five years from the effective date of the temporary standard (20.6.4.10.F(8) NMAC, 40 CFR 131.14(b)(1)(v)). If the discharger cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard. If the reevaluation is not completed at the frequency specified or the Department does not submit the reevaluation to EPA within 30 days of completion, the underlying designated use and criterion will be the applicable water quality standard for Clean Water Act purposes until the Department completes and submits the reevaluation to EPA. Public input on the reevaluation will be invited during NPDES permit renewals or triennial reviews, as applicable, in accordance with the State's most current approved water quality management plan and continuing planning process.
(11) Timeline for proposed actions. Tasks and target completion dates are listed in the most recent, WQCC-approved version of the New Mexico Environment Department, Surface Water Quality Bureau's "Nutrient Temporary Standards for City of Raton Wastewater Treatment Plant, NPDES No. NM0020273 to Doggett Creek."
[20.6.4.318 NMAC - N, XX/XX/XXXX]

20.6.4.319 - 20.6.4.400 [RESERVED]

20.6.4.401 SAN JUAN RIVER BASIN: - The main stem of the San Juan river from the Navajo Nation boundary at the Hogback upstream to its confluence with the Animas river. Some waters in this segment are under the joint jurisdiction of the state and the Navajo Nation.
A. Designated uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.
[20.6.4.401 NMAC - Rp 20 NMAC 6.1.2401, 10/12/2000; A, 5/23/2005; A, 12/1/2010]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.408 NMAC.]

20.6.4.402 SAN JUAN RIVER BASIN: - La Plata river from its confluence with the San Juan river upstream to the New Mexico-Colorado line.
A. Designated uses: irrigation, marginal warmwater aquatic life, marginal coldwater aquatic life, livestock watering, wildlife habitat and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.
[20.6.4.402 NMAC - Rp 20 NMAC 6.1.2402, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.403 SAN JUAN RIVER BASIN: The Animas river from its confluence with the San Juan river upstream to Estes arroyo.
A. Designated uses: Public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, coolwater aquatic life, and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 29°C (84.2°F) or less.
[20.6.4.403 NMAC - Rp 20 NMAC 6.1.2403, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.404 SAN JUAN RIVER BASIN: The Animas river from Estes arroyo upstream to the Southern Ute Indian tribal boundary.

A. Designated uses: Coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: phosphorus (unfiltered sample) 0.l mg/L or less.

[20.6.4.404 NMAC - Rp 20 NMAC 6.1.2404, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.405 SAN JUAN RIVER BASIN: - The main stem of the San Juan river from Canyon Largo upstream to the Navajo dam.

A. Designated uses: high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.405 NMAC - Rp 20 NMAC 6.1.2405, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.406 SAN JUAN RIVER BASIN: - Navajo reservoir in New Mexico.

A. Designated uses: coldwater aquatic life, warmwater aquatic life, irrigation storage, livestock watering, wildlife habitat, public water supply, industrial water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.406 NMAC - Rp 20 NMAC 6.1.2406, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.407 SAN JUAN RIVER BASIN: - Perennial reaches of the Navajo river from the Jicarilla Apache reservation boundary to the Colorado border and perennial reaches of Los Pinos river in New Mexico.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, public water supply, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: phosphorus (unfiltered sample) 0.1 mg/L or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.407 NMAC - Rp 20 NMAC 6.1.2407, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.408 SAN JUAN RIVER BASIN: - The main stem of the San Juan river from its confluence with the Animas river upstream to its confluence with Canyon Largo.

A. Designated uses: public water supply, industrial water supply, irrigation, livestock watering, wildlife habitat, primary contact, marginal coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 32.2°C (90°F) or less.

[20.6.4.408 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.409 SAN JUAN RIVER BASIN: - Lake Farmington.

A. Designated uses: public water supply, wildlife habitat, livestock watering, primary contact, coldwater aquatic life and warmwater aquatic life.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.

[20.6.4.409 NMAC - N, 12/1/2010]

20.6.4.410 SAN JUAN RIVER BASIN: - Jackson lake.

A. **Designated uses:** coolwater aquatic life, irrigation, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.
[20.6.4.410 NMAC - N, 7/10/2012]

20.6.4.411 - 20.6.4.450: [RESERVED]

20.6.4.451 LITTLE COLORADO RIVER BASIN - The Rio Nutria upstream of the Zuni pueblo boundary, Tampico draw, Agua Remora, Tampico springs.

A. **Designated uses:** coolwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.451 NMAC - N, 12/1/2010]

20.6.4.452 LITTLE COLORADO RIVER BASIN: - Ramah lake.

A. **Designated uses:** coldwater aquatic life, warmwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.
[20.6.4.452 NMAC - N, 12/1/2010]

20.6.4.453 LITTLE COLORADO RIVER BASIN: - Quemado lake.

A. **Designated uses:** coolwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. **Criteria:** The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.453 NMAC - N, 7/10/2012]

20.6.4.454 - 20.6.4.500 [RESERVED]

20.6.4.501 GILA RIVER BASIN: - The main stem of the Gila river from the New Mexico-Arizona line upstream to Redrock canyon and perennial reaches of streams in Hidalgo county.

A. **Designated uses:** irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.501 NMAC - Rp 20 NMAC 6.1.2501, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.502 GILA RIVER BASIN: The main stem of the Gila river from Redrock canyon upstream to the confluence of the West Fork Gila river and East Fork Gila river and perennial reaches of tributaries to the Gila river downstream of Mogollon creek.

A. **Designated uses:** industrial water supply, irrigation, livestock watering, wildlife habitat, marginal coldwater aquatic life, primary contact and warmwater aquatic life.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: 28°C (82.4°F) or less.
[20.6.4.502 NMAC - Rp 20 NMAC 6.1.2502, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.503 GILA RIVER BASIN: All perennial tributaries to the Gila river upstream of and including Mogollon creek.

A. **Designated uses:** domestic water supply, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance of 400 µS/cm or less for all perennial tributaries except West Fork Gila and tributaries thereto, specific conductance of 300 µS/cm or less;

32.2°C (90°F) or less in the east fork of the Gila river and Sapillo creek downstream of Lake Roberts; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.503 NMAC - Rp 20 NMAC 6.1.2503, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.504 GILA RIVER BASIN: - Wall lake, Lake Roberts and Snow lake.
A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: specific conductance 300 µS/cm or less.
[20.6.4.504 NMAC - Rp 20 NMAC 6.1.2504, 10/12/2000; A, 5/23/2005; A, 12/1/2010]
[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.806 NMAC.]

20.6.4.505 GILA RIVER BASIN: - Bill Evans lake.
A. Designated uses: coolwater aquatic life, primary contact, livestock watering and wildlife habitat.
B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.505 NMAC - N, 7/10/2012]

20.6.4.506 - 20.6.4.600 [RESERVED]

20.6.4.601 SAN FRANCISCO RIVER BASIN: - The main stem of the San Francisco river from the New Mexico-Arizona line upstream to state highway 12 at Reserve and perennial reaches of Mule creek.
A. Designated uses: irrigation, marginal warmwater and marginal coldwater aquatic life, livestock watering, wildlife habitat and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.601 NMAC - Rp 20 NMAC 6.1.2601, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.602 SAN FRANCISCO RIVER BASIN: - The main stem of the San Francisco river from state highway 12 at Reserve upstream to the New Mexico-Arizona line.
A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: temperature 25°C (77°F) or less.
[20.6.4.602 NMAC - Rp 20 NMAC 6.1.2602, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.603 SAN FRANCISCO RIVER BASIN: - All perennial reaches of tributaries to the San Francisco river above the confluence of Whitewater creek and including Whitewater creek.
A. Designated uses: domestic water supply, fish culture, high quality coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.
B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 400 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less; and temperature 25°C (77°F) or less in Tularosa creek.
[20.6.4.603 NMAC - Rp 20 NMAC 6.1.2603, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.604 - 20.6.4.700 [RESERVED]

20.6.4.701 DRY CIMARRON RIVER: - Perennial portions of the Dry Cimarron river above Oak creek and perennial reaches of Oak creek.
A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.
B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: temperature 25°C (77°F) or less, the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less and chloride 40 mg/L or less.

[20.6.4.701 NMAC - Rp 20 NMAC 6.1.2701, 10/12/2000; A, 5/23/2005 A, 12/1/2010]

[**NOTE:** The segment covered by this section was divided effective 5/23/2005. The standards for the additional segment are under 20.6.4.702 NMAC.]

20.6.4.702 DRY CIMARRON RIVER: - Perennial portions of the Dry Cimarron river below Oak creek, and perennial portions of Long canyon and Carrizozo creeks.

A. Designated uses: coolwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria:

(1) The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of *E. coli* bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

(2) TDS 1,200 mg/L or less, sulfate 600 mg/L or less and chloride 40 mg/L or less.

[20.6.4.702 NMAC - N, 5/23/2005; A, 12/1/2010; A, 7/10/2012]

20.6.4.703 - 20.6.4.800 [RESERVED]

20.6.4.801 CLOSED BASINS: - Rio Tularosa upstream of the old U.S. highway 70 bridge crossing east of Tularosa and all perennial tributaries to the Tularosa basin except Three Rivers and Dog Canyon creek, and excluding waters on the Mescalero tribal lands.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.801 NMAC - Rp 20 NMAC 6.1.2801, 10/12/2000; A, 5/23/2005; A, 12/1/2010; A, 2/13/2018]

[**NOTE:** This segment was divided effective 2/13/2018. The standards for Dog Canyon creek are under 20.6.4.810 NMAC.]

20.6.4.802 CLOSED BASINS: - Perennial reaches of Three Rivers.

A. Designated uses: irrigation, domestic water supply, high quality coldwater aquatic life, primary contact, livestock watering and wildlife habitat.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 500 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.

[20.6.4.802 NMAC - Rp 20 NMAC 6.1.2802, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.803 CLOSED BASINS: Perennial reaches of the Mimbres river downstream of the confluence with Allie canyon and all perennial reaches of tributaries thereto.

A. Designated uses: Coolwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less and temperature of 30°C (86°F) or less.

[20.6.4.803 NMAC - Rp 20 NMAC 6.1.2803, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.804 CLOSED BASINS: Perennial reaches of the Mimbres river upstream of the confluence with Allie canyon to Cooney canyon, and all perennial reaches of East Fork Mimbres (McKnight canyon) downstream of the fish barrier, and all perennial reaches thereto.

A. Designated uses: Irrigation, domestic water supply, coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.804 NMAC - Rp 20 NMAC 6.1.2804, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 02-28-2018; A, 3/2/2017]
[**NOTE:** The segment covered by this section was divided effective 3/2/2017. The standards for the additional segment are covered under 20.6.4.807 NMAC.]

20.6.4.805 CLOSED BASINS: - Perennial reaches of the Sacramento river (Sacramento-Salt Flat closed basin) and all perennial tributaries thereto.

A. Designated uses: domestic water supply, livestock watering, wildlife habitat, marginal coldwater aquatic life and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses.
[20.6.4.805 NMAC - Rp 20 NMAC 6.1.2805, 10/12/2000; A, 5/23/2005; A, 12/1/2010]

20.6.4.806 CLOSED BASINS: - Bear canyon reservoir.

A. Designated uses: coldwater aquatic life, irrigation, livestock watering, wildlife habitat and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criterion applies: specific conductance 300 µS/cm or less.
[20.6.4.806 NMAC - N, 5/23/2005; A, 12/1/2010]

20.6.4.807 CLOSED BASINS: Perennial reaches of the Mimbres river upstream of Cooney canyon and all perennial reaches thereto, including perennial reaches of East Fork Mimbres river (McKnight canyon) upstream of the fish barrier.

A. Designated uses: Irrigation, domestic water supply, high quality coldwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: specific conductance 300 µS/cm or less; the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.807 NMAC - N, 3/2/2017]

20.6.4.808 CLOSED BASINS: Perennial and intermittent watercourses within Smelter Tailing Soils Investigation Unit lands at the Chino mines company, excluding those ephemeral waters listed in 20.6.4.809 NMAC and including, but not limited to. the mainstem of Lampbright draw, beginning at the confluence of Lampbright Draw with Rustler canyon, all tributaries that originate west of Lampbright draw to the intersection of Lampbright draw with U.S. 180, and all tributaries of Whitewater creek that originate east of Whitewater creek from the confluence of Whitewater creek with Bayard canyon downstream to the intersection of Whitewater creek with U.S. 180.

A. Designated uses: Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute and chronic aquatic life criteria for copper set forth in Subsection I of 20.6.4.900 NMAC shall be determined by multiplying that criteria by the water effect ratio ("WER") adjustment expressed by the following equation:

$$\mathrm{WER} = \frac{[10^{0.588+(0.703 \times \log \mathrm{DOC})+(0.395 \times \log \mathrm{Alkalinity})}] \times (\frac{100}{\mathrm{Hardness}})^{0.9422}}{19.31}$$

For purposes of this section, dissolved organic carbon (DOC) is expressed in units of milligrams carbon per liter or mg C/L; alkalinity is expressed in units of mg/L as $CaCO_3$, and hardness is expressed in units of mg/L as $CaCO_3$. In waters that contain alkalinity concentrations greater than 250 mg/L, a value of 250 mg/L shall be used in the equation. In waters that contain DOC concentrations greater than 16 mg C/L, a value of 16 mg C/L shall be used in the equation. In waters that contain hardness concentrations greater than 400 mg/L, a value of 400 mg/L shall be used in the equation. The alkalinity, hardness and DOC concentrations used to calculate the WER value are those

measured in the subject water sample.
[20.6.4.808 NMAC - N, 3/2/2017]

20.6.4.809 CLOSED BASINS: Ephemeral watercourses within smelter tailing soils investigation unit lands at the Chino mines company, limited to Chino mines property subwatershed drainage A and tributaries thereof, Chino mines property subwatershed drainage B and tributaries thereof (excluding the northwest tributary containing Ash spring and the Chiricahua leopard frog critical habitat transect); Chino mines property subwatershed drainage C and tributaries thereof (excluding reaches containing Bolton spring, the Chiricahua leopard frog critical habitat transect and all reaches in subwatershed C that are upstream of the Chiricahua leopard frog critical habitat); subwatershed drainage D and tributaries thereof (drainages D-1, D-2 and D-3, excluding the southeast tributary in drainage D1 that contains Brown spring) and subwatershed drainage E and all tributaries thereof (drainages E-1, E-2 and E-3).

A. Designated uses: Limited aquatic life, livestock watering, wildlife habitat and secondary contact.

B. Criteria: The use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the acute aquatic life criteria for copper set forth in Subsection I of 20.6.4.900 NMAC shall be determined by multiplying that criteria by the water effect ratio ("WER") adjustment expressed by the following equation:

$$WER = \frac{[10^{0.588+(0.703 \times \log DOC)+(0.395 \times \log Alkalinity)}] \times (\frac{100}{Hardness})^{0.9422}}{19.31}$$

For purposes of this section, dissolved organic carbon (DOC) is expressed in units of milligrams carbon per liter or mg C/L; alkalinity is expressed in units of mg/L as $CaCO_3$, and hardness is expressed in units of mg/L as $CaCO_3$. In waters that contain alkalinity concentrations greater than 250 mg/L, a value of 250 mg/L shall be used in the equation. In waters that contain DOC concentrations greater than 16 mg C/L, a value of 16 mg C/L shall be used in the equation. In waters that contain hardness concentrations greater than 400 mg/L, a value of 400 mg/L shall be used in the equation. The alkalinity, hardness and DOC concentrations used to calculate the WER value are those measured in the subject water sample.
[20.6.4.809 NMAC - N, 3/2/2017]

20.6.4.810 CLOSED BASINS: Perennial reaches of Dog Canyon creek.

A. Designated uses: coolwater aquatic life, irrigation, livestock watering, wildlife habitat, public water supply, and primary contact.

B. Criteria: the use-specific numeric criteria set forth in 20.6.4.900 NMAC are applicable to the designated uses, except that the following segment-specific criteria apply: the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less.
[20.6.4.810 NMAC - N, 2/13/2018]

20.6.4.811 - 20.6.4.899 [RESERVED]

20.6.4.900 CRITERIA APPLICABLE TO EXISTING, DESIGNATED OR ATTAINABLE USES UNLESS OTHERWISE SPECIFIED IN 20.6.4.97 THROUGH 20.6.4.899 NMAC:

A. Fish culture and water supply: Fish culture, public water supply and industrial water supply are designated uses in particular classified waters of the state where these uses are actually being realized. However, no numeric criteria apply uniquely to these uses. Water quality adequate for these uses is ensured by the general criteria and numeric criteria for bacterial quality, pH and temperature.

B. Domestic water supply: Surface waters of the state designated for use as domestic water supplies shall not contain substances in concentrations that create a lifetime cancer risk of more than one cancer per 100,000 exposed persons. Those criteria listed under domestic water supply in Subsection J of this section apply to this use.

C. Irrigation and irrigation storage: the following numeric criteria and those criteria listed under irrigation in Subsection J of this section apply to this use:

(1) dissolved selenium 0.13 mg/L
(2) dissolved selenium in presence of >500 mg/L SO_4 0.25 mg/L.

D. Primary contact: The monthly geometric mean of E. coli bacteria of 126 cfu/100 mL or MPN/100 ml and single sample of 410 cfu/100 mL or MPN/100 mL and pH within the range of 6.6 to 9.0 apply to this use. The results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN) depending on the analytical method used.

E. **Secondary contact:** The monthly geometric mean of E. coli bacteria of 548 cfu/100 mL or MPN/100 mL and single sample of 2507 cfu/100 mL or MPN/100 mL apply to this use. The results for *E. coli* may be reported as either colony forming units (CFU) or the most probable number (MPN), depending on the analytical method used.

F. **Livestock watering:** the criteria listed in Subsection J of this section for livestock watering apply to this use.

G. **Wildlife habitat:** Wildlife habitat shall be free from any substances at concentrations that are toxic to or will adversely affect plants and animals that use these environments for feeding, drinking, habitat or propagation; can bioaccumulate; or might impair the community of animals in a watershed or the ecological integrity of surface waters of the state. The numeric criteria listed in Subsection J for wildlife habitat apply to this use.

H. **Aquatic life:** Surface waters of the state with a designated, existing or attainable use of aquatic life shall be free from any substances at concentrations that can impair the community of plants and animals in or the ecological integrity of surface waters of the state. Except as provided in Paragraph (7) of this subsection, the acute and chronic aquatic life criteria set out in Subsections I, J, K and L of this section and the human health-organism only criteria set out in Subsection J of this section are applicable to all aquatic life use subcategories. In addition, the specific criteria for aquatic life subcategories in the following paragraphs apply to waters classified under the respective designations.

(1) **High quality coldwater:** dissolved oxygen 6.0 mg/L or more, 4T3 temperature 20°C (68°F), maximum temperature 23°C (73°F), pH within the range of 6.6 to 8.8 and specific conductance a segment-specific limit between 300 µS/cm and 1,500 µS/cm depending on the natural background in the particular surface water of the state (the intent of this criterion is to prevent excessive increases in dissolved solids which would result in changes in community structure). Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 4T3 temperature applies.

(2) **Coldwater:** dissolved oxygen 6.0 mg/L or more, 6T3 temperature 20°C (68°F), maximum temperature 24°C (75°F) and pH within the range of 6.6 to 8.8. Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies.

(3) **Marginal coldwater:** dissolved oxygen 6 mg/L or more, 6T3 temperature 25°C (77°F), maximum temperature 29°C (84°F) and pH within the range from 6.6 to 9.0. Where a single segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature and no 6T3 temperature applies.

(4) **Coolwater:** dissolved oxygen 5.0 mg/L or more, maximum temperature 29°C (84°F) and pH within the range of 6.6 to 9.0.

(5) **Warmwater:** dissolved oxygen 5 mg/L or more, maximum temperature 32.2°C (90°F) and pH within the range of 6.6 to 9.0. Where a segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature.

(6) **Marginal warmwater:** dissolved oxygen 5 mg/L or more, pH within the range of 6.6 to 9.0 and maximum temperature 32.2°C (90°F). Where a segment-specific temperature criterion is indicated in 20.6.4.101-899 NMAC, it is the maximum temperature.

(7) **Limited aquatic life:** The acute aquatic life criteria of Subsections I and J of this section apply to this subcategory. Chronic aquatic life criteria do not apply unless adopted on a segment-specific basis. Human health-organism only criteria apply only for persistent pollutants unless adopted on a segment-specific basis.

I. Hardness-dependent acute and chronic aquatic life criteria for metals are calculated using the following equations. The criteria are expressed as a function of dissolved hardness (as mg $CaCO_3$/L). With the exception of aluminum, the equations are valid only for dissolved hardness concentrations of 0-400 mg/L. For dissolved hardness concentrations above 400 mg/L, the criteria for 400 mg/L apply. For aluminum the equations are valid only for dissolved hardness concentrations of 0-220 mg/L. For dissolved hardness concentrations above 220 mg/L, the aluminum criteria for 220 mg/L apply.

(1) **Acute aquatic life criteria for metals:** The equation to calculate acute criteria in µg/L is $\exp(m_A[\ln(\text{hardness})] + b_A)(CF)$. Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department. The EPA has disapproved the hardness-based equation for total recoverable aluminum in waters where the pH is less than 6.5 in the receiving stream for federal purposes of the Clean Water Act. The equation parameters are as follows:

Metal	m_A	b_A	Conversion factor (CF)

NMED EXHIBIT 1A

Aluminum (Al)	1.3695	1.8308	
Cadmium (Cd)	0.8968	-3.5699	1.136672-[(ln hardness)(0.041838)]
Chromium (Cr) III	0.8190	3.7256	0.316
Copper (Cu)	0.9422	-1.700	0.960
Lead (Pb)	1.273	-1.460	1.46203-[(ln hardness)(0.145712)]
Manganese (Mn)	0.3331	6.4676	
Nickel (Ni)	0.8460	2.255	0.998
Silver (Ag)	1.72	-6.59	0.85
Zinc (Zn)	0.9094	0.9095	0.978

(2) Chronic aquatic life criteria for metals: The equation to calculate chronic criteria in µg/L is $\exp(m_C[\ln(\text{hardness})] + b_C)(CF)$. Except for aluminum, the criteria are based on analysis of dissolved metal. For aluminum, the criteria are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department. The EPA has disapproved the hardness-based equation for total recoverable aluminum in waters where the pH is less than 6.5 in the receiving stream for federal purposes of the Clean Water Act. The equation parameters are as follows:

Metal	**m_C**	**b_C**	**Conversion factor (CF)**
Aluminum (Al)	1.3695	0.9161	
Cadmium (Cd)	0.7647	-4.2180	1.101672-[(ln hardness)(0.041838)]
Chromium (Cr) III	0.8190	0.6848	0.860
Copper (Cu)	0.8545	-1.702	0.960
Lead (Pb)	1.273	-4.705	1.46203-[(ln hardness)(0.145712)]
Manganese (Mn)	0.3331	5.8743	
Nickel (Ni)	0.8460	0.0584	0.997
Zinc (Zn)	0.9094	0.6235	0.986

(3) Selected values of calculated acute and chronic criteria (µg/L).

Hardness as $CaCO_3$, dissolved (mg/L)		**Al**	**Cd**	**Cr III**	**Cu**	**Pb**	**Mn**	**Ni**	**Ag**	**Zn**
25	Acute	512	0.51	180	4	14	1,881	140	0.3	45
	Chronic	205	0.17	24	3	1	1,040	16		34
30	Acute	658	0.59	210	4	17	1,999	170	0.4	54
	Chronic	263	0.19	28	3	1	1,105	19		41
40	Acute	975	0.76	270	6	24	2,200	220	0.7	70
	Chronic	391	0.23	35	4	1	1,216	24		53
50	Acute	1,324	0.91	320	7	30	2,370	260	1.0	85
	Chronic	530	0.28	42	5	1	1,309	29		65
60	Acute	1,699	1.07	370	8	37	2,519	300	1.3	101
	Chronic	681	0.31	49	6	1	1,391	34		76
70	Acute	2,099	1.22	430	10	44	2,651	350	1.7	116
	Chronic	841	0.35	55	7	2	1,465	38		88
80	Acute	2,520	1.37	470	11	51	2,772	390	2.2	131
	Chronic	1,010	0.39	62	7	2	1,531	43		99
90	Acute	2,961	1.51	520	12	58	2,883	430	2.7	145
	Chronic	1,186	0.42	68	8	2	1,593	48		110
100	Acute	3,421	1.65	570	13	65	2,986	470	3.2	160
	Chronic	1,370	0.45	74	9	3	1,650	52		121
200	Acute	8,838	2.98	1,010	26	140	3,761	840	11	301
	Chronic	3,541	0.75	130	16	5	2,078	90		228

Hardness as $CaCO_3$, dissolved (mg/L)		Al	Cd	Cr III	Cu	Pb	Mn	Ni	Ag	Zn
220	Acute	10,071	3.23	1,087	28	151	3,882	912	13	328
	Chronic	4,035	0.80	141	18	6	2,145	101		248
300	Acute		4.21	1,400	38	210	4,305	1190	21	435
	Chronic		1.00	180	23	8	2,379	130		329
400 and above	Acute		5.38	1,770	50	280	4,738	1510	35	564
	Chronic		1.22	230	29	11	2,618	170		428

J. Use-specific numeric criteria.

(1) Table of numeric criteria: The following table sets forth the numeric criteria applicable to existing, designated and attainable uses. For metals, criteria represent the total sample fraction unless otherwise specified in the table. Additional criteria that are not compatible with this table are found in Subsections A through I, K and L of this section.

Pollutant	CAS Number	DWS	Irr	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Aluminum, dissolved	7429-90-5		5,000						
Aluminum, total recoverable	7429-90-5					a	a		
Antimony, dissolved	7440-36-0	6						640	P
Arsenic, dissolved	7440-38-2	10	100	200		340	150	9.0	C,P
Asbestos	1332-21-4	7,000,000 fibers/L							
Barium, dissolved	7440-39-3	2,000							
Beryllium, dissolved	7440-41-7	4							
Boron, dissolved	7440-42-8		750	5,000					
Cadmium, dissolved	7440-43-9	5	10	50		a	a		
Chlorine residual	7782-50-5				11	19	11		
Chromium III, dissolved	16065-83-1					a	a		
Chromium VI, dissolved	18540-29-9					16	11		
Chromium, dissolved	7440-47-3	100	100	1,000					
Cobalt, dissolved	7440-48-4		50	1,000					
Copper, dissolved	7440-50-8	1300	200	500		a	a		
Cyanide, total recoverable	57-12-5	200			5.2	22.0	5.2	140	
Lead, dissolved	7439-92-1	15	5,000	100		a	a		
Manganese, dissolved	7439-96-5					a	a		
Mercury	7439-97-6	2		10	0.77				
Mercury, dissolved	7439-97-6					1.4	0.77		
Methylmercury	22967-92-6							0.3 mg/kg in fish tissue	P
Molybdenum, dissolved	7439-98-7		1,000						
Molybdenum, total recoverable	7439-98-7					7,920	1,895		
Nickel, dissolved	7440-02-0	700				a	a	4,600	P
Nitrate as N		10 mg/L							
Nitrite + Nitrate				132 mg/L					
Selenium, dissolved	7782-49-2	50	b	50				4,200	P

Pollutant	CAS Number	DWS	Irr	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Selenium, total recoverable	7782-49-2				5.0	20.0	5.0		
Silver, dissolved	7440-22-4					a			
Thallium, dissolved	7440-28-0	2						0.47	P
Uranium, dissolved	7440-61-1	30							
Vanadium, dissolved	7440-62-2		100	100					
Zinc, dissolved	7440-66-6	10,500	2,000	25,000		a	a	26,000	P
Adjusted gross alpha		15 pCi/L		15 pCi/L					
Radium 226 + Radium 228		5 pCi/L		30.0 pCi/L					
Strontium 90		8 pCi/L							
Tritium		20,000 pCi/L		20,000 pCi/L					
Acenaphthene	83-32-9	2,100						990	
Acrolein	107-02-8	18						9	
Acrylonitrile	107-13-1	0.65						2.5	C
Aldrin	309-00-2	0.021				3.0		0.00050	C,P
Anthracene	120-12-7	10,500						40,000	
Benzene	71-43-2	5						510	C
Benzidine	92-87-5	0.0015						0.0020	C
Benzo(a)anthracene	56-55-3	0.048						0.18	C
Benzo(a)pyrene	50-32-8	0.2						0.18	C,P
Benzo(b)fluoranthene	205-99-2	0.048						0.18	C
Benzo(k)fluoranthene	207-08-9	0.048						0.18	C
alpha-BHC	319-84-6	0.056						0.049	C
beta-BHC	319-85-7	0.091						0.17	C
Gamma-BHC (Lindane)	58-89-9	0.20				0.95		1.8	
Bis(2-chloroethyl) ether	111-44-4	0.30						5.3	C
Bis(2-chloroisopropyl) ether	108-60-1	1,400						65,000	
Bis(2-ethylhexyl) phthalate	117817	6						22	C
Bromoform	75-25-2	44						1,400	C
Butylbenzyl phthalate	85-68-7	7,000						1,900	
Carbon tetrachloride	56-23-5	5						16	C
Chlordane	57-74-9	2				2.4	0.0043	0.0081	C,P
Chlorobenzene	108-90-7	100						1,600	
Chlorodibromomethane	124-48-1	4.2						130	C
Chloroform	67-66-3	57						4,700	C
2-Chloronaphthalene	91-58-7	2,800						1,600	
2-Chlorophenol	95-57-8	175						150	
Chrysene	218-01-9	0.048						0.18	C
Diazinon	333-41-5					0.17	0.17		
4,4'-DDT and derivatives		1.0			0.001	1.1	0.001	0.0022	C,P
Dibenzo(a,h)anthracene	53-70-3	0.048						0.18	C
Dibutyl phthalate	84-74-2	3,500						4,500	
1,2-Dichlorobenzene	95-50-1	600						1,300	
1,3-Dichlorobenzene	541-73-1	469						960	
1,4-Dichlorobenzene	106-46-7	75						190	

Pollutant	CAS Number	DWS	Irr	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
3,3'-Dichlorobenzidine	91-94-1	0.78						0.28	C
Dichlorobromomethane	75-27-4	5.6						170	C
1,2-Dichloroethane	107-06-2	5						370	C
1,1-Dichloroethylene	75-35-4	7						7,100	C
2,4-Dichlorophenol	120-83-2	105						290	
1,2-Dichloropropane	78-87-5	5.0						150	C
1,3-Dichloropropene	542-75-6	3.5						210	C
Dieldrin	60-57-1	0.022				0.24	0.056	0.00054	C,P
Diethyl phthalate	84-66-2	28,000						44,000	
Dimethyl phthalate	131-11-3	350,000						1,100,000	
2,4-Dimethylphenol	105-67-9	700						850	
2,4-Dinitrophenol	51-28-5	70						5,300	
2,4-Dinitrotoluene	121-14-2	1.1						34	C
Dioxin		3.0E-05						5.1E-08	C,P
1,2-Diphenylhydrazine	122-66-7	0.44						2.0	C
alpha-Endosulfan	959-98-8	62				0.22	0.056	89	
beta-Endosulfan	33213-65-9	62				0.22	0.056	89	
Endosulfan sulfate	1031-07-8	62						89	
Endrin	72-20-8	2				0.086	0.036	0.060	
Endrin aldehyde	7421-93-4	10.5						0.30	
Ethylbenzene	100-41-4	700						2,100	
Fluoranthene	206-44-0	1,400						140	
Fluorene	86-73-7	1,400						5,300	
Heptachlor	76-44-8	0.40				0.52	0.0038	0.00079	C
Heptachlor epoxide	1024-57-3	0.20				0.52	0.0038	0.00039	C
Hexachlorobenzene	118-74-1	1						0.0029	C,P
Hexachlorobutadiene	87-68-3	4.5						180	C
Hexachlorocyclopen-tadiene	77-47-4	50						1,100	
Hexachloroethane	67-72-1	25						33	C
Ideno(1,2,3-cd)pyrene	193-39-5	0.048						0.18	C
Isophorone	78-59-1	368						9,600	C
Methyl bromide	74-83-9	49						1,500	
2-Methyl-4,6-dinitrophenol	534-52-1	14						280	
Methylene chloride	75-09-2	5						5,900	C
Nitrobenzene	98-95-3	18						690	
N-Nitrosodimethylamine	62-75-9	0.0069						30	C
N-Nitrosodi-n-propylamine	621-64-7	0.050						5.1	C
N-Nitrosodiphenylamine	86-30-6	71						60	C
Nonylphenol	84852-15-3					28	6.6		
Polychlorinated Biphenyls (PCBs)	1336-36-3	0.50			0.014	2	0.014	0.00064	C,P
Pentachlorophenol	87-86-5	1.0				19	15	30	C
Phenol	108-95-2	10,500						860,000	
Pyrene	129-00-0	1,050						4,000	
1,1,2,2-Tetrachloroethane	79-34-5	1.8						40	C
Tetrachloroethylene	127-18-4	5						33	C,P

Pollutant	CAS Number	DWS	Irr	LW	WH	Aquatic Life			Type
						Acute	Chronic	HH-OO	
Toluene	108-88-3	1,000						15,000	
Toxaphene	8001-35-2	3				0.73	0.0002	0.0028	C
1,2-Trans-dichloroethylene	156-60-5	100						10,000	
1,2,4-Trichlorobenzene	120-82-1	70						70	
1,1,1-Trichloroethane	71-55-6	200							
1,1,2-Trichloroethane	79-00-5	5						160	C
Trichloroethylene	79-01-6	5						300	C
2,4,6-Trichlorophenol	88-06-2	32						24	C
Vinyl chloride	75-01-4	2						24	C

(2) Notes applicable to the table of numeric criteria in Paragraph (1) of this subsection.

(a) Where the letter "a" is indicated in a cell, the criterion is hardness-based and can be referenced in Subsection I of 20.6.4.900 NMAC.

(b) Where the letter "b" is indicated in a cell, the criterion can be referenced in Subsection C of 20.6.4.900 NMAC.

(c) Criteria are in µg/L unless otherwise indicated.

(d) Abbreviations are as follows: CAS - chemical abstracts service (see definition for "CAS number" in 20.6.4.7 NMAC); DWS - domestic water supply; Irr/Irr storage- irrigation or irrigation storage; LW - livestock watering; WH - wildlife habitat; HH-OO - human health-organism only; C - cancer-causing; P - persistent.

(e) The criteria are based on analysis of an unfiltered sample unless otherwise indicated. The acute and chronic aquatic life criteria for aluminum are based on analysis of total recoverable aluminum in a sample that is filtered to minimize mineral phases as specified by the department.

(f) The criteria listed under human health-organism only (HH-OO) are intended to protect human health when aquatic organisms are consumed from waters containing pollutants. These criteria do not protect the aquatic life itself; rather, they protect the health of humans who ingest fish or other aquatic organisms.

(g) The dioxin criteria apply to the sum of the dioxin toxicity equivalents expressed as 2,3,7,8-TCDD dioxin.

(h) The criteria for polychlorinated biphenyls (PCBs) apply to the sum of all congeners, to the sum of all homologs or to the sum of all aroclors.

K. Acute aquatic life criteria for total ammonia are dependent on pH and the presence or absence of salmonids. The criteria in mg/L as N based on analysis of unfiltered samples are as follows:

pH	Where Salmonids Present	Where Salmonids Absent
6.5 and below	32.6	48.8
6.6	31.3	46.8
6.7	29.8	44.6
6.8	28.1	42.0
6.9	26.2	39.1
7.0	24.1	36.1
7.1	22.0	32.8
7.2	19.7	29.5
7.3	17.5	26.2
7.4	15.4	23.0
7.5	13.3	19.9
7.6	11.4	17.0
7.7	9.65	14.4
7.8	8.11	12.1
7.9	6.77	10.1
8.0	5.62	8.40
8.1	4.64	6.95

pH	Where Salmonids Present	Where Salmonids Absent
8.2	3.83	5.72
8.3	3.15	4.71
8.4	2.59	3.88
8.5	2.14	3.20
8.6	1.77	2.65
8.7	1.47	2.20
8.8	1.23	1.84
8.9	1.04	1.56
9.0 and above	0.885	1.32

L. Chronic aquatic life criteria for total ammonia are dependent on pH, temperature and whether fish in early life stages are present or absent. The criteria are based on analysis of unfiltered samples and are calculated according to the equations in Paragraphs (1) and (2) of this subsection. For temperatures from below 0 to 14°C, the criteria for 14°C apply; for temperatures above 30°C, the criteria for 30°C apply. For pH values below 6.5, the criteria for 6.5 apply; for pH values above 9.0, the criteria for 9.0 apply.

(1) Chronic aquatic life criteria for total ammonia when fish early life stages are present:

(a) The equation to calculate chronic criteria in mg/L as N is:

$$((0.0577/(1 + 10^{7.688\text{-pH}})) + (2.487/(1 + 10^{\text{pH-}7.688})) \text{ x MIN } (2.85, 1.45 \text{ x } 10^{0.028 \text{ x } (25\text{-T})})$$

(b) Selected values of calculated chronic criteria in mg/L as N:

pH	Temperature (°C)									
	14 and below	15	16	18	20	22	24	26	28	30 and above
6.5 and below	6.67	6.46	6.06	5.33	4.68	4.12	3.62	3.18	2.80	2.46
6.6	6.57	6.36	5.97	5.25	4.61	4.05	3.56	3.13	2.75	2.42
6.7	6.44	6.25	5.86	5.15	4.52	3.98	3.50	3.07	2.70	2.37
6.8	6.29	6.10	5.72	5.03	4.42	3.89	3.42	3.00	2.64	2.32
6.9	6.12	5.93	5.56	4.89	4.30	3.78	3.32	2.92	2.57	2.25
7.0	5.91	5.73	5.37	4.72	4.15	3.65	3.21	2.82	2.48	2.18
7.1	5.67	5.49	5.15	4.53	3.98	3.50	3.08	2.70	2.38	2.09
7.2	5.39	5.22	4.90	4.31	3.78	3.33	2.92	2.57	2.26	1.99
7.3	5.08	4.92	4.61	4.06	3.57	3.13	2.76	2.42	2.13	1.87
7.4	4.73	4.59	4.30	3.78	3.32	2.92	2.57	2.26	1.98	1.74
7.5	4.36	4.23	3.97	3.49	3.06	2.69	2.37	2.08	1.83	1.61
7.6	3.98	3.85	3.61	3.18	2.79	2.45	2.16	1.90	1.67	1.47
7.7	3.58	3.47	3.25	2.86	2.51	2.21	1.94	1.71	1.50	1.32
7.8	3.18	3.09	2.89	2.54	2.23	1.96	1.73	1.52	1.33	1.17
7.9	2.80	2.71	2.54	2.24	1.96	1.73	1.52	1.33	1.17	1.03
8.0	2.43	2.36	2.21	1.94	1.71	1.50	1.32	1.16	1.02	0.897
8.1	2.10	2.03	1.91	1.68	1.47	1.29	1.14	1.00	0.879	0.773
8.2	1.79	1.74	1.63	1.43	1.26	1.11	0.973	0.855	0.752	0.661
8.3	1.52	1.48	1.39	1.22	1.07	0.941	0.827	0.727	0.639	0.562
8.4	1.29	1.25	1.17	1.03	0.906	0.796	0.700	0.615	0.541	0.475
8.5	1.09	1.06	0.990	0.870	0.765	0.672	0.591	0.520	0.457	0.401
8.6	0.920	0.892	0.836	0.735	0.646	0.568	0.499	0.439	0.386	0.339
8.7	0.778	0.754	0.707	0.622	0.547	0.480	0.422	0.371	0.326	0.287
8.8	0.661	0.641	0.601	0.528	0.464	0.408	0.359	0.315	0.277	0.244
8.9	0.565	0.548	0.513	0.451	0.397	0.349	0.306	0.269	0.237	0.208
9.0 and above	0.486	0.471	0.442	0.389	0.342	0.300	0.264	0.232	0.204	0.179

(2) Chronic aquatic life criteria for total ammonia when fish early life stages are absent.

(a) The equation to calculate chronic criteria in mg/L as N is:

$$((0.0577/(1 + 10^{7.688\text{-pH}})) + (2.487/(1 + 10^{\text{pH-}7.688})) \times 1.45 \times 10^{0.028 \times (25\text{-MAX}(T,7))}$$

(b) Selected values of calculated chronic criteria in mg/L as N:

pH	Temperature (°C)								
	7 and below	8	9	10	11	12	13	14	15 and above
6.5 and below	10.8	10.1	9.51	8.92	8.36	7.84	7.35	6.89	6.46
6.6	10.7	9.99	9.37	8.79	8.24	7.72	7.24	6.79	6.36
6.7	10.5	9.81	9.20	8.62	8.08	7.58	7.11	6.66	6.25
6.8	10.2	9.58	8.98	8.42	7.90	7.40	6.94	6.51	6.10
6.9	9.93	9.31	8.73	8.19	7.68	7.20	6.75	6.33	5.93
7.0	9.60	9.00	8.43	7.91	7.41	6.95	6.52	6.11	5.73
7.1	9.20	8.63	8.09	7.58	7.11	6.67	6.25	5.86	5.49
7.2	8.75	8.20	7.69	7.21	6.76	6.34	5.94	5.57	5.22
7.3	8.24	7.73	7.25	6.79	6.37	5.97	5.60	5.25	4.92
7.4	7.69	7.21	6.76	6.33	5.94	5.57	5.22	4.89	4.59
7.5	7.09	6.64	6.23	5.84	5.48	5.13	4.81	4.51	4.23
7.6	6.46	6.05	5.67	5.32	4.99	4.68	4.38	4.11	3.85
7.7	5.81	5.45	5.11	4.79	4.49	4.21	3.95	3.70	3.47
7.8	5.17	4.84	4.54	4.26	3.99	3.74	3.51	3.29	3.09
7.9	4.54	4.26	3.99	3.74	3.51	3.29	3.09	2.89	2.71
8.0	3.95	3.70	3.47	3.26	3.05	2.86	2.68	2.52	2.36
8.1	3.41	3.19	2.99	2.81	2.63	2.47	2.31	2.17	2.03
8.2	2.91	2.73	2.56	2.40	2.25	2.11	1.98	1.85	1.74
8.3	2.47	2.32	2.18	2.04	1.91	1.79	1.68	1.58	1.48
8.4	2.09	1.96	1.84	1.73	1.62	1.52	1.42	1.33	1.25
8.5	1.77	1.66	1.55	1.46	1.37	1.28	1.20	1.13	1.06
8.6	1.49	1.40	1.31	1.23	1.15	1.08	1.01	0.951	0.892
8.7	1.26	1.18	1.11	1.04	0.976	0.915	0.858	0.805	0.754
8.8	1.07	1.01	0.944	0.855	0.829	0.778	0.729	0.684	0.641
8.9	0.917	0.860	0.806	0.756	0.709	0.664	0.623	0.584	0.548
9.0 and above	0.790	0.740	0.694	0.651	0.610	0.572	0.536	0.503	0.471
At 15ºC and above, the criterion for fish early life stages absent is the same as the criterion for fish early life stages present (refer to table in Paragraph (1) of this subsection).									

[20.6.4.900 NMAC - Rp 20 NMAC 6.1.3100, 10/12/2010; A, 10/11/2002; A, 5/23/2005; A, 7/17/2005; A, 12/1/2010; A, 3/2/2017]

20.6.4.901 PUBLICATION REFERENCES: These documents are intended as guidance and are available for public review during regular business hours at the offices of the surface water quality bureau. Copies of these documents have also been filed with the New Mexico state records center in order to provide greater access to this information.

A. American public health association. 1992. *Standard Methods For The Examination Of Water And Wastewater, 18th Edition.* Washington, D.C. 1048 p.

B. American public health association. 1995. *Standard Methods For The Examination Of Water And Wastewater, 19th Edition.* Washington, D.C. 1090 p.

C. American public health association. 1998. *Standard Methods For The Examination Of Water And Wastewater, 20th Edition.* Washington, D.C. 1112 p.

D. United States geological survey. 1987. *Methods For Determination Of Inorganic Substances In Water And Fluvial Sediments, Techniques Of Water-Resource Investigations Of The United States Geological Survey.* Washington, D.C. 80 p.

E. United States geological survey. 1987. *Methods for the determination of organic substances in water and fluvial sediments, techniques of water-resource investigations of the U.S. Geological survey.* Washington, D.C. 80 p.

F. United States environmental protection agency. 1974. *Methods For Chemical Analysis Of Water And Wastes.* National environmental research center, Cincinnati, Ohio. (EPA-625-/6-74-003). 298 p.

G. New Mexico water quality control commission. 2003. *(208) State Of New Mexico Water Quality Management Plan*. Santa Fe, New Mexico. 85 p.

H. Colorado river basin salinity control forum. 2014. *2014 Review, Water Quality Standards For Salinity, Colorado River System.* Phoenix, Arizona. 99 p.

I. United States environmental protection agency. 2002. *Methods For Measuring The Acute Toxicity Of Effluents And Receiving Waters To Freshwater And Marine Organisms.* Office of research and development, Washington, D.C. (5th Ed., EPA 821-R-02-012). 293 p. http://www.epa.gov/ostWET/disk2/atx.pdf

J. United States environmental protection agency. 2002. *Short-Term Methods For Estimating The Chronic Toxicity Of Effluents And Receiving Waters To Freshwater Organisms.* Environmental monitoring systems laboratory, Cincinnati, Ohio. ([4th Ed., EPA 821-R-02-01). 335 p.

K. Ambient-induced mixing, in United States environmental protection agency. 1991. *Technical Support Document For Water Quality-Based Toxics Control*. Office of water, Washington, D.C. (EPA/505/2-90-001). 2 p.

L. United States environmental protection agency. 1983. *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses*. Office of water, regulations and standards, Washington, D.C. 251 p. http://www.epa.gov/OST/library/wqstandards/uaavol123.pdf

M. United States environmental protection agency. 1984. *Technical Support Manual: Waterbody Surveys And Assessments For Conducting Use Attainability Analyses, Volume Iii: Lake Systems*. Office of water, regulations and standards, Washington, D.C. 208 p. http://www.epa.gov/OST/library/wqstandards/uaavol123.pdf

[20.6.4.901 NMAC - Rp 20 NMAC 6.1.4000, 10/12/2010; A, 5/23/2005; A, 12/1/2010; A, 3/2/2017]

HISTORY of 20.6.4 NMAC:

Pre-NMAC History:

Material in the part was derived from that previously filed with the commission of public records - state records center and archives:

WQC 67-1, Water Quality Standards, filed 7-17-67, effective 8-18-67
WQC 67-1, Amendment Nos. 1-6, filed 3-21-68, effective 4-22-68
WQC 67-1, Amendment No. 7, filed 2-27-69, effective 3-30-69
WQC 67-1, Amendment No. 8, filed 7-14-69, effective 8-15-69
WQC 70-1, Water Quality Standards for Intrastate Waters and Tributaries to Interstate Streams, filed July 17, 1970;
WQC 67-1, Amendment Nos. 9 and 10, filed 2-12-71, effective 3-15-71
WQC 67-1, Amendment No. 11, filed 3-4-71, effective 4-5-71
WQC 73-1, New Mexico Water Quality Standards, filed 9-17-73, effective 10-23-73
WQC 73-1, Amendment Nos. 1 and 2, filed 10-3-75, effective 11-4-75
WQC 73-1, Amendment No. 3, filed 1-19-76, effective 2-14-76
WQC 77-2, Amended Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 2-24-77, effective 3-11-77
WQC 77-2, Amendment No. 1, filed 3-23-78, effective 4-24-78
WQC 77-2, Amendment No. 2, filed 6-12-79, effective 7-13-79
WQCC 80-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 8-28-80, effective 9-28-80
WQCC 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 5-5-81, effective 6-4-81
WQCC 81-1, Amendment No. 1, filed 5-19-82, effective 6-18-82
WQCC 81-1, Amendment No. 2, filed 6-24-82, effective 7-26-82
WQCC 85-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 1-16-85, effective 2-15-85
WQCC 85-1, Amendment No. 1, filed 8-28-87, effective 9-28-87
WQCC 88-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 3-24-88, effective 4-25-88

WQCC 91-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, filed 5-29-91, effective 6-29-91
WQCC 91-1, Amendment No. 1, filed 10-11-91, effective 11-12-91

History of the Repealed Material:
WQC 67-1, Water Quality Standards, - Superseded, 10-23-73
WQC 73-1, New Mexico Water Quality Standards, - Superseded, 3-11-77
WQC 77-2, Amended Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 9-28-80
WQCC 80-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 6-4-81
WQCC 81-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 2-15-85
WQCC 85-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 4-25-88
WQCC 88-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 6-29-91
WQCC 91-1, Water Quality Standards for Interstate and Intrastate Streams in New Mexico, - Superseded, 1-23-95
20 NMAC 6.1, Standards for Interstate and Intrastate Streams, - Repealed, 2-23-00
20 NMAC 6.1, Standards for Interstate and Intrastate Surface Waters, - Repealed, 10/12/2000

Jennifer T. Fullam

WORK HISTORY
March 2017- Present
State of New Mexico Environment Department, Santa Fe, New Mexico
Surface Water Quality Bureau
Standards, Planning and Reporting (SPR) Team Supervisor

- Serve as the coordinator for New Mexico's surface water quality standards which includes but is not limited to applying the procedures established for adopting changes to the surface water quality standards, petitioning for a hearing to the Water Quality Control Commission (WQCC), preparing and advertising public notices, providing written and oral testimony for a hearing before the WQCC, preparing for cross examination, understanding and applying hearing guidelines, assisting with the development of post-hearing submittals and filing rule changes to State Records and Archives in accordance with 20.1.24.10 NMAC.
- Maintain knowledge of State and Federal statutory requirements that affect surface water quality standards and standards development.
- Coordinate with the United States Environmental Protection Agency (EPA) on actions pertaining to the State's Water Quality Standards and the Federal Clean Water Act. This includes submitting surface water quality standards (new and revised) to EPA Region 6 for review and action (approval or disapproval).
- Conduct and review use attainability analysis and hydrology protocol surveys which propose to revise, remove or add segment specific water quality standards to 20.6.4 NMAC.
- Responsible for the daily management and oversight of work conducted by the Standards, Planning and Reporting Team which oversees the implementation of the Bureau's Quality Assurance requirements, technical and educational outreach activities and development of regulatory and rulemaking actions.
- Review and revise the Water Quality Management Plan and Continuing Planning Process as required under the Clean Water Act.
- Coordinate and provide guidance and appropriate training for staff on program procedures.
- Ensure that all written work products from the SPR team are of high quality, reflect the professionalism of the Bureau and Department, and support New Mexico Environment Department's (NMED's) role as the lead agency for surface water quality protection in New Mexico.
- Conduct employee performance reviews of staff under the SPR Team.
- Conduct recruitment, disciplinary and hiring actions in accordance with State Personnel and Human Resources policies and procedures.
- Conduct technical and educational public outreach for proposed rulemaking actions to the surface water quality standards. This includes coordinating public notices through the website, listserv, newspapers, media releases and public meetings, providing technical and regulatory information from members of the public and recognized stakeholders.
- Collaborate and facilitate dialogue with Tribes on water quality standard issues. Reviewing Tribal Water Quality Standards and providing input, as applicable.
- Participate on national issues pertaining to water quality standards such as variances, proposed rules on Waters of the United States (WOTUS) and proposed guidelines for standards.

NMED EXHIBIT 2

- Facilitate positive working relationships with other state and federal agencies, stakeholders and cooperators involved in surface water quality standards activities.
- Oversee the development of quality assurance guidance documents such as the Quality Management Plan (QMP) and Quality Assurance Project Plan (QAPP), Standard Operating Procedures and Field Sampling Plans
- Oversee the Quality Assurance Manager responsible for quality assurance activities pertaining to surface water data collection both within the Bureau and with outside entities seeking to submit water quality data for assessment purposes.

March 2014-March 2017
State of New Mexico Environment Department, Santa Fe, New Mexico
Petroleum Storage Tank Bureau
Compliance Assistance Coordinator/Environmental Scientist Specialist-A

- Responsible for the implementation and daily management of the Delivery Prohibition enforcement program.
- Development and implementation of strategic data management processes.
- Create and maintain tracking tools to assist in data collection and case management.
- Effectively track specific violations and enforcement actions for approximately 300 new cases (1300 individual violations) per year in a consistent, objective and timely manner.
- Compile information, through active data mining within these internal tracking applications, the Department's database and facility owner's files, to be able to provide compliance and enforcement statistics to meet the Federal Environmental Protection Agency's mandates and State reporting requirements.
- Effectively communicate, both verbally as well as in writing to various audiences including peers, management, regulated community and legal counsel.
- Review and clarify observations documented by the inspectors in the field and prepare a legally defensible enforcement case.
- In the event enforcement actions are appealed to the Secretary, assist in preparing testimony for a hearing.
- Apply knowledge of Federal (specifically 40 CFR §280) and State regulations (20.5 NMAC) with technical and legal writing skills experience to draft and edit enforcement documents.
- Involved in the development of new regulations to meet 40 CFR § 280.
- Regularly coordinate with the Bureau Chief and Program Managers within the Bureau
- Seek input and collaborate with staff from other Bureaus as it applies towards implementation of State and Federal Regulations.
- Network with other States and Tribes on processes and regulatory implementation.
- Provide written and verbal notification to facility owners of upcoming enforcement actions and offer assistance on actions required to obtain compliance.
- Maintain open communication with inspectors to assemble the chronological histories of ongoing outreach with owners and operators facing enforcement actions.
- Gather, collaborate and discuss ongoing applicability of the regulations and disseminate this information to inspectors to ensure continuity within the delivery prohibition program.
- Manage and delegate tasks to technical and administrative staff assisting with the delivery prohibition program.
- Serve as a Bureau-wide web author, updating the Bureau's website as necessary using cloud based programs and Adobe Contribute.
- Assist with additional projects such as with the development of standard operating procedures for the Prevention Inspection Program and database development and management.

- Assist the Bureau's Prevention Inspection Program by contributing to the ongoing program development and conducting compliance inspections at facilities around the State; which requires knowledge of the technical aspects of both UST and AST systems.

July 2007- March 2014
State of New Mexico Environment Department, Santa Fe, New Mexico
Ground Water Quality Bureau
Pollution Prevention Section
Environmental Scientist-O

- Ensuring the protection of ground water throughout the State of New Mexico by regulatory management for over 70 ground water discharge permits. The diversity of sites range from large federal industrial facilities, large domestic wastewater treatment plants and small septic tank/leachfield systems.
- Administering regulatory functions as they pertain to permitted and un-permitted facilities. Actions include but are not limited to management of records subject to the public information act, data entry of facility monitoring reports, database management for assigned facilities, ground water and wastewater sampling, response to unauthorized releases and enforcement actions.
- Successfully worked with Permittees and the general public in achieving voluntary compliance through non-enforcement actions. Refined experience in assessing potentially volatile situations and diffusing with effective and clear communication. Ground water protection has also been achieved through promoting cost-effective and source control mechanisms to reduce potential contaminants from reaching ground water. Discharge Permits are designed to address protection of ground water and human health while working towards long-term sustainability of small businesses.
- Maintain and continuously enhancing an already robust understanding of Federal Regulations such as the Clean Water Act, Resource Conservation and Recovery Act, Biosolids Standards the State of New Mexico's Clean Water act, Water Quality Control Commission regulations which have been used for evaluating site specific conditions and development of priority actions.
- Ongoing coordination and collaboration with Tribal entities including but not limited to compiling the annual Tribal Collaboration report for the Ground Water Quality Bureau, participation in the Annual Tribal Summit, planning and serving as a mentor and instructor for the annual Tribal Youth Environmental Science Camp.
- Effectively facilitate dialogue among a diverse group of individuals, with varying backgrounds and expertise, in order to develop and strategize a productive approach in resolving complex issues. Ongoing work includes facilitation of discussions between the GWQB, Hazardous Waste Bureau, Department of Energy Oversight Bureau, Surface Water Bureau and Los Alamos National Laboratory in order to maintain regulatory compliance and cross-departmental communications for the management of the facility.
- Provide assistance to legal counsel on litigation cases. These have included involvement with a federal negotiation case with the Hazardous Waste Bureau and Los Alamos National Laboratory as well as a Chapter 11 Bankruptcy Lawsuit against Mark IV Industries for the continued remediation of a contaminated ground water site in east Albuquerque which resulted in an Order of Consent.
- Actively participated and spearheaded discussions in various workgroups within the section to enhance the regulatory process and streamline the efficiency of the program to ensure protection of the State's resources as well as promoting economic development for rural communities. These have included the development of Best Management Practices for RV

Parks, Tribal Consultation Policy, Grease Trap Management Practices and Domestic Wastewater Discharge Permit Template.

- Development of sound investigative skills to truth information submitted to NMED through remote sensing technologies, ground-truthing or through various technological resources.
- Development of internal mechanisms and processes to effectively manage and increase efficiency in the management of regulatory processes.
- Serve as a Quality Assurance Manager (QAM) for the Radiation Control Bureau's Quality Assurance Project Plan (QAPP) ensuring all data collection activities are collected in a consistent and defensible manner.
- Applying federal laws and regulations, effective approaches to gain voluntary compliance and general management tools and resources to increase efficacy in job performance.
- General program administration functions to include preparing timesheets, vehicle logs, travel requests, along with submitting quarterly and annual reports to management as assigned.

April 2003-July 2007
Pueblo of Tesuque, Santa Fe, New Mexico
Environment Department
Biologist/Director

- Responsible for overseeing the management and execution of activities associated with the protection of environmental resources. The program included surface water quality, water rights, ground water, planning and development, forest restoration, wildlife habitat management, wildland fire response, emergency response as it pertained to the community and potential environmental impacts, general community assistance, education (pre-k through college) and outreach.
- Reported directly to the Tribal Administrator, Governor and Tribal Council on the department's activities.
- Supervised up to 11 individuals on routine and special projects undertaken by the department which included but were not limited to surface water, forest restoration, WUI fire suppression projects, wildlife surveys and habitat assessments, economic development projects, Aamodt water rights settlement committee, community activities, educational outreach (kindergarten through college), assistance with organic farm program, community assistance as requested.
- Worked and collaborated with numerous federal, state and local government agencies such as the Environmental Protection Agency (EPA), Army Corp of Engineers, Bureau of Indian Affairs, Indian Health Services, State of New Mexico Environment Department, Santa Fe County, City of Santa Fe, and various Tribal governments.
- Responsible for writing and managing over $1,000,000.00 in State and Federal grants through the U.S. Forest Service, Administration for Native Americans, Environmental Protection Agency, U.S. Fish and Wildlife, and New Mexico Clean and Beautiful, submitting quarterly and annual reports on a regular basis as well as auditing expenses to ensure allocation of funds was completed and reported appropriately.
- Served as a member on the Tribal Emergency Planning committee and Land Use Planning Committee, Board member of Inter-Tribal Bison Cooperative, Inter-Tribal Resource Advisory Committee, and Water Rights Committee and as a voting member for EPA Region 6 Regional Tribal Operations Committee.
- Responsible for writing and implementing Quality Assurance documents and the department's annual Quality Management Plan, Quality Assurance Project Plans for water quality monitoring, GIS/GPS, and the Elk Demonstration Project.
- Prepared and conducted the triennial review of Tesuque Pueblo's Water Quality Standards.

- Actively engaged with community members to better understand the needs and priorities of the Tribe in order to effectively target financial mechanisms and internal resources which could be utilized to achieve long-term goals.
- Designed and implemented a multi-parameter study to assess movement and habitat utilization of elk herds within lower pinon/juniper forests of Tesuque Pueblo. Field work consisted of off-road driving and heavy lifting of equipment and supplies, remote sensing and data management.
- Use of various field equipment for work pertaining to water quality monitoring (ground and surface water), riparian ecosystem rehabilitation projects, wildlife habitat and behavior. Data correction and management of files.

January 2002- April 2003
Los Alamos National Laboratory, Los Alamos, New Mexico
Contaminant Monitoring Team
Graduate Research Assistant

- Provided technical research support for the Ecology Group including compiling, writing and editing portions of the published technical reports as well as the annual Environmental Surveillance Report.
- Collected and processed field samples from remote areas with a wide array of equipment.
- Analyzed data in MS Excel for risk assessment of contaminant such as high explosives, radionuclide, polychlorinated biphenyls (PCBs), dioxins, furans and pesticides such as DDT.
- Actively participated in a cooperative group with the New Mexico Environment Department, Los Alamos County and Tribal entities to designed and implement a contaminant mobilization study in the Rio Grande to assess the possible PCB risk levels that may be associated with LANL's historic PCB releases and the potential of mobilization after the Cerro Grande fire using semi-permeable membrane devises (LANL Publication Gonzales and Montoya 2005).

EDUCATION

2002-2008 New Mexico Highlands University, Las Vegas, New Mexico
Master of Science (May 2008)

- Thesis on the unique characteristics of elk movement and habitat utilization within the pinon/juniper forests of Tesuque Pueblo
- Other studies included toxicology, environmental assessment, surface hydrology, dendrology, wildlife habitat assessment and research methods
- Research on the use of semi-permeable membrane devices to assess the effects of pulse flooding events on PCB concentrations in the Rio Grande river near Los Alamos
- Cumulative GPA 4.0

1999-2002 University of New Mexico, Albuquerque, New Mexico
Bachelor of Science, Biology with minor in Geography (May 2001)

- Studies in riparian ecology, conservation biology, animal behavior, zoology and physiology.
- Formal studies and research in Geographical Information Systems.
- Graduated Cum Laude.

1994-1997 Northern New Mexico Community College, Espanola, New Mexico
Associate of Science in Science

- Graduated with Honors

APPLICABLE CERTIFICATIONS/TRAININGS

Quality Assurance

- EPA QMP/QAPP Training, Santa Fe, NM(Certificate)
- EPA Training to Quality Assurance Management, Data Quality Objectives, Santa Fe, NM (Certificate)

Water and Wastewater

- EPA Tribal Water Quality Standards Academy Intermediate level (Certificate)
- EPA Water Quality Standards Academy, Washington D.C. (Certificate)
- NMSU WTAP Advanced Secondary Treatment (certificate)
- National Onsite Wastewater Recycling Association A to Z Course (certificate)
- YSI Training on 6920 Multi-parameter water quality monitoring unit, Yellow Springs, OH
- Stream Habitat Assessment Training, Taos Pueblo, NM
- Biological Assessment Training, Santa Ana Pueblo, NM
- Fundamentals of Drilling (certificate)

Emergency Response/Safety

- FEMA National Incident management System (IS-700) Tesuque Pueblo, NM (Certificate)
- BIA Northern Pueblos Wildland Firefighter Training (S-110, S-133, S-134, I-100, L-180, S-130, S-190), Ohkay Owingeh, NM (Red Card Certification)
- Pandemic Flu, Train the Trainer, Albuquerque, NM (Certificate)
- Zoonotic Disease Training, Los Alamos National Laboratory, Los Alamos, NM
- HAZWOPER certified (2007-2017)
- AHMP Essentials of Hazardous Materials Management, Albuquerque, NM (Certificate)
- U.S. Dept of Transportation Awareness for Initial Response to Haz-Mat Incidents Course (Certificate)
- National Safety Council Defensive Driving Course (Certificate)
- Swiftwater Rescue for River Professionals Training; Level II NFPA-compliant 1670 "Operations" (Certificate)

Inspection and Enforcement

- Western States Project NMED Environmental Enforcement Procedure Training (certificate)
- UST Inspector Training (Certificate)
- State of NM HR and OGC Inspector Training (certificate)

Lawmaking and Regulations

- State of NM State Rulemaking Training
- State of NM Records and Information Management Training

PUBLICATIONS/PROFESSIONAL ORGANIZATIONS

- Gonzales, G. and Montoya, J., 2005. Polychlorinated biphenyls (PCBs) in the Rio Grande Sampled Using Semi-permeable Membrane Devices. LA-14200.
- Fullam, J., 2008. Elk Habitat Utilization Within Lower Pinon Juniper Forests of Tesuque Pueblo, New Mexico Highlands University Graduate Thesis.
- Golden Key National Honor Society (2001-Present)
- Native American Fish and Wildlife Society (2003-2007)
- The Quivera Coalition (2003-2007)
- Ecological Society of America (2016)
- The Wildlife Society (2011-2017)
- Society of Environmental Toxicology and Applied Chemistry (2002-2007; 2017-Present)

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PROPOSED AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD — **No. WQCC 19-46(R)**

DIRECT TECHNICAL TESTIMONY OF JENNIFER FULLAM

I. INTRODUCTION

My name is Jennifer Fullam, and I am presenting this written testimony (NMED Exhibit 3) on behalf of the New Mexico Environment Department ("Department") concerning the proposals to amend the water quality standards for the City of Raton Wastewater Treatment Plant ("WWTP") that discharges to Doggett Creek in Colfax County. I am currently employed as the Standards, Planning and Reporting Team Supervisor and serve as the Water Quality Standards Coordinator with the Department's Surface Water Quality Bureau ("SWQB"). A copy of my resume is included as NMED Exhibit 2. It is accurate and up-to-date.

I will be presenting testimony regarding the discharger-specific temporary standard proposal prepared by the Department to establish a temporary water quality standard for the City of Raton's WWTP. My testimony will outline the regulations for creating a temporary standard and the administrative process for changing the State's water quality standards which are codified under, 20.6.4 of the New Mexico Administrative Code ("NMAC") as *Standards for Interstate and Intrastate Surface Waters*.

II. BACKGROUND ON TEMPORARY WATER QUALITY STANDARDS

The goal of the Federal Water Pollution Control Act, also known as the "Clean Water Act" or "CWA", requires that, wherever attainable, water quality shall provide for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water. Section 101(a)(2) of the CWA (NMED Exhibit 19). Each state must specify appropriate water uses to be achieved and protected. 40 C.F.R. § 131.10 [2019] (NMED Exhibit 20). The requirements, as outlined under 40 C.F.R. § 131.10 (NMED Exhibit 20) and the CWA have been codified for state purposes under 20.6.4 NMAC. All waters within the State of New Mexico, as defined under 20.6.4.7(S)(5) NMAC, have established designated uses to meet the goals of the CWA.

The State's *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC), established designated uses and the associated criteria for protection of those uses for aquatic life and recreation. As defined under 20.6.4.7(D)(3) NMAC, a designated use is a use specified in 20.6.4.97 through 20.6.4.899 NMAC for a surface water of the state whether or not it is being attained. There are cases in which, for various reasons, the designated use for a water body is not attainable. If the factor preventing the attainment of the use is due to a time-limited condition, such as socio-economic conditions and to which incremental improvement can be made towards attaining the water quality associated with the designated use, the water body, segment of the water body or discharge to the water body may be eligible for a temporary water quality standard ("temporary standard"). 40 C.F.R. § 131.14 (NMED Exhibit 20); 20.6.4.10(F) NMAC.

A temporary standard is a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the temporary standard. 20.6.4.10(F)(12) NMAC. A temporary standard can be issued for a waterbody, a segment of a waterbody or a specific discharger. A temporary standard limits the degradation of water quality to the minimum necessary to achieve the original standard by the expiration date of the temporary standard and will not reduce quality of current water quality conditions nor cause the further impairment or loss of an existing use. 40 C.F.R. § 131.14 (NMED

Exhibit 20) and 20.6.4.10(F) NMAC. For a temporary standard that applies to a specific discharger, the highest attainable condition must be quantifiably expressed as one of the following:

1. The highest attainable interim criterion; or
2. The interim effluent condition that reflects the greatest pollutant reduction achievable; or
3. If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the state adopts the WQS variance (temporary standard), and the adoption and implementation of a pollutant minimization program.

40 C.F.R. § 131.14(b)(1)(ii)(A) (2019) (NMED Exhibit 20).

Temporary standards are incorporated as amendments to 20.6.4 NMAC and are required to undergo state rulemaking procedures as prescribed under the State Rules Act, NMSA 1978, § 14-4-1 through 14-4-11 (as amended through 2017), Rulemaking Procedures for the Water Quality Control Commission, 20.1.6 NMAC, and General Government Administration Rules, 1.24 NMAC. In addition, the U.S. Environmental Protection Agency ("EPA") must approve the temporary standard to be effective for CWA purposes in accordance with 40 C.F.R. § 131.20. (NMED Exhibit 20).

A temporary standard petition must identify the underlying water quality standard(s), the proposed temporary standard for the specific pollutant(s) based on the highest attainable condition that shall not result in any lowering of the currently attained ambient water quality, the permittee(s), the specific waterbody to which the temporary standard would apply, and the factor(s) precluding attainment of the designated use. 40 C.F.R. §131.14 (NMED Exhibit 20). The petitioner shall prepare a work plan with a timetable of proposed actions for incremental improvements, including baseline water quality and any investigations, projects, facility modifications, monitoring, or other measures necessary to achieve compliance with the original standard. 20.6.4.10(F)(5) NMAC. Furthermore, for discharger-specific temporary standards, the petition must also demonstrate that existing or proposed discharge control technologies comply with technology-based effluent limitations ("TBELs"), and feasible technological controls and other management alternatives. 40 C.F.R. § 131.14(a)(4) (NMED Exhibit 20) and 20.6.4.10(F)(1)(c) NMAC.

Because the term of the temporary standard must be only as long as necessary to achieve the highest attainable condition (40 C.F.R. § 131.14(b)(1)(iv)) (NMED Exhibit 20); and the temporary standard shall expire no later than the date specified in the approval (20.6.4.10(F)(10) NMAC), the term of the temporary standard is effective for the approved term or until such a time to which the highest attainable condition has been met, whichever comes first.. Upon termination of the temporary standard, the original water quality standard becomes the applicable standard. 20.6.4.10(F)(8) NMAC. In accordance with 40 C.F.R. § 131.14(b)(1)(iv) (NMED Exhibit 20), the state may adopt a subsequent temporary standard if demonstrated to meet the requirements under 40 C.F.R. § 131.14 (NMED Exhibit 20) and 20.6.4.10(F) NMAC. Alternatively, a designated use may be removed, if not an existing use, by conducting a use attainability analysis in accordance with 40 C.F.R. § 131.10(g) (NMED Exhibit 20) and 20.6.4.15 NMAC. In addition, the Commission may consider a petition to extend an approved temporary standard only if the factors precluding the attainment still apply, the petitioner is meeting the conditions required for approval of the temporary standard, and that reasonable progress towards meeting the underlying standard is being achieved. 20.6.4.10(F)(9) NMAC.

III. RE-EVALUATION OF THE TEMPORARY STANDARD

Pursuant to 40 CFR 131.14(b)(1)(v) (NMED Exhibit 20), the highest attainable condition in the temporary standard is required to be reevaluated by the State using all existing and readily available information no less than every five (5) years and the reevaluation must include a mechanism for public input. Subsequently, 20.6.4.10(F)(8) NMAC requires a review of the temporary standard as part of the Triennial Review which is conducted in accordance with Section 303(c)(1) of the Clean Water Act. In order to adhere to the requirements under 40 CFR 131.14(b)(1)(v) (NMED Exhibit 20) and 20.6.4.10(F)(8), the Department will reevaluate of the highest attainable condition for all temporary standards during the Triennial Review of the State's Water Quality Standards, as required under Section 303(c)(1) of the CWA. (NMED Exhibit 19). The Department will submit the results of the reevaluation to EPA within 30 days as part of the submittal of the Triennial Review to EPA Region 6.

The purpose of the review is to determine progress consistent with the original conditions of the temporary standard. If the discharger cannot demonstrate that sufficient progress has been made, the Commission has the authority to revoke the temporary standard or provide additional conditions to the temporary standard. 20.6.4.10(F)(8) NMAC. If the Department or the discharger does not complete their review at the frequency specified, or does not submit the re-evaluation to EPA within 30 days of completion, the temporary standard will no longer be the applicable water quality standard under the CWA until the Department and the discharger complete and submit the re-evaluation to EPA. 40 C.F.R. § 131.14 (NMED Exhibit 20); 20.6.4.10(F)(8) NMAC.

IV. OUTREACH AND ADMINISTRATIVE PROCESS

A. Tribal Outreach

General public outreach on the Department's subscribed email notification system, GovDelivery, initiated the public comment period. (NMED Exhibit 18). No additional outreach was extended as there were no tribal lands, either federally recognized or traditional areas, identified in or around the area of impact which includes areas around the City of Raton in the northeastern portion of New Mexico.

B. Public Outreach

For proposed amendments to 20.6.4 NMAC, public outreach is conducted in accordance with the State's Water Quality Management Plan/Continuing Planning Process (NMED Exhibit 21), which is a requirement under 40 C.F.R. §§ 130.5 and 130.6 (NMED Exhibit 22), and according to the SWQB Public Involvement Plan ("PIP") for the City of Raton Nutrient Temporary Standard (NMED Exhibit 23). For this proposed amendment, public outreach and participation included a 30-day public comment period on the proposed demonstration that began on October 1, 2019 and closed on October 31, 2019. (NMED Exhibit 18). The notification was provided in both English and Spanish and sent to 1,706 subscribers on the Bureau's email listserv through GovDelivery (NMED Exhibit 18), posted on the Bureau's website (NMED Exhibit 16), and placed on the Department's online calendar of events. There were no public comments received during this period.

C. Collaboration with EPA

Although the addition of temporary standards language and process to NMAC was approved by the Commission and EPA in 2017, this is the first temporary standard petition to be proposed as a standards amendment. EPA and the Department have been working with EPA's contractors, TetraTech and ECONorthwest, since 2017 to evaluate and develop the *Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico* included as an appendix to the proposed *Nutrient Temporary Standard: City of Raton Wastewater Treatment Plant NPDES Permit No. NM0020273 to Doggett Creek* (NMED Exhibit 24). EPA, TetraTech and the Department hold biweekly teleconferences to discuss New Mexico's temporary standards demonstration projects. The biweekly calls are opportunities for the agencies to report out and provide comment on work products related to New Mexico's nutrient temporary standards projects. EPA and Tetra Tech Inc. provided technical and policy review and comments on this proposed temporary standard prior to releasing for public comment. This temporary standard proposal is a collaborative effort, which included extensive and ongoing dialogue between EPA, Tetra Tech Inc., the Department, and the City of Raton.

D. Stakeholder Outreach

The Department, with EPA's support, has engaged with the City of Raton regularly throughout the development of this proposed temporary standard, and met with the City on October 30, 2017; August 27, 2018; March 29, 2019; May 16, 2019; and June 13, 2019. The City of Raton was vital to the development of this temporary standard demonstration and provided input on the interim economic analysis and system processes, developed a technical memorandum to help identify the highest attainable condition, and drafted a timeline of proposed actions to meet the highest attainable condition (NMED Exhibit 24). The City of Raton was also in attendance at the November 12, 2019 meeting of the Commission in support of the Department's petition for a hearing on the proposed temporary standard.

E. Water Quality Control Commission

In accordance with 20.6.4.10 NMAC, the Department filed a petition to the Commission on October 29, 2019 for a hearing to adopt this temporary standard. The Commission heard the Department's request during a regularly scheduled Water Quality Control Commission public meeting on November 12, 2019. The Commission granted a hearing to be held on March 10, 2020 as documented in the Notice of Hearing and Appointment of a Hearing Officer dated November 20, 2019. The 60-day notice of hearing (NMED Exhibit 6) was published in accordance with 20.1.6.201 NMAC in the New Mexico Register on December 31, 2019 (NMED Exhibit 11 and 12), the *Santa Fe New Mexican*, on December 30, 2019 (NMED Exhibit 9 and 10), and in the *Taos News*, a newspaper of general circulation in the Raton area affected by this action, on December 26, 2019 (NMED Exhibit 7 and 8).

In accordance with 20.1.6.202 NMAC, the Department submitted Notice of Intent to Present Technical Testimony 20 days prior to the hearing.

V. PROPOSED AMENDMENTS IN 20.6.4 NMAC

The findings of the investigation conducted by the Department, in collaboration with EPA, TetraTech, ECONorthwest and the City of Raton support a discharger-specific temporary standard for plant nutrients (total nitrogen and total phosphorus) for the City of Raton's Wastewater Treatment Plant (NPDES permit no. NM0020273). (NMED Exhibit 24). In order to accommodate the temporary standard, it is recommended that a new section be incorporated in 20.6.4 NMAC, as follows:

20.6.4.318 CANADIAN RIVER BASIN: Doggett creek.

A. **Designated uses:** Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

C. **Discharger-specific temporary standard:**

(1) **Discharger:** City of Raton wastewater treatment plant

(2) **NPDES permit number:** NM0020273, Outfall 001

(3) **Receiving waterbody:** Doggett creek, 20.6.4.318 NMAC

(4) **Discharge latitude/longitude:** 36° 52' 13.91" N / 104° 25' 39.18" W

(5) **Pollutant(s):** nutrients; total nitrogen and total phosphorus

(6) **Factor of issuance:** substantial and widespread economic and social impacts (40 C.F.R. § 131.10(g)(6))

(7) **Highest attainable condition:** interim effluent condition of 8.0 mg/L total nitrogen and 1.6 mg/L total phosphorus as 30-day averages. The highest attainable condition shall be either the highest attainable condition identified at the time of the adoption, or any higher attainable condition later identified during any reevaluation, whichever is more stringent (40 C.F.R. § 131.14(b)(1)(iii)).

(8) **Effective date of temporary standard:** This temporary standard becomes effective for Clean Water Act purposes on the date of EPA approval.

(9) **Expiration date of temporary standard:** no later than 20 years from the effective date.

(10) **Reevaluation period:** at each succeeding review of water quality standards and at least once every five years from the effective date of the temporary standard

(20.6.4.10.F(8) NMAC, 40 C.F.R. § 131.14(b)(1)(v)). If the discharger cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard. If the reevaluation is not completed at the frequency specified or the Department does not submit the reevaluation to EPA within 30 days of completion, the underlying designated use and criterion will be the applicable water quality standard for Clean Water Act purposes until the Department completes and submits the reevaluation to EPA. Public input on the reevaluation will be invited during NPDES permit renewals or triennial reviews, as applicable, in accordance with the State's most current approved water quality management plan and continuing planning process.

(11) **Timetable of proposed actions.** Tasks and target completion dates are listed in most recent, WQCC-approved version of the New Mexico Environment Department, Surface Water Quality Bureau document, "Nutrient Temporary Standard: City of Raton Wastewater Treatment Plant NPDES Permit Number NM0020273 to Doggett Creek."

This concludes my direct testimony.

Shelly Lemon

Education

M.S. HYDROLOGY | UNIVERSITY OF ARIZONA, TUSCON, AZ

B.S. BIOLOGY | UNIVERSITY OF ARIZONA, TUCSON, AZ

Experience

BUREAU CHIEF | NMED – SURFACE WATER QUALITY BUREAU (SWQB), SANTA FE, NM
08/2016 – PRESENT

- Manage the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) by planning, setting, and achieving goals set forth in the NMED Strategic Plan, EPA approved work plans, and program planning documents.
- Work with the public, industry and decision makers (legislators, Governor's staff, etc.) to ensure that the goals of the bureau are achieved.
- Oversee an operating budget of $6.4 million dollars that requires administration of general funds, special revenue funds, interagency transfers, and federal grants.
- Directly or indirectly supervise 35 technical and administrative staff including hiring, work performance evaluations, and discipline, if needed. Ensure performance goals are met and activities are conducted in accordance with applicable statutes, policies, rules, permits, orders, and grant commitments.
- Develop and respond to legislative proposals and develop regulatory initiatives; e.g., assist the NMED's legislative tracking office during various legislative sessions, including bill analysis and being a lobbyist and expert witness; participate in the development and revision of state surface water quality standards and regulations, and present technical testimony during hearings.
- Participate in meetings and strategy discussions to refine technical processes and work products and to ensure technical work is of high quality and defensible.
- Work with staff to identify future trends and opportunities to develop strategies that improve the program, bureau, and agency.
- Facilitate coordination between EPA, and other public/private agencies/entities involved in surface water quality protection, management and regulation.
- Develop policies, guidelines and templates to facilitate successful completion of projects and ensure efficient implementation of all programs.
- Ensure that information requests are responded to in a timely and professional manner.
- Oversee short-term investigations in response to citizen complaints, accidental spills, and other emergencies (e.g., Gold King Mine, Cimarron River tanker spill, etc.).
- Work with the Department's webmaster to create, update, and maintain webpages, resources, and links associated with activities of the Bureau.

PROGRAM MANAGER MONITORING, ASSESSMENT & STANDARDS | NMED-SWQB, SANTA FE, NM
06/2015 – 10/2016

- Managed the Surface Water Quality Bureau's monitoring, assessment, and standards program including writing, submitting, and managing the Clean Water Act (CWA) Section 106 grant and the CWA Section 106 Supplemental grant on an annual basis with semi-annual updates.
- Oversaw and evaluated the performance of 14 staff.
- Participated in the development and revision of state surface water quality standards and regulations including the 2013 Triennial Review presented during the Water Quality Control Commission's October 2015 hearing and subsequent deliberations.

- Planned water quality surveys throughout New Mexico that met budgetary constraints and data quality objectives.
- Reviewed, integrated, and assessed data for use in Clean Water Act required activities.
- Prepared water quality reports (e.g. watershed survey summaries, use attainability analyses, TMDLs, etc.) for the public and as a deliverable to EPA.
- Reviewed, updated, and developed protocols to standardize tasks including sample collection, data assessment, and report writing.
- Represented the Bureau at meetings, professional conferences, workshops, and Water Quality Control Commission meetings.
- Conducted short-term investigations in response to citizen complaints, accidental spills, and other emergencies including NMED's response to the Gold King Mine release.
- Worked with the Bureau's webmaster to create, update, and maintain webpages, resources, and links associated with activities of the Section and Bureau.

MUNICIPAL TEAM LEADER | NMED-SWQB, SANTA FE, NM
03/2014 – 05/2015

- Reviewed and evaluated the performance of the Municipal Team by providing meaningful, frequent, and ongoing input on work performance and prioritization of workloads.
- Cooperated with and supported the efforts of other SWQB sections. Facilitated positive working relationships with other state and federal agencies, stakeholders, and cooperators involved in NPDES permitting activities.
- Reviewed, analyzed data, and prepared comments on NPDES discharge permits submitted to the Bureau for certification under Section 401 of the Federal Clean Water Act. Ensured consistency in NPDES permit certifications.
- Investigated regulated facilities for compliance/non-compliance with applicable state and federal surface water quality laws, standards and regulations, and prepared and submitted comprehensive inspection reports that documented the status of the facilities regarding the federal NPDES permit program and regulations.
- Collected accurate and detailed information and useable evidence during site investigations to supplement information contained in NPDES permits, to evaluate violations of state surface water quality standards and regulations, and to assist in enforcement.
- Reviewed, analyzed, and prepared well-written, clear, concise, and factual comments on proposed or new amended federal and state agency policies and procedures, regulations, and technical recommendations.
- Developed standard operating procedures for wastewater sampling and compliance sampling. Evaluated and acquired sampling equipment necessary for monitoring NPDES permitted facilities.
- Reviewed, analyzed data, and prepared comments relevant to regulatory requirements and surface water quality studies and findings on Environmental Assessments (EA) and Environmental Impact Statements (EIS) submitted to SWQB for review.

ACTING MANAGER MONITORING, ASSESSMENT & STANDARDS | NMED-SWQB, SANTA FE, NM
07/2012 – 07/2013

- Managed the Surface Water Quality Bureau's monitoring, assessment, and standards program including writing, submitting, and managing the Clean Water Act Section 106 Supplemental grant on an annual basis with semi-annual updates.
- Oversaw and evaluated the performance of 15 staff.
- Participated in the development and revision of state surface water quality standards and regulations.
- Planned water quality surveys throughout New Mexico that met budgetary constraints and data quality objectives.
- Reviewed, integrated, and assessed data for use in Clean Water Act required activities.
- Prepared water quality reports (e.g. watershed survey summaries, use attainability analyses, TMDLs, etc.) for the public and as a deliverable to EPA.
- Developed protocols to standardize tasks including sample collection, data assessment, and report writing.

- Represented the Bureau at meetings, professional conferences, workshops, and Water Quality Control Commission meetings.
- Conducted short-term investigations in response to citizen complaints, accidental spills, and other emergencies.
- Maintained analytical results in the SWQB water quality database, prepared retrievals of stored data as requested, and scheduled uploads of data to the EPA's national database.
- Worked with the Bureau's webmaster to create, update, and maintain webpages, resources, and links associated with activities of the Section and Bureau.

MONITORING TEAM LEADER | NMED-SWQB, SANTA FE, NM
04/2011 – 07/2013

- Managed the statewide ambient monitoring program for the Bureau. The Monitoring Team is responsible for collecting water quality data and associated flow measurements in surface waters of the state. Data collected by the Monitoring Team is used to determine if the water body meets water quality standards and supports designated uses.
- Oversaw and evaluated the performance of 5 staff.
- Planned water quality surveys throughout New Mexico that met budgetary constraints and data quality objectives.
- Ensured adequate and appropriate data were collected to support a variety of Clean Water Act required activities (e.g., WQS changes, TMDL development, NPDES permits, NPS monitoring effectiveness, etc.).
- Prepared watershed survey summaries for the public and as a deliverable to EPA.
- Developed protocols to standardize tasks including sample collection, data assessment, and report writing; specifically, responsible for developing, updating, and revising the *Field Sampling Plan* and *Physical Habitat* standard operating procedures.
- Maintained analytical results in the SWQB water quality database, prepared retrievals of stored data as requested, and scheduled uploads of data to the EPA's national database.
- Conducted short-term investigations in response to citizen complaints, accidental spills, and other emergencies.
- Worked with the Bureau's webmaster to create, update, and maintain monitoring webpages, resources, and links.
- Represented the Bureau at meetings, professional conferences, and workshops.

NUTRIENTS AND LAKES TEAM LEADER & TMDL WRITER | NMED-SWQB, SANTA FE, NM
08/2004 – 04/2011

- Prepared watershed planning documents (TMDLs) to improve water quality and conducted public meetings to address stakeholder comments and concerns.
- Presented the final draft documents to the NM Water Quality Control Commission (WQCC) for inclusion and adoption into the State's Water Quality Management Plan.
- Oversaw the nutrient criteria development program for NM's streams, rivers, and lakes.
- Headed efforts in hydrology and monitoring design to develop a *Hydrology Protocol* that distinguishes between ephemeral, intermittent, and perennial waters in New Mexico and to create a practical yet thorough 10-year monitoring and assessment strategy for the Bureau.
- Managed and evaluated the performance of 3 technical staff.

GRADUATE RESEARCH ASSISTANT | SUSTAINABILITY OF SEMI-ARID HYDROLOGY AND RIPARIAN AREAS (SAHRA) – UNIVERSITY OF ARIZONA, TUCSON, AZ
01/2002 – 01/2004

- Designed, coordinated, and implemented a hydrologic research project to determine the influence of land use and regional hydrology on surface water quality in a semi-arid stream.
- Organized and prepared an objective, scientifically sound thesis describing the methods, results, conclusions, and management implications of this research.

- Co-authored the journal article, "Spatial variability in dissolved organic matter and inorganic nitrogen concentrations in a semiarid stream, San Pedro River, Arizona" for the *Journal of Geophysical Research* Volume: 112, Issue: G3.

GRADUATE TEACHING ASSISTANT | UNIVERSITY OF ARIZONA, TUCSON, AZ
01/2002 – 12/2003

- Assisted in the instruction of an "Introduction to Global Change" class for undergraduates and a "Fundamentals of Water Quality" class for graduates.
- Developed hands-on activities to enhance global awareness and environmental stewardship.
- Designed and facilitated a final project to encourage critical analysis and informed decision-making.

Other Experience

Middle School Science Teacher | Academy of Technology and the Classics, Santa Fe, NM

High School Science Teacher | Chino Valley High School, Chino Valley, AZ

Teacher Fellow | Earth Watch Institute – Forest Birds Project, Bellavista Preserve, Ecuador

Science Instructor | Nizhoni - Upward Bound Summer Academy, Flagstaff, AZ

Naturalist | San Joaquin Outdoor Education, La Honda, CA

Science Instructor & Dive Master | Catalina Island Marine Institute, Avalon, CA

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PROPOSED AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD — **No. WQCC 19-46(R)**

DIRECT TECHNICAL TESTIMONY OF SHELLY LEMON

I. INTRODUCTION

My name is Shelly Lemon and I am currently the Bureau Chief of the New Mexico Environment Department ("Department") Surface Water quality Bureau ("SWQB"). I am presenting this written testimony (NMED Exhibit 5) on behalf of the Department concerning the petition to amend the State of New Mexico's *Standards for Interstate and Intrastate Surface Waters* ("Standards"), 20.6.4 NMAC, for the City of Raton Wastewater Treatment Plant ("WWTP") that discharges to Doggett Creek in Colfax County under National Pollutant Discharge Elimination System ("NPDES") Permit No. NM0020273 (NMED Exhibit 32). A copy of my resume is included as NMED Exhibit 4. It is accurate and up to date.

I will first provide some background related to the water quality standards and discharger-specific nutrient temporary standards. I will then provide some background on Doggett Creek Watershed and its ecological conditions including baseline water quality and current standards attainment. Finally, I will describe the proposed discharger-specific nutrient temporary standard for the City of Raton WWTP, justification for the discharger-specific nutrient temporary standard, and workplan and timeline for proposed actions to be taken.

II. QUALIFICATIONS

I hold a Bachelor of Science degree in Biology from the University of Arizona, and a Master of Science degree in Hydrology from the University of Arizona. I have held the position of bureau chief of the Department's Surface Water Quality Bureau since March of 2017 and was the acting bureau chief prior to that for eight months. In this position I oversee the State program for surface water quality, including certification of federal permits issued under the Clean Water Act ("CWA") for point source discharges and dredge or fill operations, implementation of watershed and river protection projects with state and federal funds, development and revision of surface water quality standards, monitoring and assessment of state surface waters, and development of water quality planning documents to protect and restore water quality.

I have been employed with the SWQB since August of 2004, with a short absence from July 2013 through March 2014. Prior to serving as bureau chief, I have also been the program manager of the Monitoring, Assessment and Standards Section, Municipal Team Lead, Monitoring Team Lead, Nutrient and Lakes Team Lead and a TMDL Writer. My Master's thesis focused on spatial and temporal variability of nutrients in a semi-arid stream. I have been working on nutrient-related issues in New Mexico since I began working at SWQB, and have written nutrient Total Maximum Daily Load ("TMDL") documents, oversaw the nutrient criteria development program, drafted and implemented the New Mexico Nutrient Reduction Strategy, assisted with development and revision of nutrient assessment protocols, conditioned numeric nutrient effluent limitations into NPDES permits based on antidegradation, and am continuing to work with the Environmental Protection Agency ("EPA") and permittees to evaluate and develop nutrient temporary standards for demonstration facilities. The City of Raton WWTP discharger-specific nutrient temporary standard is the first temporary standard to be proposed in New Mexico using the temporary standard provision at 20.6.4.10(F) NMAC.

III. WATER QUALITY STANDARDS & PLANT NUTRIENTS

Under the Section 4 of the New Mexico Water Quality Act ("WQA"), NMSA 1978, § 74-6-1 through -17 (1967 as amended through 2019), the Water Quality Control Commission ("Commission") is responsible for adopting water quality standards. The standards must, at a minimum, protect public health or welfare, enhance the quality of water and serve the purposes of the WQA. § 74-6-4. Federal Clean Water Act regulations provide similar direction: "States adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act." 40 C.F.R. § 131.2 (NMED Exhibit 20).

A water quality standard "defines the goals for a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses." *Id.* The Standards also establish water quality criteria that will protect the designated uses of a water body. These criteria can be general narrative criteria that apply to all waters, or numeric criteria that apply to a specific designated use or water quality segment. Water quality standards regulations in 20.6.4 NMAC include a narrative nutrient criterion, which states that "[p]lant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state." 20.6.4.13(E) NMAC. The Department interprets this narrative criterion using numeric nutrient threshold values that are based on reference conditions and applied to specific site classes in perennial, wadeable streams. The data analysis and numeric nutrient threshold synthesis can be found in the reports by Jessup et al. 2015 and NMED-SWQB 2016 through the Nutrient Scientific

Technical Exchange Partnership and Support ("N-STEPS") administered by EPA's National Nutrient Criteria Program (NMED Exhibits 25 and 26).

Facilities discharging to nutrient impaired streams will likely have to meet the threshold concentrations "end-of-pipe" because of the limited available dilution in many receiving waters in New Mexico; however, these concentrations may not be currently achievable for many permittees.

IV. DISCHARGER-SPECIFIC NUTRIENT TEMPORARY STANDARD

In 2017, the Commission approved a provision in the Standards that created a framework for adopting temporary standards. 20.6.4.10(F) NMAC. In promulgating this regulation, the Commission sought to address situations where effluent limitations are not currently achievable, but incremental improvements toward achieving the underlying standard are possible. The New Mexico temporary standards regulation is based on EPA's regulation on variances at 40 C.F.R. Section 131.14 (NMED Exhibit 20). The purpose of this petition is to apply the State's framework established in 20.6.4 NMAC to the City of Raton's WWTP, to request a discharger-specific temporary standard from the underlying water quality standards for plant nutrients (i.e., total phosphorus and total nitrogen).

Under Section 6(B) of the WQA, and 20.1.6.200 NMAC, any person (including the Department) may at any time petition the Commission to adopt, amend or repeal a water quality standard .if it is demonstrated that attainment of the designated use is not currently feasible and the proposed temporary standard is the highest degree of protection that is feasible. After the Commission holds a public hearing and adopts the new or amended standards, the new or amended standards must be submitted by the State to EPA for approval under Section 303(c) (NMED Exhibit 19) of the CWA. §§ 74-6-3(E), 6(A).

The only discharger to be permitted under the terms and conditions of this proposed temporary standard is the City of Raton WWTP in Colfax County, New Mexico. The City of Raton WWTP discharges to Doggett Creek which is a tributary to Raton Creek, Chicorica Creek, and the Canadian River. Doggett Creek (AU ID NM-2305.A_255) is located in the Raton Creek 12-digit hydrologic unit code (HUC) 110800010104 in northeastern New Mexico. There are no other permitted discharges to Doggett Creek. The adoption of a temporary standard does not exempt the City of Raton WWTP from complying with all other applicable water quality standards or control technologies. Furthermore, the underlying nutrient standard and numeric thresholds remain applicable for all other CWA and WQA purposes (e.g., assessment, TMDLs, new or proposed discharges, etc.).

V. DOGGETT CREEK WATERSHED – RECEIVING WATER

Doggett Creek is part of the larger Canadian Headwaters watershed, which is bounded by the Sangre de Cristo Mountains to the west and the Great Plains to the east. From a point south-southeast of Maxwell, New Mexico to its headwaters, the watershed drains approximately 1,725 square miles. Elevation ranges from 11,610 feet above sea level at Vermejo Peak to 5,640 feet at USGS Gage 07211500 near Taylor Springs, New Mexico. The average annual precipitation in Colfax County in northeastern New Mexico is 16.34 inches. Average annual snowfall in the watershed is 72 inches (or 7.2 inches of precipitation).

Doggett Creek is a perennial tributary to Raton Creek located within the Upper Canadian Plateau ecoregion (Omernik Level IV Ecoregion 26l). Land use within the Doggett Creek watershed consists of 46% grassland, 31% evergreen forest, 15% shrub/scrub, and 2% deciduous forest. Several threatened and endangered species occur in the Raton Creek watershed; however, there are no critical habitats identified in this watershed. It is not anticipated that granting this temporary standard will jeopardize threatened and endangered species or result in the destruction or adverse modification of critical habitat. Nor should the temporary standard jeopardize natural communities of conservation concern (e.g., emergent wetland, riverine wetland, prairie, glade, fen) because habitat will not be impacted, and water quality will improve.

VI. DOGGETT CREEK DESIGNATED USES & BASELINE WATER QUALITY

Doggett Creek is identified as a perennial water under 20.6.4.99 NMAC with designated uses of warmwater aquatic life, livestock watering, wildlife habitat and primary contact. Doggett Creek falls within the "TN Flat" class for total nitrogen and the "TP Flat-Moderate" class for total phosphorus. The nutrient threshold concentrations used to interpret the State's narrative criterion are 0.69 milligrams per liter ("mg/L") and 0.061 mg/L, respectively. Doggett Creek is listed on the 2018-2020 Integrated List as impaired due to nutrients and *E. coli* bacteria. (NMED Exhibit 27). The nutrient impairment was first identified in 1998 with data from the 1980s and 1990s. *Id*. Subsequent sampling results from 2002 and 2015-2016 confirmed the nutrient impairment. *Id*. Doggett Creek was most recently sampled during the Department's 2015-2016 Canadian Watershed survey. Total nitrogen and total phosphorus thresholds were exceeded in 100% of the samples at the water quality station below the Raton WWTP discharge, with periodic dissolved oxygen (DO) concentrations below 5.0 mg/L and a maximum daily DO swing more than three times the impairment threshold (NMED Exhibits 28 and 29).

Raton's current NPDES permit has performance-based 30-day average effluent limits of 10 mg/L total nitrogen (TN) and 3.0 mg/L total phosphorus (TP). Although these limits are performance-based, they were included in the NPDES permit to protect and maintain existing water quality and prevent further degradation of the receiving water. Discharge monitoring data for the period from 2017 and 2018 indicate a long-term average effluent TN concentration of approximately 7.3 mg/L (approximately ten times the threshold) and a long-term average TP concentration of approximately 2.37 mg/L (almost forty times the threshold). Streamflow measurements taken during the 2015 and 2016 field seasons show that streamflow is comprised of 80-90% effluent below the outfall (NMED Exhibit 30).

VII. TEMPORARY STANDARD DEMONSTRATION & JUSTIFICATION

A. Existing and Planned Controls and Current Performance

The City of Raton's WWTP is an activated sludge system using an enhanced sequential batch reactor. The facility operates in a biological nutrient removal mode by alternating phases of aeration and anoxic/anaerobic cycles. The secondary effluent is decanted to an effluent equalization basin and then flows by gravity to either the reuse facility or to ultra-violet ("UV") disinfection. The effluent going through the UV disinfection is discharged to Doggett Creek.

Anticipating that its future NPDES permits will include effluent limits based on the numeric nutrient thresholds, Raton is examining how the use of chemical precipitation (alum) would affect its treatment system and its effluent pollutant concentrations. Chemical precipitation is one potential treatment option for phosphorus removal; however, this is still in the investigation and planning stages (NMED Exhibit 24).

B. Technology- and Water Quality-Based Effluent Limits for Nutrients

There are no national, regional or statewide technology-based requirements for nutrients applicable to publicly owned treatment works. Therefore, technology-based effluent limits are not sufficient to meet water quality standards.

Doggett Creek falls within the "TN Flat" class for total nitrogen and the "TP Flat-Moderate" class for total phosphorus. Thus, the following nutrient threshold concentrations would be used to interpret the narrative criterion and derive water quality-based effluent limits (WQBELs):

- TN = 0.69 mg/L
- TP = 0.061 mg/L

The nutrient threshold values are interpreted as 30-day average values, therefore WQBELs may be appropriately expressed as average monthly limits. In the case of the City of Raton WWTP, the receiving water (Doggett Creek) has no allowance for mixing because the effluent composes the bulk of flow in Doggett Creek, as discussed above. Thus, the threshold values are applied as "end of pipe" WQBELs. In other words, the average monthly effluent limits for TN and TP would be equal to the TN and TP thresholds expressed above.

C. Factor Precluding Attainment of the Applicable Water Quality Standard

The basis and justification for this temporary standard request is that the current standard is not feasibly attainable because "controls more stringent than those required by sections 301(b) and 306 of the [Clean Water] Act would result in substantial and widespread economic and social impact." 40 C.F.R. § 131.10(g)(6) (NMED Exhibits 19 and 20). Reverse osmosis ("RO") is the only technology that approaches the numeric nutrient thresholds. However, the *Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico*, prepared by Tetra Tech, Inc. and ECONorthwest for EPA and the Department (NMED Exhibit 24 - Appendix A) demonstrates that RO is not economically feasible to install and operate and would lead to substantial and widespread economic and social impacts throughout the community.

EPA's Interim Economic Guidance describes substantial and widespread economic and social impacts as two separate analyses. For public-sector entities, substantial impacts refer to the financial impacts on the community, taking into consideration current socioeconomic conditions.

Widespread impacts, on the other hand, refer to changes in the community's socioeconomic conditions (NMED Exhibit 31).

1. *Substantial Impact.* The expected annual pollution control cost per household would more than triple after installing RO. To evaluate whether this cost would be "substantial" the municipal preliminary screen ("MPS") and secondary test are used. The MPS can help determine whether or not a community can clearly pay for the pollution control project. EPA's Interim Economic Guidance suggests the project is likely to result in "substantial" economic impact when the MPS exceeds 2.0 % of median household income. Installing and operating a RO system in Raton results in a MPS of 2.8% of median household income, therefore the analysis moves to the secondary test (NMED Exhibit 24 - Appendix A).

The secondary test uses indicators of financial health to build upon the characterization of the financial burden identified in the MPS. Following EPA's Interim Economic Guidance, five secondary test indicators were used to further evaluate the economic impact of the pollution control project on the City of Raton and the surrounding community: median household income, unemployment rate, overall net debt, and property tax revenue and collection rate. The secondary test score indicated socioeconomic conditions that are mid-range between weak and strong. Evaluating the MPS and the secondary test score together suggests that installation and operation of RO would likely result in substantial economic impacts to the community (NMED Exhibit 24 - Appendix A).

2. *Widespread Impact.* Because the financial analysis indicated that the economic impacts of installing and operating RO are substantial for Raton, the next step was to determine if those substantial impacts are also widespread in the community. Several indicators were considered, including household incomes, unemployment rates, poverty rates, vulnerable

industries, and property values. The City of Raton is the county seat of Colfax County with a population of 6,350 people as of 2016, however, the population has been declining in recent years. The area is mainly rural with no other major population centers in close proximity. The community median household income is substantially lower (approximately 35% lower) than the statewide median. In addition, from 2009 to 2016, Raton's median household income has shown stagnant or declining conditions, and the share of higher paying jobs in Raton is not increasing over time (NMED Exhibit 24 - Appendix A).

Furthermore, almost all households and businesses in the community pay for wastewater treatment. The increase in wastewater treatment rates necessary to install and operate RO would apply to all ratepayers and thus to almost the entire community. A substantial community-wide rate increase would likely have broad negative effects on community financial health and may cause businesses and households to relocate. Such broad negative effects on community financial health would likely alter the ways in which people live, work, play, relate to one another and organize their activities. Together these indicators at the community scale suggest that substantial impacts to the Raton community are likely to be widespread (NMED Exhibit 24 - Appendix A).

D. Feasibility of Other Potential Options for Achieving the Applicable Standard

An alternate discharge location is not a feasible alternative to meeting the standard because the downstream water (Raton Creek) is also impaired for nutrients and does not have any dilution capacity. Zero discharge also is not feasible at this time because a preliminary engineering report and cost analysis have not been developed. However, the City of Raton currently reuses a portion of effluent for non-potable reuse at a golf course during summer and fall months. The City is collecting data to explore the option of zero discharge (100% re-use) during the summer/fall months followed by a seasonal effluent nutrient limit for discharge during the winter months. This approach would require the City to upgrade or add a polishing filter, increase the capacity of the re-use pumps, and increase the size of pipes to minimize pipe losses for 100% effluent re-use. However, during winter months, the WWTP would still need to discharge effluent to Doggett Creek because land application would be constrained due to freezing temperatures. It also may be feasible for the City to send the effluent to a water resource recovery facility in the winter for additional treatment, processing, and re-use in other capacities. As part of the proposed temporary standard workplan (Section VIII), the City will conduct a zero-discharge feasibility study to identify and evaluate costs for various upgrades and additions as well as transportation costs to send the effluent to a water resource recovery facility in winter. If it is shown that a zero-discharge option is economically and logistically feasible, the need for a NPDES permit and discharger-specific temporary standard would be eliminated. (NMED Exhibit 24).

E. Highest Attainable Condition

For a temporary standard that applies to a specific discharger, the highest attainable condition ("HAC") must be quantifiable and expressed as one of the following:

1. The highest attainable interim criterion; or
2. The interim effluent condition that reflects the greatest pollutant reduction achievable; or
3. If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the state adopts the WQS variance (temporary standard), and the adoption and implementation of a pollutant minimization program.

40 CFR 131.14(b)(1)(ii)(A) (NMED Exhibit 20).

This temporary standard expresses the HAC as the "interim effluent condition that reflects the greatest pollutant reduction achievable." Treatment options evaluated as candidates for establishing the HAC include optimization of Raton's existing treatment system and technologies (other than RO) that would provide additional reductions in nutrient effluent concentrations. Therefore, the NPDES effluent limits for the City of Raton WWTP expressed during the term of this temporary standard represent the HAC that can be achieved *without* causing substantial and widespread economic and social impact.

There are numerous technology options available to wastewater treatment plants for nutrient removal. Three treatment technology options for nitrogen removal were evaluated, including optimization of the existing system, enhanced optimization with installation of new and efficient mixers and blowers, and biological nitrogen removal through investment in denitrification filters. Similarly, three technology options for phosphorus removal were evaluated, including no additional treatment, chemical precipitation or enhanced biological phosphorus removal, and chemical precipitation with the addition of tertiary filtration. Six different treatment combinations were considered for the HAC analysis, as follows:

A. Enhanced optimization and chemical precipitation;
B. Denitrification filters and no additional phosphorus treatment;
C. Denitrification filters and chemical precipitation;
D. Optimization of the existing system and chemical precipitation with tertiary filtration;
E. Enhanced optimization and chemical precipitation with tertiary filtration; and,
F. Denitrification filters and chemical precipitation with tertiary filtration.

The six treatment options are detailed in the *Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico* (NMED Exhibit 24 - Appendix A). Based on the widespread and substantial impacts analyses for the six technology options detailed in the Report, the ability to make incremental improvements to water quality, and the desire to minimize impacts to the community and ensure an affordable, realistic, and manageable plan, a modified version of Option A (enhanced optimization and chemical precipitation) was identified as the highest attainable condition for the City of Raton WWTP and is represented by the target effluent concentrations below.

- Total Nitrogen (TN): 5.0 mg/L long term average, 8.0 mg/L 30-day average
- Total Phosphorus (TP): 1.0 mg/L long-term average, 1.6 mg/L 30-day average

These target effluent concentrations represent the highest degree of protection (HAC) that can be achieved *without* causing substantial and widespread economic and social impact. The temporary standard, as proposed, will improve water quality in Doggett Creek through plant optimization and implementation of additional pollutant controls to achieve the HAC. If the original standard cannot be achieved by the expiration date, a new temporary standard will need to be approved, the underlying standard revised, or a zero-discharge strategy implemented (NMED Exhibit 24).

F. Existing Uses

As a condition for obtaining a temporary standard, it must be demonstrated that the adoption of the temporary standard will not cause the further impairment or loss of an existing use. Existing uses are those uses attained in a surface water of the State on or after November 28, 1975. In order to determine what an existing use is for a waterbody, the quality of the water demonstrating attainment and actual use of that water for the purpose must be demonstrated. For plant nutrients in Doggett Creek, this would be the lowest concentrations of total nitrogen and total phosphorus at any point after November 28,1975.

Based on readily available data maintained by the SWQB under its Monitoring Program, the 2015-2016 data represent the lowest nutrient concentrations in the available dataset for Doggett Creek downstream of the WWTP outfall and were used to evaluate existing conditions. The long-term average total nitrogen concentration was 5.62 mg/L and the long-term average total phosphorus concentration was 2.56 mg/L. (NMED Exhibit 28). These long-term averages are greater than the HAC long-term averages of 5.0 mg/L and 1.0 mg/L for total nitrogen and total phosphorus, respectively. Therefore, the temporary standard, as proposed, will not cause loss of an existing use.

G. Justification

A temporary standard is appropriate in this case because all the following are met:

a. Existing or proposed discharge control technologies will comply with applicable technology-based effluent limitations, feasible technological controls, and other management alternatives [20.6.4.10(F)(1)(c) NMAC];

b. The underlying designated use and criterion, including numeric interpretations of narrative criteria, are not attainable now or within a defined period of time, but may be attainable in the longer term [20.6.4.10(F)(1)(a) NMAC];

c. It is feasible to make incremental improvements in water quality during the proposed term of the temporary standard; and

d. The temporary standard will not result in any lowering of currently attained ambient water quality [20.6.4.10(F)(1)(b) NMAC].

VIII. PROPOSED WORKPLAN & TIMELINE FOR PROPOSED ACTIONS

The term of this proposed temporary standard is 20 years and is detailed in the proposed *Nutrient Temporary Standard: City of Raton Wastewater Treatment Plant NPDES Permit No. NM0020273 to Doggett Creek* (NMED Exhibit 24). This term is only as long as necessary to achieve the HAC. 40 CFR 131.14(b)(1)(iv) and 20.6.4.10(F)(10) NMAC. The Department determined that the implementation schedule submitted by the City of Raton to be a reasonable and justified schedule for this temporary standard and will allow the City time to plan and distribute budgets, fees, and expenditures to lessen the impact to the City's utility budget and promote community support and encourage success of this proposal (NMED Exhibit 33). The 20-year timeline provides for planning, pilot tests, funding efforts, construction, and troubleshooting and optimization while minimizing the impact to city and utility budgets as well as to ratepayers during a weakened economy. The schedule proposes both operational optimization and modification of the existing treatment facility in two phases:

- Phase 1: Coagulation for phosphorus removal and
- Phase 2: Aeration control upgrades for nitrogen removal.

The temporary standard will be effective for the approved period of time or until such a time the standard is attained, whichever occurs first.

IX. CONCLUSION

The discharger-specific nutrient temporary standard proposal for the City of Raton WWTP demonstrates that the warmwater aquatic life use is not attainable because achieving effluent limits derived from the underlying narrative nutrient standard and associated numeric thresholds through treatment controls would necessitate the installation and operation of reverse osmosis ("RO"). The installation and operation of RO would lead to substantial and widespread economic and social impacts throughout the community. However, incremental improvements in water quality can be achieved with the highest attainable condition for the City of Raton WWTP) identified as long-term average effluent concentrations of 5.0 mg/L for TN and 1.0 mg/L for TP, and 30-day average effluent concentrations of 8.0 mg/L for TN and 1.6 mg/L for TP.

The Department recommends that the Commission adopt the temporary standard amendment as proposed. Once approved by the Commission and adopted as standards, the SWQB will submit the revised water quality standards, to EPA for formal review and final approval action under Section 303(c) of the CWA (NMED Exhibit 19). This concludes my direct testimony.

NOTICE OF PUBLIC HEARING
FOR AMENDMENTS TO 20.6.4 NMAC
ESTABLISHING A NUTRIENT TEMPORARY STANDARD
FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT

The Water Quality Control Commission ("WQCC") will hold a public hearing beginning at **9:00 am on March 10, 2020** and continuing thereafter as necessary at the **Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505.** The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Department's ("NMED") website prior to the hearing: https://www.env.nm.gov/water-quality-control-commission/wqcc/. The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMED's Surface Water Quality Bureau ("Bureau") is the proponent of the proposed amendments.

The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing.

The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at https://www.env.nm.gov/surface-water-quality/ts-raton/.

Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on **February 19, 2020, twenty (20) days before the hearing**. Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, **WQCC 19-46**.

The form and content of the notice shall:

* Identify the person for whom the witness(es) will testify;
* Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background;
* Include a copy of the direct testimony of each technical witness in narrative form;
* Include the text of any recommended modifications to the proposed regulatory change; and
* List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules.

Notices of intent to present technical testimony shall be filed with:

Cody Barnes, Hearing Office Administrator
New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
telephone: (505) 827-2428
email: cody.barnes@state.nm.us

All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number **WQCC 19-46**. Pursuant to 20.1.6.203

NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing.

The hearing will be conducted in accordance with the WQCC's rulemaking procedures, NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019), 20.6.4 NMAC, the State Rules Act, NMSA 1978, Sections 14-4-1 through -11 (1967 as amended through 2017), and other applicable procedures.

If any person requires assistance, an interpreter or auxiliary aid to participate in this process, please contact Cody Barnes, at the above address, by March 3, 2020. (TDD or TTY users please access the number via the New Mexico Relay Network, 1-800-659-1779 (voice); TTY users: 1-800-659-8331).

STATEMENT OF NON-DISCRIMINATION

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Parts 5 and 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non- discrimination programs, policies or procedures, you may contact: Kristine Yurdin, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855; email: nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator.

AVISO DE AUDIENCIA PÚBLICA
PARA ENMIENDAS A 20.6.4 NMAC
ESTABLECIMIENTO DE UN ESTÁNDAR TEMPORAL DE NUTRIENTES
PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES, LOCALIDAD DE RATON, NM

La Comisión de Control de Calidad del Agua ("WQCC" por sus siglas en inglés) celebrará una audiencia pública a partir de las **9:00 de la mañana del 10 de marzo de 2020**, y continuará después según sea necesario en **El Auditorio Runnels ubicado en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM 87505**. El lugar de la audiencia puede cambiar antes de la fecha de la audiencia, y los interesados en asistir deben visitar el sitio web del Departamento de Medio Ambiente de Nuevo México ("NMED" por sus siglas en inglés) antes de la audiencia: https://www.env.nm.gov/water-quality-control-commission/wqcc/. El propósito de la audiencia es considerar las enmiendas propuestas a 20.6.4 NMAC. Las enmiendas propuestas permitirían a la Oficina aplicar un mecanismo para avanzar hacia el logro de un criterio de uso designado y calidad del agua que actualmente no es alcanzable. La Oficina de Calidad de las Aguas Superficiales de NMED ("Oficina") es la proponente de las enmiendas propuestas.

La Oficina propone que la WQCC adopte las enmiendas propuestas a 20.6.4 del NMAC, de conformidad con su autoridad bajo NMSA 1978, Secciones 47-6-1 a -17 (1967 según enmendado hasta 2019) y 20.6.4 del NMAC. Tenga en cuenta que el formato y cambios técnicos menores a 20.6.4 NMAC, que no sean los propuestos por NMED, pueden ser propuestos en la audiencia. Además, se pueden hacer otros cambios según sea necesario en respuesta a los comentarios del público y las pruebas presentadas en la audiencia.

La norma enmendada propuesta 20.6.4 NMAC puede ser revisada durante horas hábiles regulares en la Oficina de Audiencias de NMED ubicada en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM, 87505. El texto completo de la propuesta enmendada 20.6.4 NMAC también está disponible en línea en https://www.env.nm.gov/surface-water-quality/ts-raton/.

De conformidad con el 20.1.6.202 NMAC, aquellos que deseen presentar un testimonio de carácter técnico deben presentar un aviso escrito de su intención de presentar testimonio técnico en la Oficina de Audiencias a más tardar hasta las 5:00 de la tarde del **19 de febrero de 2020, veinte (20) días antes de la audiencia**. Los avisos de intención de presentar testimonio técnico deben hacer referencia al nombre del reglamento, la fecha de la audiencia y el número de expediente, **WQCC 19-46**.

La forma y el contenido del aviso deberán:

* Identificar a la persona para la cual testificará el testigo o testigos;
* Identificar a cada testigo técnico que la persona tiene la intención de presentar y declarar la calificación de ese testigo, incluyendo una descripción de su historial educativo y laboral;
* Incluir una copia del testimonio directo de cada testigo técnico en forma narrativa;
* Incluir el texto de cualquier modificación recomendada al cambio regulatorio propuesto; y
* Enumerar y adjuntar todos los documentos u objetos de pruebas que se espera que esa persona presentará en la audiencia, incluyendo cualquier declaración propuesta de las razones para la adopción de las reglas.

Los avisos de la intención de presentar testimonio técnico deberán presentarse a:

Cody Barnes, Hearing Office Administrator
New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
teléfono: (505) 827-2428
correo electrónico: cody.barnes@state.nm.us

Toda persona interesada tendrá una oportunidad razonable en la audiencia de presentar pruebas, datos, puntos de vista y argumentos pertinentes, oralmente o por escrito; de presentar documentos u objetos de pruebas y de interrogar a los testigos. Cualquier persona que desee presentar una declaración escrita de carácter no técnico para que conste en actas en lugar de un testimonio oral debe presentar dicha declaración antes de la clausura de la audiencia. Los comentarios por escrito sobre la nueva norma propuesta pueden dirigirse al Sr. Cody Barnes, Administrador de la Oficina de Audiencias, a la dirección antes mencionada, y deben hacer referencia al número de expediente **WQCC 19-46**. De conformidad con 20.1.6.203 NMAC, cualquier miembro del público puede presentar una *entry of appearance* como parte interesada en la audiencia. La *entry of appearance* se presentará ante Cody Barnes, a la dirección antes mencionada, a más tardar el **17 de febrero de 2020, veinte (20)** días antes de la fecha de la audiencia.

La audiencia se llevará a cabo de acuerdo con los procedimientos de reglamentación de la WQCC, NMSA 1978, Secciones 47-6-1 a -17 (1967, enmendado hasta 2019), 20.6.4 NMAC, la Ley de Normas Estatales, NMSA 1978, Secciones 14-4-1 a -11 (1967, enmendado hasta 2017), y otros procedimientos aplicables.

Si alguna persona requiere asistencia, un intérprete o un dispositivo auxiliar para participar en este proceso, comuníquese con Cody Barnes, a la dirección antes mencionada, antes del 3 de marzo de 2020. (Los usuarios de TDD o TTY pueden acceder al número a través de New Mexico Relay Network, 1-800-659-1779 [voz]; los usuarios de TTY: 1-800-659-8331).

DECLARACIÓN DE NO DISCRIMINACIÓN

NMED no discrimina por motivos de raza, color, origen nacional, discapacidad, edad o sexo en la administración de sus programas o actividades, según lo exigen las leyes y regulaciones aplicables. NMED es responsable de la coordinación de los esfuerzos de cumplimiento y la recepción de consultas sobre los requisitos de no discriminación implementados por 40 C.F.R. Partes 5 y 7, incluido el Título VI de la Ley de Derechos Civiles de 1964, según enmendada; Sección 504 de la Ley de Rehabilitación de 1973; la Ley de Discriminación por Edad de 1975, el Título IX de las Enmiendas de Educación de 1972 y la Sección 13 de las Enmiendas de la Ley de Control de la Contaminación del Agua de 1972. Si tiene alguna pregunta sobre este aviso o alguno de los programas, políticas o procedimientos de no discriminación de NMED o si cree que ha sido discriminado con respecto a un programa o actividad de NMED, puede comunicarse con: Kristine Yurdin, coordinadora de no discriminación, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, teléfono (505) 827-2855, correo electrónico nd.coordinator@state.nm.us. También puede visitar nuestro sitio web en https://www.env.nm.gov/non-employee-discrimination-complaint-page/ para saber cómo y dónde presentar una queja de discriminación.

County: Taos
Printed In: Taos News
Printed On: 2019/12/26

Legal No. 17,077. NOTICE OF PUBLIC HEARING FOR AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT The Water Quality Control Commission (â€œWQCCâ€.) will hold a public hearing beginning at 9:00 am on March 10, 2020 and continuing thereafter as necessary at the Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505. The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Departmentâ€™s (â€œNMEDâ€) website prior to the hearing: https://www.env.nm.gov/water-quality- control- commission/wqcc/ The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMEDâ€™s Surface Water Quality Bureau (â€œBureauâ€) is the proponent of the proposed amendments. The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing. The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at https://www.env.nm.gov/surface-water-quality/ts-raton/ Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on February 19, 2020, twenty (20) days before the hearing. Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, WQCC 19-46. The form and content of the notice shall: * Identify the person for whom the witness(es) will testify; * Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background; * Include a copy of the direct testimony of each technical witness in narrative form; * Include the text of any recommended modifications to the proposed regulatory change; and * List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules. Notices of intent to present technical testimony shall be filed with: Cody Barnes, Hearing Office Administrator, New Mexico Environment Department, Harold Runnels Building, P.O. Box 5469, Santa Fe, NM 87502 tele: (505) 827-2428 email: cody.barnes@state.nm.us All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number WQCC 19-46. Pursuant to 20.1.6.203 NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing. The hearing will be conducted in accordance with the WQCCâ€™s rulemaking procedures, NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019), 20.6.4 NMAC, the State Rules Act, NMSA 1978, Sections 14-4-1 through -11 (1967 as amended through 2017), and other applicable procedures. If any person requires assistance, an interpreter or auxiliary aid to participate in this process, please contact Cody Barnes, at the above address, by March 3, 2020. (TDD or TTY users please access the number via the New Mexico Relay Network, 1-800-659-1779 (voice); TTY users: 1-800-659-8331). STATEMENT OF NON-DISCRIMINATION NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Parts 5 and 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMEDâ€™s non- discrimination programs, policies or procedures, you may contact: Kristine Yurdin, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855; email: nd.coordinat or@state.nm.us If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator. *********** AVISO DE AUDIENCIA PÃšBLICA PARA ENMIENDAS A 20.6.4 NMAC ESTABLECIMIENTO DE UN ESTÃNDAR TEMPORAL DE NUTRIENTES PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES, LOCALIDAD DE RATON, NM La ComisiÃ³n de Control de Calidad del Agua ("WQCC" por sus siglas en inglÃ©s) celebrarÃ¡ una audiencia pÃºblica a partir de las 9:00 de la maÃ±ana del 10 de marzo de 2020, y continuarÃ¡ despuÃ©s segÃºn sea necesario en El Auditorio Runnels ubicado en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM 87505. El lugar de la audiencia puede cambiar antes de la fecha de la audiencia, y los interesados en asistir deben visitar el sitio web del Departamento de Medio Ambiente de Nuevo MÃ©xico ("NMED" por sus siglas en inglÃ©s) antes de la audiencia: https://www.env.nm.gov/water-quality-control-commission/wqcc/ El propÃ³sito de la audiencia es considerar las enmiendas propuestas a 20.6.4 NMAC. Las enmiendas propuestas permitirÃan a la Oficina aplicar un mecanismo para avanzar hacia el logro de un criterio de uso designado y calidad del agua que actualmente no es alcanzable. La Oficina de Calidad de las Aguas Superficiales de NMED ("Oficina") es la proponente de las enmiendas propuestas. La Oficina propone que la WQCC adopte las enmiendas propuestas a 20.6.4 del NMAC, de conformidad con su autoridad bajo NMSA 1978, Secciones 47-6-1 a -17 (1967 segÃºn enmendado hasta 2019) y 20.6.4 del NMAC. Tenga en cuenta que el formato y cambios tÃ©cnicos menores a 20.6.4 NMAC, que no sean los propuestos por NMED, pueden ser propuestos en la audiencia. AdemÃ¡s, se pueden hacer otros cambios segÃºn sea necesario en respuesta a los comentarios del pÃºblico y las pruebas presentadas en la audiencia. La norma enmendada propuesta 20.6.4 NMAC puede ser revisada durante horas hÃ¡biles regulares en la Oficina de Audiencias de NMED ubicada en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM, 87505. El texto completo de la propuesta enmendada 20.6.4 NMAC tambiÃ©n estÃ¡ disponible en lÃnea en https://www.env.nm.gov/surface-water-quality/ts-raton/ De conformidad con el 20.1.6.202 NMAC, aquellos que deseen presentar un testimonio de carÃ¡cter tÃ©cnico deben presentar un aviso escrito de su intenciÃ³n de presentar testimonio tÃ©cnico en la Oficina de Audiencias a mÃ¡s tardar hasta las 5:00 de la tarde del 19 de febrero de 2020, veinte (20) dÃas antes de la audiencia. Los avisos de intenciÃ³n de presentar testimonio tÃ©cnico deben hacer referencia al nombre del reglamento, la fecha de la audiencia y el nÃºmero de expediente, WQCC 19-46. La forma y el contenido del aviso deberÃ¡n: * Identificar a la persona para la cual testificarÃ¡ el testigo o testigos; * Identificar a cada testigo tÃ©cnico que la persona tiene la intenciÃ³n de presentar y declarar la calificaciÃ³n de ese testigo, incluyendo una descripciÃ³n de su historial educativo y laboral; * Incluir una copia del testimonio directo de cada testigo tÃ©cnico en forma narrativa; * Incluir el texto de cualquier modificaciÃ³n recomendada al cambio regulatorio propuesto; y * Enumerar y adjuntar todos los documentos u objetos de pruebas que se espera que esa persona presentarÃ¡ en la audiencia, incluyendo cualquier declaraciÃ³n propuesta de las razones para la adopciÃ³n de las reglas. Los avisos de la intenciÃ³n de presentar testimonio tÃ©cnico deberÃ¡in presentarse a: Cody Barnes, Hearing Office Administrator, New Mexico Environment Department, Harold Runnels Building, P.O. Box 5469, Santa Fe, NM 87502 telÃ©fono: (505) 827-2428 correo electrÃ³nico: cody.barnes@state.nm.us Toda persona interesada tendrÃ¡ una oportunidad razonable en la audiencia de presentar pruebas, datos, puntos de vista y argumentos pertinentes, oralmente o por escrito; de presentar documentos u objetos de pruebas y de interrogar a los testigos. Cualquier persona que desee presentar una declaraciÃ³n escrita de carÃ¡cter no tÃ©cnico para que conste en actas en lugar de un testimonio oral debe presentar dicha declaraciÃ³n antes de la clausura de la audiencia. Los comentarios por escrito sobre la nueva norma propuesta pueden dirigirse al Sr. Cody Barnes, Administrador de la Oficina de Audiencias, a la direcciÃ³n antes mencionada, y deben hacer referencia al nÃºmero de expediente WQCC 19-46. De conformidad con 20.1.6.203 NMAC, cualquier miembro del pÃºblico puede presentar una entry of appearance como parte interesada en la audiencia. La entry of appearance se presentarÃ¡ ante Cody Barnes, a la direcciÃ³n antes mencionada, a mÃ¡s tardar el 17 de febrero de 2020, veinte (20) dÃas antes de la fecha de la audiencia. La audiencia se llevarÃ¡ a cabo de acuerdo con los procedimientos de reglamentaciÃ³n de la WQCC, NMSA 1978, Secciones 47-6-1 a -17 (1967, enmendado hasta 2019), 20.6.4 NMAC, la Ley de Normas Estatales, NMSA 1978, Secciones 14-4-1 a -11 (1967, enmendado hasta 2017), y otros procedimientos aplicables. Si alguna persona requiere asistencia, un intÃ©rprete o un dispositivo auxiliar para participar en este proceso, comunÃquese con Cody Barnes, a la direcciÃ³n antes mencionada, antes del 3 de marzo de 2020. (Los usuarios de TDD o TTY pueden acceder al nÃºmero a travÃ©s de New Mexico Relay Network, 1-800-659-1779 [voz]; los usuarios de TTY: 1-800-659-8331). DECLARACI'N DE NO DISCRIMINACI'N NMED no discrimina por motivos de raza, color, origen nacional, discapacidad, edad o sexo en la administraciÃ³n de sus programas o actividades, segÃºn lo exigen las leyes y regulaciones aplicables. NMED es responsable de la coordinaciÃ³n de los esfuerzos de cumplimiento y la recepciÃ³n de consultas sobre los requisitos de no discriminaciÃ³n implementados por 40 C.F.R. Partes 5 y 7, incluido el TÃtulo VI de la Ley de Derechos Civiles de 1964, segÃºn enmendada; SecciÃ³n 504 de la Ley de RehabilitaciÃ³n de 1973; la Ley de DiscriminaciÃ³n por Edad de 1975, el TÃtulo IX de las Enmiendas de EducaciÃ³n de 1972 y la SecciÃ³n 13 de las Enmiendas de la Ley de Control de la ContaminaciÃ³n del Agua de 1972. Si tiene alguna pregunta sobre este aviso o alguno de los programas, polÃticas o procedimientos de no discriminaciÃ³n de NMED o si cree que ha sido discriminado con respecto a un programa o actividad de NMED, puede comunicarse con: Kristine Yurdin, coordinadora de no discriminaciÃ³n, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, telÃ©fono (505) 827-2855, correo electrÃ³nico nd.coordinator@state.nm.us. TambiÃ©n puede visitar nuestro sitio web en https://www.env.nm.gov/non-employee-discrimination-complaint-page/ para saber cÃ³mo y dÃ³nde presentar una queja de discriminaciÃ³n. (Legal No. 17,077; Pub. Dec. 26, 2019).

Public Notice ID:

NMED EXHIBIT 7

AFFP

Legal 17077_20.6.4 NMAC

Affidavit of Publication

STATE OF NM }
COUNTY OF TAOS } SS

Gabrielle Sanchez, being duly sworn, says:

That she is Legal Advertising Representative of the The Taos News, a weekly newspaper of general circulation, printed and published in Colfax County, Rio Arriba County, Taos County, NM; that the publication, a copy of which is attached hereto, was published in the said newspaper on the following

December 26, 2019

That said newspaper was regularly issued and circulated on those dates.

SIGNED:

Gabrielle Sanchez

Subscribed to and sworn to me this 26th day of December 2019.

Mary Chavez

Mary Chavez, Notary Public, Taos County, NM

My commission expires: April 03, 2021

OFFICIAL SEAL
MARY CHAVEZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires 4·3·2021

00010188 00033187

Chris Vigil
NEW MEXICO ENVIRONMENT DEPT.
121 Tijeras Avenue, STE. 1000
Albuquerque, NM 87102

NMED EXHIBIT 8

Legal No. 17,077.

NOTICE OF PUBLIC HEARING FOR AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT

The Water Quality Control Commission ("WQCC") will hold a public hearing beginning at 9:00 am on March 10, 2020 and continuing thereafter as necessary at the Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505. The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Department's ("NMED") website prior to the hearing:
https://www.env.nm.gov/water-quality-control-commission/wqcc/

The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMED's Surface Water Quality Bureau ("Bureau") is the proponent of the proposed amendments.

The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing.

The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at
https://www.env.nm.gov/surface-water-quality/ts-raton/

Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on February 19, 2020, twenty (20) days before the hearing. Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, WQCC 19-46.

The form and content of the notice shall:

* Identify the person for whom the witness(es) will testify;
* Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background;
* Include a copy of the direct testimony of each technical witness in narrative form;
* Include the text of any recommended modifications to the proposed regulatory change; and
* List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules.

Notices of intent to present technical testimony shall be filed with:
Cody Barnes, Hearing Office Administrator, New Mexico Environment Department, Harold Runnels Building, P.O. Box 5469, Santa Fe, NM 87502
tele: (505) 827-2428 email: cody.barnes@state.nm.us

All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number WQCC 19-46. Pursuant to 20.1.6.203 NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing.

The hearing will be conducted in accordance with the WQCC's rulemaking procedures, NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019), 20.6.4 NMAC, the State Rules Act, NMSA 1978, Sections 14-4-1 through -11 (1967 as amended through 2017), and other applicable procedures.

If any person requires assistance, an interpreter or auxiliary aid to participate in this process, please contact Cody Barnes, at the above address, by March 3, 2020. (TDD or TTY users please access the number via the New Mexico Relay Network, 1-800-659-1779 (voice); TTY users: 1-800-659-8331).

STATEMENT OF NON-DISCRIMINATION

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Parts 5 and 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, you may contact: Kristine Yurdin, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855; email: nd.coordinator@state.nm.us

If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator.

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AVISO DE AUDIENCIA PÚBLICA PARA ENMIENDAS A 20.6.4 NMAC ESTABLECIMIENTO DE UN ESTÁNDAR TEMPORAL DE NUTRIENTES PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES, LOCALIDAD DE RATON, NM

La Comisión de Control de Calidad del Agua ("WQCC" por sus siglas en inglés) celebrará una audiencia pública a partir de las 9:00 de la mañana del 10 de marzo de 2020, y continuará después según sea necesario en El Auditorio Runnels ubicado en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM 87505. El lugar de la audiencia puede cambiar antes de la fecha de la audiencia, y los interesados en asistir deben visitar el sitio web del Departamento de Medio Ambiente de Nuevo México ("NMED" por sus siglas en inglés) antes de la audiencia:
https://www.env.nm.gov/water-quality-control-commission/wqcc/

El propósito de la audiencia es considerar las enmiendas propuestas a 20.6.4 NMAC. Las enmiendas propuestas permitirían a la Oficina aplicar un mecanismo para avanzar hacia el logro de un criterio de uso designado y calidad del agua que actualmente no es alcanzable. La Oficina de Calidad de las Aguas Superficiales de NMED ("Oficina") es la proponente de las enmiendas propuestas.

La Oficina propone que la WQCC adopte las enmiendas propuestas a 20.6.4 del NMAC, de conformidad con su autoridad bajo NMSA 1978, Secciones 47-6-1 a -17 (1967 según enmendado hasta 2019) y 20.6.4 del NMAC. Tenga en cuenta que el formato y cambios técnicos menores a 20.6.4 NMAC, que no sean los propuestos por NMED, pueden ser propuestos en la audiencia. Además, se pueden hacer otros cambios según sea necesario en respuesta a los comentarios del público y las pruebas presentadas en la audiencia.

La norma enmendada propuesta 20.6.4 NMAC puede ser revisada durante horas hábiles regulares en la Oficina de Audiencias de NMED ubicada en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM, 87505. El texto completo de la propuesta enmendada 20.6.4 NMAC también está disponible en línea en https://www.env.nm.gov/surface-water-quality/ts-raton/

De conformidad con el 20.1.6.202 NMAC, aquellos que deseen presentar un testimonio de carácter técnico deben presentar un aviso escrito de su intención de presentar testimonio técnico en la Oficina de Audiencias a más tardar hasta las 5:00 de la tarde del 19 de febrero de 2020, veinte (20) días antes de la audiencia. Los avisos de intención de presentar testimonio técnico deben hacer referencia al nombre del reglamento, la fecha de la audiencia y el número de expediente, WQCC 19-46.

La forma y el contenido del aviso deberán:

* Identificar a la persona para la cual testificará el testigo o testigos;
* Identificar a cada testigo técnico que la persona tiene la intención de presentar y declarar la calificación de ese testigo, incluyendo una descripción de su historial educativo y laboral;
* Incluir una copia del testimonio directo de cada testigo técnico en forma narrativa;
* Incluir el texto de cualquier modificación recomendada al cambio regulatorio propuesto; y
* Enumerar y adjuntar todos los documentos u objetos de pruebas que se espera que esa persona presentará en la audiencia, incluyendo cualquier declaración propuesta de las razones para la adopción de las reglas.

Los avisos de la intención de presentar testimonio técnico deberán presentarse a: Cody Barnes, Hearing Office Administrator, New Mexico Environment Department, Harold Runnels Building, P.O. Box 5469, Santa Fe, NM 87502
teléfono: (505) 827-2428 correo electrónico: cody.barnes@state.nm.us

Toda persona interesada tendrá una oportunidad razonable en la audiencia de presentar pruebas, datos, puntos de vista y argumentos pertinentes, oralmente o por escrito; de presentar documentos u objetos de pruebas y de interrogar a los testigos. Cualquier persona que desee presentar una declaración escrita de carácter no técnico para que conste en actas en lugar de un testimonio oral debe presentar dicha declaración antes de la clausura de la audiencia. Los comentarios por escrito sobre la nueva norma propuesta pueden dirigirse al Sr. Cody Barnes, Administrador de la Oficina de Audiencias, a la dirección antes mencionada, y deben hacer referencia al número de expediente WQCC 19-46. De conformidad con 20.1.6.203 NMAC, cualquier miembro del público puede presentar una entry of appearance como parte interesada en la audiencia. La entry of appearance se presentará ante Cody Barnes, a la dirección antes mencionada, a más tardar el 17 de febrero de 2020, veinte (20) días antes de la fecha de la audiencia.

La audiencia se llevará a cabo de acuerdo con los procedimientos de reglamentación de la WQCC, NMSA 1978, Secciones 47-6-1 a -17 (1967, enmendado hasta 2019), 20.6.4 NMAC, la Ley de Normas Estatales, NMSA 1978, Secciones 14-4-1 a -11 (1967, enmendado hasta 2017), y otros procedimientos aplicables.

Si alguna persona requiere asistencia, un intérprete o un dispositivo auxiliar para participar en este proceso, comuníquese con Cody Barnes, a la dirección antes mencionada, antes del 3 de marzo de 2020. (Los usuarios de TDD o TTY pueden acceder al número a través de New Mexico Relay Network, 1-800-659-1779 [voz]; los usuarios de TTY: 1-800-659-8331).

DECLARACIÓN DE NO DISCRIMINACIÓN

NMED no discrimina por motivos de raza, color, origen nacional, discapacidad, edad o sexo en la administración de sus programas o actividades, según lo exigen las leyes y regulaciones aplicables. NMED es responsable de la coordinación de los esfuerzos de cumplimiento y la recepción de consultas sobre los requisitos de no discriminación implementados por 40 C.F.R. Partes 5 y 7, incluido el Título VI de la Ley de Derechos Civiles de 1964, según enmendada; Sección 504 de la Ley de Rehabilitación de 1973; la Ley de Discriminación por Edad de 1975, el Título IX de las Enmiendas de Educación de 1972 y la Sección 13 de las Enmiendas de la Ley de Control de la Contaminación del Agua de 1972. Si tiene alguna pregunta sobre este aviso o alguno de los programas, políticas o procedimientos de no discriminación de NMED o si cree que ha sido discriminado con respecto a un programa o actividad de NMED, puede comunicarse con: Kristine Yurdin, coordinadora de no discriminación, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, teléfono (505) 827-2855, correo electrónico nd.coordinator@state.nm.us. También puede visitar nuestro sitio web en https://www.env.nm.gov/non-employee-discrimination-complaint-page/ para saber cómo y dónde presentar una queja de discriminación.

(Legal No. 17,077; Pub. Dec. 26, 2019).

NMED EXHIBIT 8

AFFP

Legal 17077_20.6.4 NMAC

Affidavit of Publication

STATE OF NM }
COUNTY OF TAOS } SS

Gabrielle Sanchez, being duly sworn, says:

That she is Legal Advertising Representative of the The Taos News, a weekly newspaper of general circulation, printed and published in Colfax County, Rio Arriba County, Taos County, NM; that the publication, a copy of which is attached hereto, was published in the said newspaper on the following

December 26, 2019

LEGAL COPY ON NEXT PAGE

That said newspaper was regularly issued and circulated on those dates.

SIGNED:

Gabrielle Sanchez

Subscribed to and sworn to me this 26th day of December 2019.

Mary Chavez

Mary Chavez, Notary Public, Taos County, NM

My commission expires: April 03, 2021

OFFICIAL SEAL
MARY CHAVEZ
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires 4·3·2021

00010188 00033187

Chris Vigil
NEW MEXICO ENVIRONMENT DEPT.
121 Tijeras Avenue, STE. 1000
Albuquerque, NM 87102

Legal No. 17,077.

NOTICE OF PUBLIC HEARING FOR AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT

The Water Quality Control Commission ("WQCC") will hold a public hearing beginning at 9:00 am on March 10, 2020 and continuing thereafter as necessary at the Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505. The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Department's ("NMED") website prior to the hearing:
https://www.env.nm.gov/water-quality-control-commission/wqcc/

The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMED's Surface Water Quality Bureau ("Bureau") is the proponent of the proposed amendments.

The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing.

The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at
https://www.env.nm.gov/surface-water-quality/ts-raton/

Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on February 19, 2020, twenty (20) days before the hearing. Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, WQCC 19-46.

The form and content of the notice shall:

* Identify the person for whom the witness(es) will testify;
* Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background;
* Include a copy of the direct testimony of each technical witness in narrative form;
* Include the text of any recommended modifications to the proposed regulatory change; and
* List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules.

Notices of intent to present technical testimony shall be filed with:
Cody Barnes, Hearing Office Administrator, New Mexico Environment Department, Harold Runnels Building, P.O. Box 5469, Santa Fe, NM 87502
tele: (505) 827-2428 email: cody.barnes@state.nm.us

All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number WQCC 19-46. Pursuant to 20.1.6.203 NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing.

The hearing will be conducted in accordance with the WQCC's rulemaking procedures, NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019), 20.6.4 NMAC, the State Rules Act, NMSA 1978, Sections 14-4-1 through -11 (1967 as amended through 2017), and other applicable procedures.

If any person requires assistance, an interpreter or auxiliary aid to participate in this process, please contact Cody Barnes, at the above address, by March 3, 2020. (TDD or TTY users please access the number via the New Mexico Relay Network, 1-800-659-1779 (voice); TTY users: 1-800-659-8331).

STATEMENT OF NON-DISCRIMINATION

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Parts 5 and 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, you may contact: Kristine Yurdin, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855; email: nd.coordinator@state.nm.us

If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator.

****

AVISO DE AUDIENCIA PÚBLICA PARA ENMIENDAS A 20.6.4 NMAC ESTABLECIMIENTO DE UN ESTÁNDAR TEMPORAL DE NUTRIENTES PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES, LOCALIDAD DE RATON, NM

La Comisión de Control de Calidad del Agua ("WQCC" por sus siglas en inglés) celebrará una audiencia pública a partir de las 9:00 de la mañana del 10 de marzo de 2020, y continuará después según sea necesario en El Auditorio Runnels ubicado en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM 87505. El lugar de la audiencia puede cambiar antes de la fecha de la audiencia, y los interesados en asistir deben visitar el sitio web del Departamento de Medio Ambiente de Nuevo México ("NMED" por sus siglas en inglés) antes de la audiencia:
https://www.env.nm.gov/water-quality-control-commission/wqcc/

El propósito de la audiencia es considerar las enmiendas propuestas a 20.6.4 NMAC. Las enmiendas propuestas permitirían a la Oficina aplicar un mecanismo para avanzar hacia el logro de un criterio de uso designado y calidad del agua que actualmente no es alcanzable. La Oficina de Calidad de las Aguas Superficiales de NMED ("Oficina") es la proponente de las enmiendas propuestas.

La Oficina propone que la WQCC adopte las enmiendas propuestas a 20.6.4 del NMAC, de conformidad con su autoridad bajo NMSA 1978, Secciones 47-6-1 a -17 (1967 según enmendado hasta 2019) y 20.6.4 del NMAC. Tenga en cuenta que el formato y cambios técnicos menores a 20.6.4 NMAC, que no sean los propuestos por NMED, pueden ser propuestos en la audiencia. Además, se pueden hacer otros cambios según sea necesario en respuesta a los comentarios del público y las pruebas presentadas en la audiencia.

La norma enmendada propuesta 20.6.4 NMAC puede ser revisada durante horas hábiles regulares en la Oficina de Audiencias de NMED ubicada en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM, 87505. El texto completo de la propuesta enmendada 20.6.4 NMAC también está disponible en línea en https://www.env.nm.gov/surface-water-quality/ts-raton/

De conformidad con el 20.1.6.202 NMAC, aquellos que deseen presentar un testimonio de carácter técnico deben presentar un aviso escrito de su intención de presentar testimonio técnico en la Oficina de Audiencias a más tardar hasta las 5:00 de la tarde del 19 de febrero de 2020, veinte (20) días antes de la audiencia. Los avisos de intención de presentar testimonio técnico deben hacer referencia al nombre del reglamento, la fecha de la audiencia y el número de expediente, WQCC 19-46.

La forma y el contenido del aviso deberán:

* Identificar a la persona para la cual testificará el testigo o testigos;
* Identificar a cada testigo técnico que la persona tiene la intención de presentar y declarar la calificación de ese testigo, incluyendo una descripción de su historial educativo y laboral;
* Incluir una copia del testimonio directo de cada testigo técnico en forma narrativa;
* Incluir el texto de cualquier modificación recomendada al cambio regulatorio propuesto; y
* Enumerar y adjuntar todos los documentos u objetos de pruebas que se espera que esa persona presentará en la audiencia, incluyendo cualquier declaración propuesta de las razones para la adopción de las reglas.

Los avisos de la intención de presentar testimonio técnico deberán presentarse a: Cody Barnes, Hearing Office Administrator, New Mexico Environment Department, Harold Runnels Building, P.O. Box 5469, Santa Fe, NM 87502
teléfono: (505) 827-2428 correo electrónico: cody.barnes@state.nm.us

Toda persona interesada tendrá una oportunidad razonable en la audiencia de presentar pruebas, datos, puntos de vista y argumentos pertinentes, oralmente o por escrito; de presentar documentos u objetos de pruebas y de interrogar a los testigos. Cualquier persona que desee presentar una declaración escrita de carácter no técnico para que conste en actas en lugar de un testimonio oral debe presentar dicha declaración antes de la clausura de la audiencia. Los comentarios por escrito sobre la nueva norma propuesta pueden dirigirse al Sr. Cody Barnes, Administrador de la Oficina de Audiencias, a la dirección antes mencionada, y deben hacer referencia al número de expediente WQCC 19-46. De conformidad con 20.1.6.203 NMAC, cualquier miembro del público puede presentar una entry of appearance como parte interesada en la audiencia. La entry of appearance se presentará ante Cody Barnes, a la dirección antes mencionada, a más tardar el 17 de febrero de 2020, veinte (20) días antes de la fecha de la audiencia.

La audiencia se llevará a cabo de acuerdo con los procedimientos de reglamentación de la WQCC, NMSA 1978, Secciones 47-6-1 a -17 (1967, enmendado hasta 2019), 20.6.4 NMAC, la Ley de Normas Estatales, NMSA 1978, Secciones 14-4-1 a -11 (1967, enmendado hasta 2017), y otros procedimientos aplicables.

Si alguna persona requiere asistencia, un intérprete o un dispositivo auxiliar para participar en este proceso, comuníquese con Cody Barnes, a la dirección antes mencionada, antes del 3 de marzo de 2020. (Los usuarios de TDD o TTY pueden acceder al número a través de New Mexico Relay Network, 1-800-659-1779 [voz]; los usuarios de TTY: 1-800-659-8331).

DECLARACIÓN DE NO DISCRIMINACIÓN

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(Legal No. 17,077; Pub. Dec. 26, 2019).

NMED EXHIBIT 8

FOR AMENDMENTS TO 20.6.4 NMAC
ESTABLISHING A NUTRIENT TEMPORARY STANDARD
FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT

The Water Quality Control Commission ("WQCC") will hold a public hearing beginning at **9:00 am on March 10, 2020** and continuing thereafter as necessary at the **Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505.** The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Department's ("NMED") website prior to the hearing: https://www.env.nm.gov/water-quality-control-commission/wqcc/. The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMED's Surface Water Quality Bureau ("Bureau") is the proponent of the proposed amendments.

The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing.

The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at https://www.env.nm.gov/surface-water-quality/ts-raton/.

Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on **February 19, 2020, twenty (20) days before the hearing.** Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, **WQCC 19-46.**

The form and content of the notice shall:
* Identify the person for whom the witness(es) will testify;
* Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background;
* Include a copy of the direct testimony of each technical witness in narrative form;
* Include the text of any recommended modifications to the proposed regulatory change; and
* List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules.

Notices of intent to present technical testimony shall be filed with:

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New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
telephone: (505) 827-2428
email: cody.barnes@state.nm.us

All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number **WQCC 19-46.** Pursuant to 20.1.6.203

NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing.

The hearing will be conducted in accordance with the WQCC's rulemaking procedures, NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019), 20.6.4 NMAC, the State Rules Act, NMSA 1978, Sections 14-4-1 through -11 (1967 as amended through 2017), and other applicable procedures.

If any person requires assistance, an interpreter or auxiliary aid to participate in this process, please contact Cody Barnes, at the above address, by March 3, 2020. (TDD or TTY users please access the number via the New Mexico Relay Network, 1-800-659-1779 (voice); TTY users: 1-800-659-8331).

STATEMENT OF NON-DISCRIMINATION

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PARA ENMIENDAS A 20.6.4 NMAC
ESTABLECIMIENTO DE UN ESTÁNDAR TEMPORAL DE NUTRIENTI
PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES,
LOCALIDAD DE RATON, NM

La Comisión de Control de Calidad del Agua ("WQCC" por sus siglas en inglés) celebrará una audiencia pública a partir de las **9:00 de la mañana del 10 de marzo de 2020,** y continuará después según sea necesario en **El Auditorio Runnels ubicado en el Edificio Harold Runnels, 119C South St. Francis Drive, Santa Fe, NM 87505.** El lugar de la audiencia puede cambiar antes de la fecha de la audiencia, y los interesados en asi deben visitar el sitio web del Departamento de Medio Ambiente de Nuevc México ("NMED" por sus siglas en inglés) antes de la audiencia: https://www.env.nm.gov/water-quality-control-commission/wqcc/. El propósito de la audiencia es considerar las enmiendas propuestas a 20.6.4 NMAC. Las enmiendas propuestas permitirían a la Oficina aplicar un mecanismo para avanzar hacia el logro de un criterio de uso designado y calidad del agua que actualmente no es alcanzable. La Oficina de Calidad de las Agu Superficiales de NMED ("Oficina") es la proponente de las enmiendas propuestas.

La Oficina propone que la WQCC adopte las enmiendas propuestas a 20. del NMAC, de conformidad con su autoridad bajo NMSA 1978, Seccione 47-6-1 a -17 (1967 según enmendado hasta 2019) y 20.6.4 del NMAC. Ten en cuenta que el formato y cambios técnicos menores a 20.6.4 NMAC, qu no sean los propuestos por NMED, pueden ser propuestos en la audienci Además, se pueden hacer otros cambios según sea necesario en respue a los comentarios del público y las pruebas presentadas en la audiencia.

La norma enmendada propuesta 20.6.4 NMAC puede ser revisada durant horas hábiles regulares en la Oficina de Audiencias de NMED ubicada en Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM, 875C El texto completo de la propuesta enmendada 20.6.4 NMAC también está disponible en línea en **https://www.env.nm.gov/surface-water-quality/ ts-raton/.**

De conformidad con el 20.1.6.202 NMAC, aquellos que deseen presentar un testimonio de carácter técnico deben presentar un aviso escrito de su intención de presentar testimonio técnico en la Oficina de Audiencias a más tardar hasta las 5:00 de la tarde del **19 de febrero de 2020, veinte (20) días antes de la audiencia.** Los avisos de intención de presentar testimonio técnico deben hacer referencia al nombre del reglamento, la fecha de la audiencia y el número de expediente, **WQCC 19-46.**

La forma y el contenido del aviso deberán:
* Identificar a la persona para la cual testificará el testigo o testigos;
* Identificar a cada testigo técnico que la persona tiene la intención de presentar y declarar la calificación de ese testigo, incluyendo una descripción de su historial educativo y laboral;
* Incluir una copia del testimonio directo de cada testigo técnico en forma narrativa;
* Incluir el texto de cualquier modificación recomendada al cambio regulatorio propuesto; y
* Enumerar y adjuntar todos los documentos u objetos de pruebas que se espera que esa persona presentará en la audiencia, incluyendo cualquie declaración propuesta de las razones para la adopción de las reglas.

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Harold Runnels Building
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Santa Fe, NM 87502
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La audiencia se llevará a cabo de acuerdo con los procedimientos de reglamentación de la WQCC, NMSA 1978, Secciones 47-6-1 a -17 (1967, enmendado hasta 2019), 20.6.4 NMAC, la Ley de Normas Estatales, NMS 1978, Secciones 14-4-1 a -11 (1967, enmendado hasta 2017), y otros procedimientos aplicables.

Si alguna persona requiere asistencia, un intérprete o un dispositivo auxili para participar en este proceso, comuníquese con Cody Barnes, a la dirección antes mencionada, antes del 3 de marzo de 2020. (Los usuarios de TDD o TTY pueden acceder al número a través de New Mexico Relay Network, 1-800-659-1779 [voz]; los usuarios de TTY: 1-800-659-8331).

DECLARACIÓN DE NO DISCRIMINACIÓN

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Legal # 86535
Pub.: Dec. 30, 2019

SANTA FE NEW MEXICAN

Founded 1849

NM ENVIRONMENT.
P O BOX 5469
SANTA FE, NM 87502

RECEIVED
JAN 06 2020
SURFACE WATER QUALITY BUREAU

ACCOUNT:	1997
AD NUMBER:	0000269419
LEGAL NO 86535	P.O. #: 34814
1 TIME(S)	409.75
AFFIDAVIT	20.00
TAX	35.42
TOTAL	455.17

AFFIDAVIT OF PUBLICATION

STATE OF NEW MEXICO
COUNTY OF SANTA FE

I, C. Valdez, being first duly sworn declare and say that I am Legal Advertising Representative of THE SANTA FE NEW MEXICAN, a daily newspaper published in the English language, and having a general circulation in the Counties of Santa Fe, Rio Arriba, San Miguel, and Los Alamos, State of New Mexico and being a newspaper duly qualified to publish legal notices and advertisements under the provisions of Chapter 167 on Session Laws of 1937; that the Legal No 86535 a copy of which is hereto attached was published in said newspaper 1 day(s) between 12/30/2019 and 12/31/2019 and that the notice was published in the newspaper proper and not in any supplement; the first date of publication being on the 30th day of December, 2019 and that the undersigned has personal knowledge of the matter and things set forth in this affidavit.

/S/ C Valdez

LEGAL ADVERTISEMENT REPRESENTATIVE

Subscried and sworn to before me on this 2nd day of January, 2020

Notary Anne M Icenhower

Commission Expires: 2-20-22

OFFICIAL SEAL
Anne M Icenhower
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires 2-20-22

NMED EXHIBIT 10

New Mexico Register / Volume XXX, Issue 24 / December 31, 2019

**NOTICE OF PUBLIC HEARING
FOR AMENDMENTS TO 20.6.4 NMAC
ESTABLISHING A NUTRIENT TEMPORARY STANDARD
FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT**

The Water Quality Control Commission ("WQCC") will hold a public hearing beginning at **9:00 am on March 10, 2020** and continuing thereafter as necessary at the **Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505.** The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Department's ("NMED") website prior to the hearing: https://www.env.nm.gov/water-quality-control-commission/wqcc/. The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMED's Surface Water Quality Bureau ("Bureau") is the proponent of the proposed amendments.

The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing.

The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at https://www.env.nm.gov/surface-water-quality/ts-raton/.

Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on **February 19, 2020, twenty (20) days before the hearing**. Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, **WQCC 19-46**.

The form and content of the notice shall:

* Identify the person for whom the witness(es) will testify;
* Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background;
* Include a copy of the direct testimony of each technical witness in narrative form;
* Include the text of any recommended modifications to the proposed regulatory change; and
* List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules.

Notices of intent to present technical testimony shall be filed with:

Cody Barnes, Hearing Office Administrator
New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
telephone: (505) 827-2428
email: cody.barnes@state.nm.us

All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number **WQCC 19-46**. Pursuant to 20.1.6.203 NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing.

The hearing will be conducted in accordance with the WQCC's rulemaking procedures, NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019), 20.6.4 NMAC, the State Rules Act, NMSA 1978, Sections 14-4-1 through -11 (1967 as amended through 2017), and other applicable procedures.

If any person requires assistance, an interpreter or auxiliary aid to participate in this process, please contact Cody Barnes, at the above address, by March 3, 2020. (TDD or TTY users please access the number via the New Mexico Relay Network, 1-800-659-1779 (voice); TTY users: 1-800-659-8331).

STATEMENT OF NON-DISCRIMINATION

NMED EXHIBIT 11

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Parts 5 and 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non- discrimination programs, policies or procedures, you may contact: Kristine Yurdin, Non-Discrimination Coordinator, New Mexico Environment Department, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, (505) 827-2855; email: nd.coordinator@state.nm.us. If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator.

AVISO DE AUDIENCIA PÚBLICA
PARA ENMIENDAS A 20.6.4 NMAC
ESTABLECIMIENTO DE UN ESTÁNDAR TEMPORAL DE NUTRIENTES
PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES, LOCALIDAD DE RATON, NM

La Comisión de Control de Calidad del Agua ("WQCC" por sus siglas en inglés) celebrará una audiencia pública a partir de las **9:00 de la mañana del 10 de marzo de 2020**, y continuará después según sea necesario en **El Auditorio Runnels ubicado en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM 87505**. El lugar de la audiencia puede cambiar antes de la fecha de la audiencia, y los interesados en asistir deben visitar el sitio web del Departamento de Medio Ambiente de Nuevo México ("NMED" por sus siglas en inglés) antes de la audiencia: https://www.env.nm.gov/water-quality-control-commission/wqcc/. El propósito de la audiencia es considerar las enmiendas propuestas a 20.6.4 NMAC. Las enmiendas propuestas permitirían a la Oficina aplicar un mecanismo para avanzar hacia el logro de un criterio de uso designado y calidad del agua que actualmente no es alcanzable. La Oficina de Calidad de las Aguas Superficiales de NMED ("Oficina") es la proponente de las enmiendas propuestas.

La Oficina propone que la WQCC adopte las enmiendas propuestas a 20.6.4 del NMAC, de conformidad con su autoridad bajo NMSA 1978, Secciones 47-6-1 a -17 (1967 según enmendado hasta 2019) y 20.6.4 del NMAC. Tenga en cuenta que el formato y cambios técnicos menores a 20.6.4 NMAC, que no sean los propuestos por NMED, pueden ser propuestos en la audiencia. Además, se pueden hacer otros cambios según sea necesario en respuesta a los comentarios del público y las pruebas presentadas en la audiencia.

La norma enmendada propuesta 20.6.4 NMAC puede ser revisada durante horas hábiles regulares en la Oficina de Audiencias de NMED ubicada en el Edificio Harold Runnels, 1190 South St. Francis Drive, Santa Fe, NM, 87505. El texto completo de la propuesta enmendada 20.6.4 NMAC también está disponible en línea en https://www.env.nm.gov/surface-water-quality/ts-raton/.

De conformidad con el 20.1.6.202 NMAC, aquellos que deseen presentar un testimonio de carácter técnico deben presentar un aviso escrito de su intención de presentar testimonio técnico en la Oficina de Audiencias a más tardar hasta las 5:00 de la tarde del **19 de febrero de 2020, veinte (20) días antes de la audiencia**. Los avisos de intención de presentar testimonio técnico deben hacer referencia al nombre del reglamento, la fecha de la audiencia y el número de expediente, **WQCC 19-46**.

La forma y el contenido del aviso deberán:

* Identificar a la persona para la cual testificará el testigo o testigos;
* Identificar a cada testigo técnico que la persona tiene la intención de presentar y declarar la calificación de ese testigo, incluyendo una descripción de su historial educativo y laboral;
* Incluir una copia del testimonio directo de cada testigo técnico en forma narrativa;
* Incluir el texto de cualquier modificación recomendada al cambio regulatorio propuesto; y
* Enumerar y adjuntar todos los documentos u objetos de pruebas que se espera que esa persona presentará en la audiencia, incluyendo cualquier declaración propuesta de las razones para la adopción de las reglas.

Los avisos de la intención de presentar testimonio técnico deberán presentarse a:

Cody Barnes, Hearing Office Administrator
New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
teléfono: (505) 827-2428
correo electrónico: cody.barnes@state.nm.us

Toda persona interesada tendrá una oportunidad razonable en la audiencia de presentar pruebas, datos, puntos de vista y argumentos pertinentes, oralmente o por escrito; de presentar documentos u objetos de pruebas y de interrogar a los testigos. Cualquier persona que desee presentar una declaración escrita de carácter no técnico para que conste en actas en lugar de un testimonio oral debe presentar dicha declaración antes de la clausura de la audiencia. Los comentarios por escrito sobre la nueva norma propuesta pueden dirigirse al Sr. Cody Barnes, Administrador de la Oficina de Audiencias, a la dirección antes mencionada, y deben hacer referencia al número de expediente **WQCC 19-46**. De conformidad con 20.1.6.203 NMAC, cualquier miembro del público puede presentar una *entry of appearance* como parte interesada en la audiencia. La *entry of appearance* se presentará ante Cody Barnes, a la dirección antes mencionada, a más tardar el **17 de febrero de 2020, veinte (20)** días antes de la fecha de la audiencia.

NMED EXHIBIT 11

La audiencia se llevará a cabo de acuerdo con los procedimientos de reglamentación de la WQCC, NMSA 1978, Secciones 47-6-1 a -17 (1967, enmendado hasta 2019), 20.6.4 NMAC, la Ley de Normas Estatales, NMSA 1978, Secciones 14-4-1 a -11 (1967, enmendado hasta 2017), y otros procedimientos aplicables.

Si alguna persona requiere asistencia, un intérprete o un dispositivo auxiliar para participar en este proceso, comuníquese con Cody Barnes, a la dirección antes mencionada, antes del 3 de marzo de 2020. (Los usuarios de TDD o TTY pueden acceder al número a través de New Mexico Relay Network, 1-800-659-1779 [voz]; los usuarios de TTY: 1-800-659-8331).

DECLARACIÓN DE NO DISCRIMINACIÓN

NMED no discrimina por motivos de raza, color, origen nacional, discapacidad, edad o sexo en la administración de sus programas o actividades, según lo exigen las leyes y regulaciones aplicables. NMED es responsable de la coordinación de los esfuerzos de cumplimiento y la recepción de consultas sobre los requisitos de no discriminación implementados por 40 C.F.R. Partes 5 y 7, incluido el Título VI de la Ley de Derechos Civiles de 1964, según enmendada; Sección 504 de la Ley de Rehabilitación de 1973; la Ley de Discriminación por Edad de 1975, el Título IX de las Enmiendas de Educación de 1972 y la Sección 13 de las Enmiendas de la Ley de Control de la Contaminación del Agua de 1972. Si tiene alguna pregunta sobre este aviso o alguno de los programas, políticas o procedimientos de no discriminación de NMED o si cree que ha sido discriminado con respecto a un programa o actividad de NMED, puede comunicarse con: Kristine Yurdin, coordinadora de no discriminación, NMED, 1190 St. Francis Dr., Suite N4050, P.O. Box 5469, Santa Fe, NM 87502, teléfono (505) 827-2855, correo electrónico nd.coordinator@state.nm.us. También puede visitar nuestro sitio web en https://www.env.nm.gov/non-employee-discrimination-complaint-page/ para saber cómo y dónde presentar una queja de discriminación.

NMED EXHIBIT 11

NEW MEXICO
State Records Center and Archives
COMMISSION OF PUBLIC RECORDS
Your Access to Public Information

Affidavit of Publication in New Mexico Register

I, Matthew Ortiz, certify that the agency noted on Invoice # 4597 has published legal notice of rulemaking or rules in the NEW MEXICO REGISTER, VOLUME XXX, that payment has been assessed for said legal notice of rulemaking or rules, which appears on the publication date and in the issue number noted on Invoice # 4597, and that Invoice # 4597 has been sent electronically to the person(s) listed on the *Billing Information Sheet* provided by the agency.

Affiant: ______________________
Matthew Ortiz

Subscribed, sworn and acknowledged before me this 31st day of December, 2019.

Notary Public: ______________________
My Commission Expires: 2/19/2020

OFFICIAL SEAL
PAMELA ANNE LUJAN Y VIGIL
Notary Public
State of New Mexico
My Comm. Expires 2/19/2020

NMED EXHIBIT 12

New Mexico Environment Depart × | Sunshine Portal | The Official Go × | statenm.force.com/public/SSP_P ×

Not secure | statenm.force.com/public/SSP_RuleHearingSearchPublic

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SUNSHINEPORTALNM.COM
THE OFFICIAL GOVERNMENT TRANSPARENCY PORTAL OF NEW MEXICO

Rule Hearing Search

Hearing Date: All | Comments Deadline Date: All | Agency: Environment Department

Search

Total Results: 19 - Page #1

View	Agency	Public Hearing	Purpose	Hearing Date	Comments Due Date
View Details	Environment Department	NOTICE OF PUBLIC HEARING FOR AMENDMENTS TO 20.6.4 NMAC	The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC.	3/10/2020	2/17/2020 5:00 PM
View Details	Environment Department	NOTICE OF PUBLIC HEARING FOR REPEALING AND REPLACING 20.7.11 NMAC	The purpose of the hearing is to consider repealing and replacing 20.7.11, Liquid Waste Treatment and Disposal Fees, which authorizes liquid waste treatment and disposal fees for the administration of the state liquid waste regulations.	2/28/2020	2/7/2020 5:00 PM
View Details	Environment Department	Notice of Public Hearing to Amend 20.7.6 NMAC and 20.7.7 NMAC	The purpose of the hearing is to consider amendments to Wastewater Facility Construction Loan Policies and Guidelines, 20.7.6 NMAC and repeal and replacement of Review Procedures for Wastewater Construction Loans, 20.7.7 NMAC ("Rules").	1/17/2020	1/2/2020 5:00 PM
View Details	Environment Department	Hazardous Waste Permit/Corrective Action Fees and Annual Hazardous Waste Fees	The purpose of the amendments is to update the Hazardous Waste Permit and Corrective Action Fee Regulations, 20.4.2 NMAC and the Annual Hazardous Waste Fees, 20.4.3 NMAC, to incorporate changes in fees based on inflation since 2004	12/20/2019	12/2/2019 5:00 PM
View Details	Environment Department	PUBLIC HEARING FOR ADOPTION OF RULE 20.10.2 NMAC, HEMP POST-HARVEST PROCESSING	The purpose of the hearing is to consider the adoption of new rule 20.10.2 NMAC, Hemp Post-Harvest Processing of the Environmental Protection Regulations.	12/2/2019	11/15/2019 5:00 PM
View Details	Environment Department	Proposed Repeal of 20.2.20 NMAC (Lime Manufacturing Plants-Particulate Matter)	The purpose of the public hearing is to consider and take possible action on a petition from NMED to repeal 20.2.20 NMAC. The purpose of the proposed repeal of 20.2.20 NMAC is to remove outdated requirements.	11/30/2018	10/28/2018 5:00 PM
View Details	Environment Department	Hearing to Amend Rulemaking Procedures for the NM Environment Dept - 20.1.9 NMAC	Bring the Rules into compliance with recent changes to the State Rules Act (NMSA 1978, Sections 14-4-1 to -11)	10/12/2018	9/21/2018 5:00 PM
View Details	Environment Department	NOTICE OF PUBLIC HEARING TO REPEAL THE EMERGENCY VERSION OF 20.5.123 NMAC	The purpose of the hearing is to consider repealing the current emergency version of 20.3.123 NMAC and replacing it with a new 20.5.123 NMAC of the Petroleum Storage Tank Regulations ("Regulations").	10/12/2018	9/21/2018 5:00 PM
View Details	Environment Department	EIB 18-05(R) - Air Quality Control Reg - 20.2.23 NMAC Fugitive Dust Control	The purpose of the hearing is to consider the matter of EIB 18-05(R), the proposed adoption of an Air Quality Control Regulation to be codified in the New Mexico Administrative Code (NMAC) at 20.2.23 NMAC, Fugitive Dust Control.	9/28/2018	9/28/2018 9:30 AM

NMED EXHIBIT 13

Type here to search

9:57 AM
12/17/2019

Proposed Rule Name:
NOTICE OF PUBLIC HEARING FOR AMENDMENTS TO 20.6.4 NMAC
Agency:
Environment Department
Purpose:
The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. NMED's Surface Water Quality Bureau ("Bureau") is the proponent of the proposed amendments.
Summary:
The Bureau proposes the WQCC adopt the proposed amendments to 20.6.4 NMAC, pursuant to its authority under NMSA 1978, Sections 47-6-1 through -17 (1967 as amended through 2019) and 20.6.4 NMAC. Please note that formatting and minor technical changes to 20.6.4 NMAC, other than those proposed by NMED, may be proposed at the hearing. Additionally, other changes may be made as necessary in response to public comments and evidence presented at the hearing. The commission may make a decision on the proposed regulatory change at the conclusion of the hearing.
Administratives Codes:
NMAC 20.6.4
Rule Complete Copy :
The proposed amended rule 20.6.4 NMAC may be reviewed during regular business hours at the NMED Hearing Office located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM, 87505. The full text of the proposed amended 20.6.4 NMAC is also available online at https://www.env.nm.gov/surface-water-quality/ts-raton/.
Corrections:
Not available
Rule Explanatory Statement:
Click Here to access the Rule Explanatory Statement
Related New Mexico Register Publications:
Not available
For any additional information or questions concerning this rule making or posting please contact:
Cody Barnes
cody.barnes@state.nm.us
(505) 827-2428
Last Updated Date
12/10/2019 9:28 AM

How to submit Comments:
Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number WQCC 19-46. Pursuant to 20.1.6.203 NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the address below, no later than February 17, 2020, twenty (20) days before the date of the hearing.

Cody Barnes, Hearing Office Administrator
New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
When are comments due:
2/17/2020 5:00 PM

Hearing Date:
3/10/2020 9:00 AM

Public Hearing Location:
Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505 3/10/2020 (9:00 AM -).
How to participate:
Pursuant to 20.1.6.202 NMAC, those wishing to present technical testimony must file a written notice of intent to present technical testimony with the Hearing Office on or before 5:00 p.m. on February 19, 2020, twenty (20) days before the hearing. Notices of intent to present technical testimony should reference the name of the regulation, the date of the hearing, and the docket number, WQCC 19-46.

The form and content of the notice shall:

* Identify the person for whom the witness(es) will testify;
* Identify each technical witness the person intends to present and state the qualification of that witness, including a description of their education and work background;
* Include a copy of the direct testimony of each technical witness in narrative form;
* Include the text of any recommended modifications to the proposed regulatory change; and
* List and attach all exhibits anticipated to be offered by that person at the hearing, including any proposed statement of reasons for adoption of rules.

Notices of intent to present technical testimony shall be filed with:

Cody Barnes, Hearing Office Administrator
New Mexico Environment Department
Harold Runnels Building
P.O. Box 5469
Santa Fe, NM 87502
telephone: (505) 827-2428
email: cody.barnes@state.nm.us

All interested persons will be given reasonable opportunity at the hearing to submit relevant evidence, data, views, and arguments, orally or in writing; to introduce exhibits; and to examine witnesses. Any person wishing to submit a non-technical written statement for the record in lieu of oral testimony must file such statement prior to the close of the hearing. Written comments regarding the proposed new rule may be addressed to Mr. Cody Barnes, Hearing Office Administrator, at the above address, and should reference docket number WQCC 19-46. Pursuant to 20.1.6.203 NMAC, any member of the public may file an entry of appearance as a party at the hearing. The entry of appearance shall be filed with Cody Barnes, at the above address, no later than February 17, 2020, twenty (20) days before the date of the hearing.

ⓘ If the document is not visible on the previewer, please download the file.

File	File Name	File Type	Description
View Document	20.6.4 NMAC Clean Copy with edits	PDF	
View Document	Revised Bi-Lingual Public Notice Raton Temp Standard	PDF	

NMED EXHIBIT 13

Vigil, Christopher J, NMENV

From: Vigil, Christopher J, NMENV
Sent: Friday, December 6, 2019 3:46 PM
To: lcs@nmlegis.gov
Subject: Notice of Rulemaking for Distribution
Attachments: Revised Bi-Lingual Public Notice Raton Temp Standard.pdf; 20.6.4 NMAC Clean Copy with edits.pdf

Good Afternoon,

Attached is a Notice of Hearing in the matter of proposed changes to 20.6.4 NMAC, for distribution to appropriate interim and standing legislative committees. Also attached is a copy of the proposed 20.6.4 NMAC in redline format.

Please confirm your receipt of this email and the distribution of these documents in pursuant to NMSA 1978, Sec. 14.4.2(E)(7) (distribution of rulemaking info to legislative committees).

If there is anything I can do to assist, please let me know.

Thank you,
Chris

Chris Vigil
Assistant General Counsel
New Mexico Environment Department
Springer Building
121 Tijeras Avenue
Suite 1000
Albuquerque, NM 87102
(505) 383-2060
Fax: (505) 383-2064
https://www.env.nm.gov/

NMED EXHIBIT 14

Public Notices

NOTICE OF PUBLIC HEARING FOR AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD FOR THE CITY OF RATON, NM WASTEWATER TREATMENT PLANT

AVISO DE AUDIENCIA PÚBLICA PARA ENMIENDAS A 20.6.4 NMAC ESTABLECIMIENTO DE UN ESTÁNDAR TEMPORAL DE NUTRIENTES PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES, LOCALIDAD DE RATON, NM

NOTICE OF ADOPTION OF FINAL RULE 20.10.2 NMAC, HEMP POST-HARVEST PROCESSING

AVISO DE ADOPCIÓN DE LA REGLA FINAL 20.10.2 NMAC, PROCESAMIENTO POSTERIOR A LA COSECHA DE HEMP

NEW MEXICO ENVIRONMENT DEPARTMENT NOTICE OF PUBLIC HEARING TO AMEND WASTEWATER FACILITY CONSTRUCTION LOAN POLICIES AND GUIDELINES – 20.7.6 NMAC AND REPEAL AND REPLACE REVIEW PROCEDURES FOR WASTEWATER CONSTRUCTION LOANS – 20.7.7 NMAC

DEPARTAMENTO DE MEDIO AMBIENTE DE NUEVO MÉXICO AVISO DE AUDIENCIA PÚBLICA PARA ENMENDAR LAS POLÍTICAS Y DIRECTRICES DE PRÉSTAMOS PARA LA CONSTRUCCIÓN DE INSTALACIONES DE AGUAS RESIDUALES – 20.7.6 NMAC Y REVOCAR Y REEMPLAZAR LOS PROCEDIMIENTOS DE REVISIÓN DE LOS PRÉSTAMOS PARA CONSTRUCCIONES PARA AGUAS RESIDUALES – 20.7.7 NMAC

PETITION FOR REGULATORY CHANGE

Exhibit 1 – Statement of Reasons

Exhibit 2

Exhibit 3

NMED EXHIBIT 15

NOTICE OF PUBLIC HEARING FOR ADOPTION OF NEW RULE 20.10.2 NMAC, HEMP POST-HARVEST PROCESSING

AVISO DE AUDIENCIA PUBLICA PARA LA ADOPCION DE LA NUEVA REGLA 20.10.2 NMAC, PROCESAMIENTO POSTERIOR A LA COSECHA DE HEMP

New Mexico Environment Department

Contact Information:
(505) 827-2855 MAIN // 1-800-219-6157 (toll free)
Environmental Emergencies:
505-827-9329 (24 hrs)

Surface Water Quality

Temporary Standard City of Raton Wastewater Treatment Plant 19-46(R)

Document	Author	Date
Public Involvement Plan	SWQB	09.25.2019
Public Comment Notice	SWQB	10.01.2019
Public Comment Draft	SWQB	10.01.2019
Petition and Request for Hearing	SWQB	10.29.2019
Hearing Notice English and Spanish	WQCC	01.07.2020

Harold Runnels Building
1190 S. St. Francis Drive, N2050
Santa Fe, New Mexico USA 87505
Phone: (505) 827-0187
Fax: (505) 827-0160
SWQB website liaison
Contact Page

NMED EXHIBIT 16

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PROPOSED AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD

No. WQCC 19-46 (R)

Surface Water Quality Bureau,
Water Protection Division,
New Mexico Environment Department,

Petitioner.

NEW MEXICO ENVIRONMENT DEPARTMENT'S NOTICE OF COMPLIANCE WITH THE SMALL BUSINESS REGULATORY RELIEF ACT

The New Mexico Environment Department gives notice that it has filed in the record of this proceeding a letter dated December 5, 2019, to the Small Business Regulatory Advisory Commission, a copy of which is attached hereto, as required by NMSA 1978, Section 14-4A-4 of the Small Business Regulatory Relief Act.

Respectfully submitted,

Chris Vigil
Assistant General Counsel
New Mexico Environment Department
121 Tijeras Ave. NW, Ste 1000
Albuquerque, NM 87102
Phone: (505) 383-2060
christopherj.vigil@state.nm.us

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing *Notice of Compliance* was served on the following party on December 5, 2019 by email:

Cody Barnes, Hearing Officer Administrator
Room S-2104, Runnels Building
1190 St. Francis Dr.
Santa Fe, New Mexico 87505

Chris Vigil
Assistant General Counsel

NMED EXHIBIT 17

NEW MEXICO
ENVIRONMENT DEPARTMENT

Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
Santa Fe, NM 87502-5469
Telephone (505) 827-2855
www.env.nm.gov

Michelle Lujan Grisham
Governor

Howie C. Morales
Lt. Governor

James C. Kenney
Cabinet Secretary

Jennifer J. Pruett
Deputy Secretary

December 5, 2019

VIA EMAIL

Small Business Regulatory Advisory Commission
c/o Johanna Nelson, Administrator
New Mexico Economic Development Department
1100 S. St. Francis Drive
Santa Fe, NM 87505-4147

RE: Proposed Amendments to the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC)

Dear Commission Members,

The New Mexico Environment Department ("Department") hereby provides notice to the Small Business Regulatory Advisory Commission pursuant to the Small Business Regulatory Relief Act, NMSA 1978, Section 14-4A-1 through -6 (2005), that the Department's Water Protection Division, Surface Water Quality Bureau ("SWQB") has petitioned the Water Quality Control Commission ("WQCC") to amend the *Standards for Interstate and Intrastate Surface Waters* (20.6.4 NMAC) to create a new section, 20.6.4.318 NMAC for Doggett Creek, and to establish a Temporary Water Quality Standard for the City of Raton Wastewater Treatment Plant ("WWTP"), NPDES Permit No. NM0020273 ("Regulations").

New Mexico's temporary standards regulations at 20.6.4.10(F) NMAC are based on the U.S. Environmental Protection Agency ("EPA") regulation on Water Quality Standard variances at 40 C.F.R. 131.14. The New Mexico regulation defines a temporary standard as "a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition ["HAC"] during the term of the temporary standard" 20.6.4.10(F)(12) NMAC. In New Mexico, the HAC may be considered synonymous with the State's definition of "temporary standard" as the "highest degree of protection feasible in the short-term." 20.6.4.10(F)(1)(b) NMAC.

A temporary standard provides a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. If a temporary standard has a term longer than 5 years, the HAC must be re-evaluated at least once every five (5) years with the opportunity for public input. 40 C.F.R. 131.14(b)(1)(v). Further, all temporary standards in New

Mexico are subject to a required review during each succeeding triennial review of water quality standards pursuant to 20.6.4.10(F)(8) NMAC.

The WQCC will hold a public hearing beginning at 9:00 am on March 10, 2020 and continuing thereafter as necessary at the Runnels Auditorium located in the Harold Runnels Building, 1190 South St. Francis Drive, Santa Fe, NM 87505. The hearing location may change prior to the hearing date, and those interested in attending should visit the New Mexico Environment Department's ("NMED") website prior to the hearing: https://www.env.nm.gov/water-quality-control-commission/wqcc/. The purpose of the hearing is to consider proposed amendments to 20.6.4 NMAC, Establishing a Nutrient Temporary Standard for the City of Raton, NM Wastewater Treatment Plant. The proposed amendments would allow the Bureau to implement a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable.

If Commission members have further questions, comments, or would like to meet and discuss the Regulations, please feel free to contact me directly at (505) 383-2060 or via email: christopherj.vigil@state.nm.us. A copy of the proposed Regulations is enclosed.

Sincerely,

Chris Vigil
Assistant General Counsel

Enclosure

Cc: Shelly Lemon, Bureau Chief, SWQB
Jennifer Fullam
Kris Barrios

NMED EXHIBIT 17

Lemon, Shelly, NMENV

From: New Mexico Environment Department <nmed@public.govdelivery.com>
Sent: Tuesday, October 1, 2019 9:10 AM
To: Lemon, Shelly, NMENV
Subject: [EXT] NMED-SWQB announces public comment period for City of Raton WWTP temporary standard

New Mexico Environment Department

Surface Water Quality Bureau

Our mission is to preserve, protect, and improve New Mexico's surface water quality for present and future generations.

Oficina de Calidad de Aguas Superficiales

Nuestra misión es preservar, proteger y mejorar la calidad de las aguas superficiales de Nuevo México para las generaciones presentes y futuras.

NEW MEXICO ENVIRONMENT DEPARTMENT, SURFACE WATER QUALITY BUREAU PROPOSES TEMPORARY WATER QUALITY STANDARDS FOR RATON WASTEWATER TREATMENT PLANT IN COLFAX COUNTY, NEW MEXICO

NOTICE OF PUBLIC COMMENT PERIOD

The New Mexico Environment Department's (NMED) Surface Water Quality Bureau (SWQB) invites the public to comment on the draft Temporary Water Quality Standard (WQS) for Nutrients and proposed amendments to the State's Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) for the City of Raton Wastewater Treatment Plant (National Pollutant Discharge Elimination System [NPDES] Permit No. NM0020273) in Colfax County, New Mexico.

As required by the federal Clean Water Act and the New Mexico Water Quality Act, the state has established WQS for its surface waters. These WQS identify the water quality goals of a water body, or portion thereof, by designating the use or uses of the water and by setting criteria that protect those designated uses.

A Temporary Standard is a time-limited WQS that reflects the highest attainable condition during the term of the temporary standard. In accordance with 40 CFR 131.14 and 20.6.4.10(F) NMAC, the Department has drafted a demonstration supporting a temporary standard for nutrients at the Raton Wastewater Treatment Plant (NPDES Permit No. NM0020273) in Colfax County. The demonstration for the nutrient temporary standards along with the proposed water quality standards amendment under 20.6.4 NMAC are available on the SWQB website at https://www.env.nm.gov/surface-water-quality/ts-raton/

The comment period for this proposal begins October 1, 2019 and closes October 31, 2019 at 5:00

p.m. Mountain Daylight Time (MDT). Comments for inclusion in the public record must be submitted in writing to Jennifer Fullam at NMED-SWQB, P.O. Box 5469, Santa Fe, NM, 87502; or by e-mail: jennifer.fullam@state.nm.us or by fax to 505-827-0160, ATTN: Jennifer Fullam.

Public meetings are not required by federal or state regulations, however if general interest is expressed NMED-SWQB may conduct informational meetings to present and discuss the proposed action and to provide a forum for interested parties and the public to ask questions.
For more information on the proposed action or to request an informational meeting in Raton or Santa Fe, please contact Jennifer Fullam at 505-827-2637 or by email at jennifer.fullam@state.nm.us or write to us at NMED-SWQB, Attn: Jennifer Fullam, P.O. Box 5469, Santa Fe, New Mexico, 87502.

Persons having a disability or requiring assistance or auxiliary aid to participate in this public process should contact the NMED Human Resources Bureau at least 10 days before any scheduled meeting, at P.O. Box 5469, 1190 St. Francis Drive, Santa Fe, New Mexico, 87502, telephone 505-827-9769. TDD or TDY users please access HRB via the New Mexico Relay Network at 1-800-659-8331.

NMED does not discriminate on the basis of race, color, national origin, disability, age or sex in the administration of its programs or activities, as required by applicable laws and regulations. NMED is responsible for coordination of compliance efforts and receipt of inquiries concerning non-discrimination requirements implemented by 40 C.F.R. Parts 5 and 7, including Title VI of the Civil Rights Act of 1964, as amended; Section 504 of the Rehabilitation Act of 1973; the Age Discrimination Act of 1975, Title IX of the Education Amendments of 1972, and Section 13 of the Federal Water Pollution Control Act Amendments of 1972. If you have any questions about this notice or any of NMED's non-discrimination programs, policies or procedures, you may contact:

Kristine Yurdin, Non-Discrimination Coordinator
New Mexico Environment Department
1190 St. Francis Dr., Suite N4050
P.O. Box 5469
Santa Fe, NM 87502
(505) 827-2855
nd.coordinator@state.nm.us

If you believe that you have been discriminated against with respect to a NMED program or activity, you may contact the Non-Discrimination Coordinator identified above.

LA OFICINA DE CALIDAD DE AGUAS SUPERFICIALES DEL DEPARTAMENTO DE MEDIO AMBIENTE DE NUEVO MÉXICO PROPONE ESTÁNDARES TEMPORALES DE CALIDAD DEL AGUA PARA LA PLANTA DE TRATAMIENTO DE AGUAS RESIDUALES DE RATÓN EN EL CONDADO DE COLFAX, NUEVO MÉXICO

AVISO DE PERÍODO DE COMENTARIOS PÚBLICOS

La Oficina de Calidad de Aguas Superficiales (SWQB, por sus siglas en inglés) del Departamento de Medio Ambiente de Nuevo México (NMED, por sus siglas en inglés) invita comentarios del público sobre el borrador de Estándares Temporales de Calidad del Agua (WQS, por sus siglas en inglés) para Nutrientes y las enmiendas propuestas a los Estándares Estatales de las Aguas Superficiales Interestatales e Intraestatales (20.6.4 NMAC) para la Planta de Tratamiento de Aguas Residuales de la localidad de Ratón (Sistema Nacional de Eliminación de Descargas de Contaminantes [NPDES, por sus siglas en inglés] Permiso Núm. NM0020273) en el condado de Colfax, Nuevo México.

Como lo requiere la Ley Federal de Agua Limpia y la Ley de Calidad del Agua de Nuevo México, el estado ha establecido el WQS para sus aguas superficiales. Estos WQS identifican las metas de calidad del agua de un cuerpo de agua, o de una parte de él, mediante la designación del uso o usos del agua y el establecimiento de criterios que protejan los usos designados.

Un Estándar Temporal es un WQS por tiempo limitado que refleja la condición más alta que se puede alcanzar durante la vigencia del estándar temporal. De acuerdo con 40 CFR 131.14 y 20.6.4.10(F) NMAC, el Departamento ha redactado una demostración que apoya un estándar temporal para nutrientes en la Planta de Tratamiento de Aguas Residuales de Ratón (Permiso NPDES Núm. NM0020273) en el condado de Colfax. La demostración de los estándares temporales para nutrientes junto con la enmienda propuesta a los estándares de calidad del agua bajo 20.6.4 NMAC están disponibles en el sitio web de SWQB en https://www.env.nm.gov/surface-water-quality/ts-raton/

El período de comentarios para esta propuesta comienza el 1 de octubre de 2019 y termina el 31 de octubre de 2019 a las 5:00 p.m., hora de verano de la montaña (MDT). Los comentarios para su inclusión en el registro público deben enviarse por escrito a Jennifer Fullam a NMED-SWQB, P.O. Box 5469, Santa Fe, NM, 87502; o por correo electrónico: jennifer.fullam@state.nm.us o por fax al 505-827-0160, ATTN: Jennifer Fullam.

Los reglamentos federales o estatales no requieren reuniones públicas, sin embargo, si se expresa un interés general, NMED-SWQB puede llevar a cabo reuniones informativas para presentar y discutir la acción propuesta y para proporcionar un foro para que las partes interesadas y el público hagan preguntas.

Para obtener más información sobre la acción propuesta o para solicitar una reunión informativa en Raton o Santa Fe, póngase en contacto con Jennifer Fullam al 505-827-2637 o por correo electrónico a jennifer.fullam@state.nm.us o escríbanos a NMED-SWQB, a la atención de: Jennifer Fullam, P.O. Box 5469, Santa Fe, NM, 87502.

Las personas que tengan una discapacidad o necesiten asistencia o ayuda auxiliar para participar en este proceso público deben comunicarse con la Oficina de Recursos Humanos de NMED por lo menos 10 días antes de cualquier reunión programada, al P.O. Box 5469, 1190 St. Francis Drive, Santa Fe, NM, 87502, teléfono 505-827-9769. Los usuarios de TDD o TDY pueden acceder a HRB a través de la Red de Transmisión de Nuevo México llamando al 1-800-659-8331.

NMED no discrimina por motivos de raza, color, origen nacional, discapacidad, edad o sexo en la administración de sus programas o actividades, según lo exigen las leyes y regulaciones aplicables. NMED es responsable de la coordinación de los esfuerzos de cumplimiento y la recepción de consultas sobre los requisitos de no discriminación implementados por 40 C.F.R. Partes 5 y 7, incluido el Título VI de la Ley de Derechos Civiles de 1964, según enmendada; Sección 504 de la Ley de Rehabilitación de 1973; la Ley de Discriminación por Edad de 1975, el Título IX de las Enmiendas de Educación de 1972 y la Sección 13 de las Enmiendas de la Ley de Control de la Contaminación del Agua de 1972. Si tiene alguna pregunta sobre este aviso o alguno de los programas, políticas o procedimientos de no discriminación de NMED o si cree que ha sido discriminado con respecto a un programa o actividad de NMED, puede comunicarse con:
Kristine Yurdin, coordinadora de no discriminación,
NMED
1190 St. Francis Dr.
Suite N4050, P.O. Box 5469
Santa Fe, NM 87502
teléfono (505) 827-2855
correo electrónico nd.coordinator@state.nm.us

También puede visitar nuestro sitio web en https://www.env.nm.gov/non-employee-discrimination-complaintpage/ para saber cómo y dónde presentar una queja de discriminación.

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cbk@umich.edu	Delivered		0	0	
ccallahan@bwenergylaw.com	Delivered		0	0	
ccardoza@hilcorp.com	Delivered		0	0	
ccking@usgs.gov	Delivered		1	0	
ccns@nuclearactive.org	Delivered		0	0	
ccordova@portalesnm.gov	Delivered		0	0	
ccs@modrall.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
ccwaterman1995@gmail.com	Delivered		1	0	
cdaniel@sandia.gov	Delivered		0	0	
cdesaillan@nmelc.org	Delivered		0	0	
ceasley@industrialinfo.com	Delivered		0	0	
ceciliaanna@msn.com	Delivered		0	0	
cedickens2@yahoo.com	Delivered		1	0	
celiamedina67@yahoo.com	Delivered		0	0	
cember.hardison@state.nm.us	Delivered		0	0	
center@biologicaldiversity.org	Delivered		0	0	
cflynn@swca.com	Delivered		0	0	
cfurr@fs.fed.us	Delivered		0	0	
cgaines@peabodyenergy.com	Delivered		0	0	
chad.dunnahoo@nm.usda.gov	Delivered		2	0	
chamapeak@gmail.com	Delivered		0	0	
chanson@ecos.org	Delivered		0	0	
chardin@rooseveltcounty.com	Delivered		0	0	
charles.dentino1@state.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
Network subscriber	Delivered		0	0	
Charstah@gmail.com	Delivered		0	0	
chcwc@hotmail.com	Delivered		0	0	
Network subscriber	Delivery Failure	3001 - [Message	0	0	
chenmitao69@hotmail.com	Delivered	Soft Bounce - Ma	0	0	
chenson@cityoftucumcari.com	Delivered		0	1	https://www.env
cheryldmkenv@gmail.com	Delivered		0	0	
chet791@gmail.com	Delivered		2	0	
chgarcia@ci.santa-fe.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
christian.maupin@em-la.doe.gov	Delivered		1	0	
christie.soulsby@wilsonco.com	Delivered		0	0	
christopher.e.fritzsche.nfg@mail.mil	Delivered		0	0	
christopher.sanderson.env@gmail.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
chuck.hayes@state.nm.us	Delivered		0	0	
chuckandsandyjohnson@comcast.net	Delivered		0	0	
Network subscriber	Delivery Failure	3002 - 554 5.0.0	0	0	

NMED EXHIBIT 18

cid@plateautel.net	Delivered		0	0	
cilawfirm@aol.com	Delivered		0	0	
ciudadswcd1944@gmail.com	Delivered		4	0	
cjohnson@tristategt.org	Delivered		0	0	
cjw@lanl.gov	Delivered		0	0	
ckelley@lrri.org	Delivered		0	0	
ckossik@ch2m.com	Delivered		1	0	
ckoury@fs.fed.us	Delivered		0	0	
claireboo2@gmail.com	Delivered		1	0	
clarence_cordova@msn.com	Delivered		0	0	
clary@wrightwater.com	Delivered		0	0	
claudette.horn@pnmresources.com	Delivered		0	0	
clcarmona@comcast.net	Delivered		0	0	
clintw@geologicservice.com	Delivered		0	0	
cltecube@yahoo.com	Delivered		0	0	
cmaxwell@alamosadesign.com	Delivered		0	0	
cmrhola@yahoo.com	Delivered		0	0	
cnaha@kewa-nsn.us	Delivered		0	0	
colleen.cunningham@state.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
connor.jorgensen@nmlegis.gov	Delivered		0	0	
constancefisher@hotmail.com	Delivered		0	0	
cordell.arellano@gmail.com	Delivered		0	0	
cpino8@phs.org	Delivered		0	0	
craig.cathey@state.nm.us	Delivered		0	0	
crcnews@rila.org	Delivered		0	0	
crich@fs.fed.us	Delivered		0	0	
cristina.acosta2@state.nm.us	Delivery Failure	1003 - 550 5.2.0	0	0	
croncw@cdmsmith.com	Delivered		0	0	
csawyer@gpamidstream.org	Delivered		0	0	
cshu-nyamboli@sfpueblo.com	Delivered		0	0	
cstropki@swca.com	Delivered		0	0	
cswhite@sevilleta.unm.edu	Delivered		0	0	
ctc.seamster@gmail.com	Delivered		1	0	
ctwing@trihydro.com	Delivered		1	1	https://www.en
cubawater@gmail.com	Delivered		1	0	
cunicorn30@hotmail.com	Delivered		0	0	
cvsalas007@yahoo.com	Delivered		0	0	
cvswcd@pvtnetworks.net	Delivered		0	0	
cwbizmarketing@aol.com	Delivered		0	0	
cwilson@sourcemolecular.com	Delivered		0	0	
cwlujan@yahoo.com	Delivered		0	0	
cwo@pamdwca.org	Delivered		0	0	
cxw@usa.com	Delivered		0	0	
cynthia.hurtado@pnmresources.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
dabollsc@gmail.com	Delivered		0	0	
dabrego@southwestcheese.com	Delivered		0	0	
dagarcia@abcwua.org	Delivered		1	0	
dan.roper@tu.org	Delivered		0	0	
dana@earthworksinstitute.org	Delivery Failure	4004 - [Message	0	0	
Network subscriber	Delivered		0	0	
daniel.bloedel@nm.usda.gov	Delivered		1	0	
daniel.guevara@state.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
daniel.valenta@state.nm.us	Delivered		0	0	
daniel@sfct.org	Delivered		0	0	
Network subscriber	Delivered		0	0	
DanielJRioux@yahoo.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
Network subscriber	Delivered		0	0	
darlene.depinho@lm.doe.gov	Delivered		0	0	
darr.richard@gmail.com	Delivered		0	0	
davaldez@rio-arriba.org	Delivered		0	0	
Network subscriber	Delivered		1	0	
davena.crosley@state.nm.us	Delivered		0	0	
david.ganaway@wipp.ws	Delivered		0	0	
david.griffin.5@us.af.mil	Delivered		0	0	
david.mercer1@state.nm.us	Delivered		0	0	

Network subscriber	Delivered		0	0	
david.trujillo@state.nm.us	Delivery Failure	1003 - 550 5.2.0	0	0	
david@ciglogistics.com	Delivered		0	0	
david@greenglobenm.com	Delivered		0	0	
David@nmrwa.org	Delivered		0	0	
david@surf-tec.ca	Delivered		0	0	
davidcwagner@yahoo.com	Delivered		0	0	
davidhenkel@comcast.net	Delivered		2	0	
DavidJose@ramahnavajo.org	Delivered		0	0	
davidson@unm.edu	Delivered		0	0	
dawn.howard@hdrinc.com	Delivered		0	0	
dbelka@molzencorbin.com	Delivered		0	4	https://www.env
dbvh@cybermesa.com	Delivered		0	0	
dca-statepubs@state.nm.us	Delivered		2	0	
dcampbell@cityofraton.com	Delivered		9	1	https://www.env
dchasse99@yahoo.com	Delivered		0	0	
dcmesch@q.com	Delivered		0	0	
dcowley@nmsu.edu	Delivered		0	0	
deanna.rothhaupt@us.af.mil	Delivered		0	0	
deb.bartel@ch2m.com	Delivered		0	0	
DebbieI@ramahnavajo.org	Delivered		1	0	
deborah.watson@wpxenergy.com	Delivered		0	0	
deborra.berlin@gmail.com	Delivered		0	0	
debra.edwards01@gmail.com	Delivered		0	0	
debra.guzman@saputo.com	Delivered		0	0	
deck@slo.state.nm.us	Delivered		1	0	
deepan.n6@gmail.com	Delivered		0	0	
dennis_newman@oxy.com	Delivered		1	0	
dennisbrockman@fs.fed.us	Delivered		0	0	
derosebammanconsulting@gmail.com	Delivered		1	0	
desertnessie@gmail.com	Delivered		4	0	
designorigins@hotmail.com	Delivered		0	0	
deubel@gilanet.com	Delivered		1	0	
Network subscriber	Delivered		0	0	
dexmaint@leaco.net	Delivered		0	0	
dgallegos@slo.state.nm.us	Delivered		0	0	
dgatterman@sscafca.com	Delivered		0	0	
dgradle@trcsolutions.com	Delivered		0	0	
dgratson@envstd.com	Delivered		0	0	
dgroenfeldt@newmexico.com	Delivered		0	0	
dguth@geiconsultants.com	Delivered		0	0	
dhaynes@nordoncorp.com	Delivered		0	0	
dhollis@lanl.gov	Delivered		0	0	
dhtset@hotmail.com	Delivered		0	0	
diad7777@outlook.com	Delivered		1	0	
diana.aranda@state.nm.us	Delivered		0	0	
dianacol@bigplanet.com	Delivery Failure	2002 - [SUPPRES	0	0	
diane.vigil-hayes@state.nm.us	Delivered		0	0	
dierdre.tarr@nm.nacdnet.net	Delivered		1	0	
dinohideaway@gmail.com	Delivered		0	0	
diosdadorivera7@gmail.com	Delivered		0	0	
director@ugwa.org	Delivered		1	0	
distevenson331@hotmail.com	Delivered		1	0	
Network subscriber	Delivered		0	0	
djferguson@eprod.com	Delivered		0	0	
dkbowman@santafenm.gov	Delivered		0	0	
dkurek@drhorton.com	Delivered		0	0	
dlarch@pb-materials.com	Delivered		0	0	
dld@gknet.com	Delivered		0	0	
dlemke@sbcglobal.net	Delivered		1	0	
dlemon@mustangresourcesllc.com	Delivered		0	0	
dlicht@cnm.edu	Delivered		0	0	
dlm@gknet.com	Delivered		0	0	
dmcgregor@bernco.gov	Delivered		1	0	
dmeiklejohn@nmelc.org	Delivered		0	0	
dml@lrpa-usa.com	Delivered		0	0	
dnde4ranch@bacavalley.com	Delivered		0	0	
dnue@chevron.com	Delivered		0	0	
doc@bbensafety.com	Delivered		0	0	

dolores.carrillo@gknet.com	Delivered	General Bounce	0	0	
domonicsilva@msn.com	Delivered		0	0	
donald.james@ch2m.com	Delivered		0	0	
donboyes@yahoo.com	Delivered		0	0	
dondiego@valornet.com	Delivered		0	0	
Network subscriber	Delivery Failure	3001 - [Message	0	0	
donna.chavez@uwc-usa.org	Delivered		2	0	
doremuswater@q.com	Delivered		4	0	
dorothygilbert2002@yahoo.com	Delivered		0	0	
doug.white@nustarenergy.com	Delivered		1	0	
dougshaw41@msn.com	Delivered		1	0	
dowelldirect@gmail.com	Delivered		0	0	
downs13d@gmail.com	Delivered		0	0	
Network subscriber	Delivered		4	0	
dpnm3@juno.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
drapeau.steve@gmail.com	Delivered		1	2	https://www.env
drbriggs@bernco.gov	Delivered		0	0	
dreber@swca.com	Delivered		0	0	
drewguerra999@msn.com	Delivered		0	0	
drewpadilla@entranosawater.com	Delivered		0	0	
drleephd6530@centurylink.net	Delivered		1	0	
drsjacobi@q.com	Delivered		0	0	
dschoep@nmsu.edu	Delivered		0	0	
dshuryn@abcwua.org	Delivered		0	0	
dsimpson@waid.com	Delivered		0	0	
dsonnenberg@bloomfieldnm.com	Delivered		1	0	
dstallings@ruidosonews.com	Delivered		0	0	
dustin.brownlow@antelopewater.com	Delivered		0	0	
dustingarrick@gmail.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
ea@riverrestoration.com	Delivered		0	0	
Network subscriber	Delivered		1	0	
earchuleta@sanipueblo.org	Delivered		0	0	
earlsradk@gmail.com	Delivered		0	0	
earthavenger@gmail.com	Delivered		0	0	
ebobelu12@gmail.com	Delivered		0	0	
eckertfidel@comcast.net	Delivered		1	0	
eclitso@shontoprep.org	Delivery Failure	1003 - 550 5.7.1	0	0	
ecology@taospueblo.com	Delivered		0	0	
ed@edmack.us	Delivered		0	0	
editor@cibolabeacon.com	Delivered		0	0	
Network subscriber	Delivered		1	0	
edranney@ix.netcom.com	Delivered		1	0	
edurrum@gmail.com	Delivered		0	0	
edward.hubbert@aecom.com	Delivered		0	0	
edward.tebo@fletc.dhs.gov	Delivered		0	0	
eed@modrall.com	Delivered		0	0	
ehall@fmi.com	Delivered		0	0	
ehren.koelsch@proact-usa.com	Delivered		0	0	
Network subscriber	Delivery Failure	3001 - 552 5.2.2	0	0	
einelson@fs.fed.us	Delivered		0	1	https://public.gc
ej-medina@hotmail.com	Delivered		0	0	
ej.anderson@pnmresources.com	Delivered		0	0	
ekendrick@montand.com	Delivered		0	0	
elgaucho@laplaza.org	Delivered		0	0	
elhuffman@fs.fed.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
Eliza.Montoya@state.nm.us	Delivered		0	0	
elizabeth.duvall@arcadis.com	Delivered		0	2	https://www.env
elizabeth.vega@las-cruces.org	Delivered		0	0	
Ellen.Soles@nau.edu	Delivered		0	0	
Network subscriber	Delivered		0	0	
elmarchitects@gmail.com	Delivered		0	0	
eltigredave@comcast.net	Delivered		1	0	
em.gagliano@yahoo.com	Delivered		0	0	
emarcillo@intera.com	Delivered		0	0	
embarber@ntua.com	Delivered		0	0	
emcnally@animasenvironmental.com	Delivered		1	0	

NMED EXHIBIT 18

emese.boross@gmail.com	Delivered		1	0	
emile.sawyer@state.nm.us	Delivered		0	0	
emilford@unm.edu	Delivered		0	0	
emily.wirth@cehmm.org	Delivered		0	0	
emily_scheller@americanchemistry.com	Delivered		0	0	
emontoya@hermitspeakwatersheds.org	Delivered		0	0	
enaranjo@santaclarapueblo.org	Delivered		0	0	
Network subscriber	Delivered		0	0	
enilorac@voicenet.com	Delivered		0	0	
ennicolas@earthlink.net	Delivered		0	0	
environment@picurispueblo.org	Delivered		1	0	
environmental.lab@lcra.org	Delivered		0	0	
epi@riousa.com	Delivered		1	0	
eppie.hogan@halliburton.com	Delivered		0	0	
eric.frey@state.nm.us	Delivered		3	0	
eric.hall@state.nm.us	Delivered		0	0	
eric.herrera@state.nm.us	Delivered		0	0	
eric@marroninc.com	Delivery Failure	1003 - 550 5.2.0	0	0	
eric_wooten@oxy.com	Delivered		4	0	
ericjaramillo1021@yahoo.com	Delivered		0	0	
eriksg@westernlaw.org	Delivered		0	0	
erin.marynak@state.nm.us	Delivered		1	0	
erin.shea@state.nm.us	Delivered		1	1	https://www.env
esparza.david@epa.gov	Delivered		0	0	
Network subscriber	Delivered		0	0	
etaylor@taylormccaleb.com	Delivered		0	0	
etsnminfo@gmail.com	Delivered		1	0	
Network subscriber	Delivered		1	0	
evans.diane@epamail.epa.gov	Delivered		1	0	
evargas@lcv.org	Delivered		0	0	
everetts@lanl.gov	Delivered		2	0	
evonne.saucedo@urenco.com	Delivered		0	0	
ewright@co.santa-fe.nm.us	Delivered		0	0	
eymartinez@sanipueblo.org	Delivered		0	0	
fabangan@sourcemolecular.com	Delivered		0	0	
faragon@envirotech-inc.com	Delivered		0	0	
fcadena@hotmail.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
felgris35@aol.com	Delivered		0	0	
fenstererm@yahoo.com	Delivered		0	0	
fernald@nmsu.edu	Delivered		0	0	
fgonzales@taosgov.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
Network subscriber	Delivered		0	0	
finance@sacramentocamp.org	Delivered		1	0	
Network subscriber	Delivered		0	0	
firechief@grantsnm.gov	Delivered		0	0	
fish4rgct@gmail.com	Delivered		0	0	
fitchka@cdmsmith.com	Delivered		0	0	
fitter7@hotmail.com	Delivered		0	0	
fleming@unm.edu	Delivered		0	0	
florenzo@sfpueblo.com	Delivered		0	0	
flysavvy@aol.com	Delivered		0	0	
fmarquez@sandovalcountynm.gov	Delivery Failure	1003 - 550 5.2.0	0	0	
fmpatorni@earthlink.net	Delivered		1	0	
fnchollis@msn.com	Delivered		0	0	
folsomvillage@bacavalley.com	Delivered		0	0	
fontenot.brian@epamail.epa.gov	Delivered		0	0	
foster3@hotmail.com	Delivered		2	0	
frank.skocypec@nv5.com	Delivered		1	0	
frankgaudet@yahoo.com	Delivered		0	0	
frankjonathan@gmail.com	Delivered		0	0	
Network subscriber	Delivered		1	0	
fredrluj@aol.com	Delivered		0	0	
fredverner@chevron.com	Delivered		0	0	
friendsofvdonwr@gmail.com	Delivered		0	0	
frostg@conocophillips.com	Delivered		0	0	
frrichar@nmsu.edu	Delivered		0	0	
fudalskii@southwestgen.com	Delivered		0	0	

NMED EXHIBIT 18

fusionfluids@hotmail.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
gaburns@commengineering.com	Delivered		0	0	
gaiaresearch@hotmail.com	Delivered		0	0	
gamercowsd@hotmail.com	Delivered		0	0	
gardiner@laplaza.org	Delivered		0	0	
gary.schiffmiller@state.nm.us	Delivered		0	0	
gbechtel@lanl.gov	Delivered		0	0	
gbralley@sandovalcounty.com	Delivery Failure	4004 - [Message	0	0	
gbroetzm@rof.net	Delivered		0	0	
gcrabtree@envirotech-inc.com	Delivered		0	0	
gdeguzman@bernco.gov	Delivered		0	0	
gecibm@outlook.com	Delivered		0	0	
Network subscriber	Delivered		1	0	
Network subscriber	Delivered		0	0	
george@oxbow-eco-eng.com	Delivered		0	0	
gesslinger@ebid-nm.org	Delivered		0	0	
getdowntoearth@yahoo.com	Delivery Failure	3002 - 554 5.0.0	0	0	
Network subscriber	Delivered		0	0	
ggutierrez@santaclarapueblo.org	Delivered		0	0	
gilvarrym@lasvegasnm.gov	Delivered		1	0	
ginger.lockeby@cci.com	Delivered		0	0	
ginger@desertmtncorp.com	Delivered		0	0	
gjhaddadeawsd@gmail.com	Delivered		1	0	
gjojola@lagunapueblo-nsn.gov	Delivered		0	0	
glolehmer@yahoo.com	Delivered		0	0	
glong@fs.fed.us	Delivered		0	0	
gloverim@yahoo.com	Delivered		0	0	
gmiller@fs.fed.us	Delivered		0	0	
gnorvell@ebid-nm.org	Delivered		0	0	
goering1951@yahoo.com	Delivered		34	0	
golobos04@gmail.com	Delivered		1	0	
Network subscriber	Delivered		0	0	
Gordon.moore@c-ka.com	Delivered		0	0	
gottconsulting@centurylink.net	Delivered		0	0	
Network subscriber	Delivered		0	0	
gpeterson@dbstephens.com	Delivered		0	0	
grant@nmsu.edu	Delivered		1	0	
gratz11@gmail.com	Delivered		0	0	
greenliontsnm@gmail.com	Delivered		0	0	
greg.heitmann@dot.gov	Delivered		1	0	
Network subscriber	Delivered		0	0	
gretchen.engel@ch2m.com	Delivered		0	0	
gretelfollingstad@gmail.com	Delivered		1	0	
grip@gilaresources.info	Delivered		0	0	
grow.r@att.net	Delivered		1	0	
Network subscriber	Delivered		0	0	
gunnar.johnson@state.nm.us	Delivered		0	1	https://www.env
gwenbr@hotmail.com	Delivered		0	0	
gziehe@fs.fed.us	Delivered		0	0	
haakuwater@aol.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
happy.trails.46@hotmail.com	Delivered		0	0	
haras_zerrot@hotmail.com	Delivered		0	0	
harmonchuck79@yahoo.com	Delivered		0	0	
harold.fernandez@state.nm.us	Delivered		3	0	
Network subscriber	Delivered		1	0	
hbar2sg@gmail.com	Delivered		1	0	
hdleute@gmail.com	Delivered		1	0	
healthyanimas.awp@gmail.com	Delivered		0	0	
heather.maccurdy@state.nm.us	Delivered		0	0	
heatherwallace34@yahoo.com	Delivered		0	0	
heidi.henderson@state.nm.us	Delivered		2	0	
heidi.krapfl@state.nm.us	Delivered		0	0	
helen.milenski@gmail.com	Delivered		1	0	
henry@garlandheart.com	Delivered		3	0	
herman@abqpipe.com	Delivered		0	0	
heydoc@q.com	Delivered		0	0	
hgshaw@windstream.net	Delivered		0	0	

NMED EXHIBIT 18

hhsaasta@gmail.com	Delivered		0	0
highdesertwater@outlook.com	Delivered		0	0
hjpatt@plateautel.net	Delivered		0	0
hkavak@projectnavigator.com	Delivered		0	0
hlenhart@wrightwater.com	Delivered		0	0
hollylhawley@gmail.com	Delivered		2	0
Network subscriber	Delivered		0	0
hqsnmedd@plateautel.net	Delivered		0	0
hrwood@gmail.com	Delivered		1	0
hsandoval_99@yahoo.com	Delivered		0	0
Hunsakerstacyj@yahoo.com	Delivered		4	0
hunt.laura@epa.gov	Delivered		0	0
iain.olness@aecom.com	Delivered		0	0
ibenton@cabq.gov	Delivered		0	0
igold@nel-con.com	Delivered		0	0
imabell@cityofcarlsbadnm.com	Delivered		0	0
Info@merrillwater.com	Delivered		0	0
info@rddirtwork.com	Delivered		0	0
info@santafewatershed.org	Delivered		0	0
info@taosflyshop.com	Delivered		0	0
interangler@newmexico.com	Delivery Failure	Soft Bounce - Ma	0	0
Network subscriber	Delivered		0	0
isabel.constable@gmail.com	Delivered		2	0
islandfoxx@gmail.com	Delivered		0	0
Network subscriber	Delivery Failure	3001 - [Message	0	0
Network subscriber	Delivered		0	0
j.aticho@yahoo.com	Delivered		1	0
j.norton@roswell-nm.gov	Delivered		0	0
j.r.hennessey@nasa.gov	Delivered		0	0
jabaca@fs.fed.us	Delivered		0	0
jackc@plateautel.net	Delivered		0	0
jackiep@trekwest.com	Delivered		2	0
jacob_pecos@pueblodecochiti.org	Delivered		0	0
jadbode@gmail.com	Delivered		0	0
jadean@fs.fed.us	Delivered		0	0
jaketrujillo505@gmail.com	Delivered		1	0
james-redhorse@navajo.net	Delivered		0	0
james.alarid@lacnm.us	Delivered		0	0
james.kenney@state.nm.us	Delivered		0	0
james@glorietageo.com	Delivered		0	0
james@salopek6u.com	Delivered		1	0
jamesjwood@gmail.com	Delivered		0	0
jan@loving-assoc.com	Delivered		0	0
jana.amacher@nmlegis.gov	Delivered		0	0
Janacrowley@yahoo.com	Delivered		0	0
janderson@trescoinc.org	Delivered		0	0
janicevarela_76@hotmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
jansley@moriartynm.gov	Delivered		0	0
jansley@tcnm.us	Delivered		0	0
JanWood7070@sbcglobal.net	Delivered		0	0
japan87305@hotmail.com	Delivered		0	0
Jaramillo501@aol.com	Delivered		1	0
jarends@nuclearactive.org	Delivered		0	0
jarpar1@msn.com	Delivered		0	0
jarrettairhart@icloud.com	Delivered		0	0
jason.streed@yahoo.com	Delivered		0	0
Jay.Low@energen.com	Delivered		0	0
jayson.romero@cochiti.org	Delivered		2	0
jbailey@abcwua.org	Delivered		1	0
jboretsky@spinn.net	Delivered		0	0
jburns144@gmail.com	Delivered		0	0
jcanders629@gmail.com	Delivered		0	0
jcdepew@earthlink.net	Delivered		0	0
jchester@camstex.com	Delivered		0	0
jcockman@cybermesa.com	Delivered		0	0
Network subscriber	Delivered		0	0
JCORDOVA@VICTORY-NM.COM	Delivered		0	0
jd3@stanfordalumni.org	Delivered		1	0

jd@campy.com	Delivered		0	0
jdeal@hilcorp.com	Delivered		0	0
jdhall@fs.fed.us	Delivered		0	0
jduong@enercon.com	Delivered		0	0
jdxd@chevron.com	Delivered		0	0
Network subscriber	Delivered		0	0
jeancanavan@att.net	Delivered		0	0
jeanne.dye-porto@us.af.mil	Delivered		0	0
jeff.cotter@amec.com	Delivered		0	0
Jeff.Falance@Santaana-nsn.gov	Delivered		0	0
jeff.ogburn@state.nm.us	Delivered		0	0
jeffery.lock@ch2m.com	Delivered		0	0
jefflambeth@yahoo.com	Delivered		0	0
jeffrey@terrasophia.com	Delivered		0	0
Network subscriber	Delivered		1	0
jeniffer.montes@us.af.mil	Delivered		0	0
jenkunzelman78@gmail.com	Delivered		0	0
jennifer.foote@state.nm.us	Delivered		5	0
jennifer.fullam@state.nm.us	Delivered		9	0
jennifer.mullins@state.nm.us	Delivered		0	0
Network subscriber	Delivery Failure	2002 - [DNS ERR	0	0
jennifer_hanna@eogresources.com	Delivered		1	0
JenniferL.Dann@state.nm.us	Delivered		0	0
jensen_m_j@hotmail.com	Delivered		0	0
jeremy.weese@halliburton.com	Delivered		0	0
jerome.hernandez@wipp.ws	Delivered		0	0
jerome.j.bustamante.mil@mail.mil	Delivered		0	0
jerry.crump@virgingalactic.com	Delivered		0	0
jerry.manuel@hunting-intl.com	Delivered		1	0
jerryyeargin@gmail.com	Delivered		0	0
jesparsen@nmcounties.org	Delivered		0	0
jessica.christianson@elpasoelectric.com	Delivered		0	0
Jessica.M.Wright@usace.army.mil	Delivered		0	0
Jessica@sombraUSA.com	Delivered		0	0
jestrada@artesianm.gov	Delivered		0	0
jesusfr@donaanacounty.org	Delivered		0	0
jfkirby@nmsu.edu	Delivered		2	0
jflores@las-cruces.org	Delivered		0	0
jfluder@swca.com	Delivery Failure	1003 - 550 5.2.0	0	0
jfmaul@msn.com	Delivered		0	0
jgalvan@abcwua.org	Delivered		0	0
jgcrystal77@gmail.com	Delivered		0	0
jgondek@geiconsultants.com	Delivered		0	0
jgood@esassoc.com	Delivered		0	0
jgriego47@live.com	Delivered		0	0
jhanna@dcpmidstream.com	Delivered		0	0
jhorning@wildearthguardians.org	Delivered		1	0
jicarillafishqs@gmail.com	Delivered		0	0
jill.csekitz@tceq.texas.gov	Delivered		0	0
jill.turner@state.nm.us	Delivered		0	0
Network subscriber	Delivered		0	0
jimwinchester@ipanm.org	Delivered		1	0
jjvlchimex@aol.com	Delivered		1	0
jkane@ncg-law.com	Delivered		2	0
jkidd@las-cruces.org	Delivered		0	0
jknowlton@hrlcom.com	Delivered		0	0
jkobyrne@nmsu.edu	Delivered		0	0
jkretzmann@yahoo.com	Delivered		1	0
jkutz@dbstephens.com	Delivered		1	0
jl.burke1979@gmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
jlawrence@northwindgrp.com	Delivered		0	0
jlpope@adelanteconsulting.com	Delivered		0	0
Network subscriber	Delivery Failure	1006 - [Message	0	0
jluetzelschwab@fs.fed.us	Delivered		0	0
jmacko@msn.com	Delivered		1	0
jmagana@bhinc.com	Delivered		0	0
jmaitland@nmda.nmsu.edu	Delivered		0	0
jmalone@aquionix.com	Delivered		0	0

jmanderson5643@gmail.com	Delivered		0	0	
jmccaleb@taylormccaleb.com	Delivered		1	0	
jmcdaniel@enduringresources.com	Delivered		0	0	
jmeadows@lanl.gov	Delivered		0	0	
jmg@las-cruces.org	Delivered		0	0	
jmicou@amaonline.com	Delivered		0	0	
jmilarch@builderstrust.com	Delivered		0	0	
jo@tessadavidson.com	Delivered		0	0	
joanm.snider@state.nm.us	Delivered		0	0	
jocar89@comcast.net	Delivered		0	0	
jodey.kougioulis@state.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
jody.garcia@soudermiller.com	Delivered		2	0	
jody.pino@state.nm.us	Delivered		0	0	
joe.barela@alphasw.com	Delivered		1	0	
joe.pere@cook-joyce.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
johanna.hodanbosi@epa.ohio.gov	Delivered		0	0	
john.best@belen-nm.gov	Delivery Failure	1003 - 550 5.0.0	0	0	
john.gordon@us.af.mil	Delivered		0	0	
john.hale@pnmresources.com	Delivered		0	0	
john.hochheimer@tetratech.com	Delivered		0	0	
john.moeny@state.nm.us	Delivered		0	0	
John.Moore@andeavor.com	Delivered		0	0	
john@wjmillerengineers.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
johnkadlecek@me.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
johns47@aznex.net	Delivered		0	0	
johnsonenv@hotmail.com	Delivered		0	0	
johnthurman77@Yahoo.com	Delivered		0	0	
joilynn.garcia@nm.usda.gov	Delivered		0	0	
jolene.catron@state.nm.us	Delivered		0	0	
jomccaleb@earthlink.net	Delivered		0	0	
jonas.armstrong@nmlegis.gov	Delivered		0	0	
jonathan.celmer@state.nm.us	Delivered		0	0	
jones.curry@epa.gov	Delivered		24	1	https://public.gc
jonsurez@me.com	Delivered		0	0	
jordan.arnswald@nnsa.doe.gov	Delivered		0	0	
jordan.chavez@hdrinc.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
joseph.fox@state.nm.us	Delivered		0	0	
joseph@navaeducationproject.org	Delivered		2	0	
Network subscriber	Delivered		0	0	
Network subscriber	Delivered		0	0	
jpark@nmelc.org	Delivered		4	1	https://www.env
jpelz@wildearthguardians.org	Delivered		1	0	
jpking@nmsu.edu	Delivered		0	0	
jrabeyta@yahoo.com	Delivered		0	0	
Network subscriber	Delivered		3	0	
Jrls@hotmail.com	Delivered		0	0	
jrosenblatt@las-cruces.org	Delivered		1	0	
jstjohn@matadorresources.com	Delivered		0	0	
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jtapia@domenicilaw.com	Delivered		0	0	
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jtkay@sandia.gov	Delivered		0	0	
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juan.santillan@gilesincorporated.com	Delivered		0	0	
juanfgarcia@windstream.net	Delivered		0	0	
judson221@gmail.com	Delivered		0	0	
judy_majoras@yahoo.com	Delivered		0	0	
judythevelyn@yahoo.com	Delivered		0	0	
julie.roybal1@state.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
julipent@nmsu.edu	Delivered		0	0	

justin.andrews@lhoist.com	Delivered		0	0
Justin.C.Riggs@usace.army.mil	Delivered		0	0
Justin.clemens@pnm.com	Delivered		0	0
justin.k.reale@usace.army.mil	Delivered		0	0
jvc@unm.edu	Delivered		0	0
jwaters@developcarlsbad.org	Delivered		1	0
jwjansens@gmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
JYoung@ziapueblo.org	Delivered		0	0
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Network subscriber	Delivered		0	0
kaleb.meihls@pacelabs.com	Delivered		0	0
kap@valmont.com	Delivered		0	0
karen.armijo@nnsa.doe.gov	Delivered		0	0
karen.thomas1@state.nm.us	Delivered		0	0
Katharine.Boyer@HollyFrontier.com	Delivered		0	0
katherine.lagen@sierraclub.org	Delivered		0	0
Network subscriber	Delivered		0	0
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kathy.koon@wfec.com	Delivered		0	0
katie.higgins@bosqueschool.org	Delivered		0	0
katiep1311@gmail.com	Delivered		2	0
kboykin@nmsu.edu	Delivered		0	0
kbronson@bernco.gov	Delivered		0	0
kcaldwell64@yahoo.com	Delivered		0	0
kcandelaria@sfpueblo.com	Delivered		0	0
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Network subscriber	Delivered		0	0
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kennethpin@hotmail.com	Delivered		0	0
Kenney.james@epa.gov	Delivered		0	0
Network subscriber	Delivered		0	0
kerri@sme-env.com	Delivered		3	0
kevin.johnson@wipp.ws	Delivered		0	0
kevin_doyle@comcast.net	Delivered		0	0
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kfetter@stormconm.com	Delivered		1	0
kgjohansen@ci.santa-fe.nm.us	Delivered		0	0
kgoetz@nmda.nmsu.edu	Delivered		0	0
khduong2k@yahoo.com	Delivered		0	0
khelms76@gmail.com	Delivered		2	0
kijun.hong@williams.com	Delivered		0	0
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kjacobsen@whpacific.com	Delivered		0	0
kjohnson@unm.edu	Delivered		0	0
kkruthaupt@nmda.nmsu.edu	Delivered		0	0
klangbecker@terrags.com	Delivered		0	0
klupton@animasenvironmental.com	Delivered		0	0
kmcwilliams@logosresourcesllc.com	Delivered		0	0
kmendoza@abcwua.org	Delivered		0	0
koatdesk@hearst.com	Delivered		0	0
kokeemahe@hotmail.com	Delivery Failure	2001 - 550 5.5.0	0	0
kpalmer@nmelc.org	Delivered		1	0
kpeine@envirotech-inc.com	Delivered		0	0

kreid@blm.gov	Delivered		0	0	
kreid@terranearpmc.com	Delivered		0	0	
kristen@dors.org	Delivered		1	0	
kristin.grahamchavez@nm.usda.gov	Delivered		0	0	
kristinamartinez.scl@gmail.com	Delivered		0	0	
kristine.pintado@state.nm.us	Delivered		1	1	https://www.en\
Kristopher.Barrios@state.nm.us	Delivered		1	0	
Network subscriber	Delivered		0	0	
ksmalen@gmail.com	Delivered		0	0	
ksorvig@unm.edu	Delivered		0	0	
kstearns@enganalytics.com	Delivered		0	0	
kstockdale@audubon.org	Delivered		0	0	
ktafoya@santaclarapueblo.org	Delivered		0	0	
kunkle@earthlink.net	Delivery Failure	3002 - 550 5.2.0	0	0	
kurt@birdseyeviewgis.com	Delivered		0	0	
kverhage@cabq.gov	Delivered		0	0	
kwells2@ta-petro.com	Delivered		0	0	
kwest@santaferealestate.com	Delivered		0	0	
kwithnall@hermitspeakwatersheds.org	Delivered		1	0	
kyle@egolflaw.com	Delivered		0	0	
kyle@kissmygrits.net	Delivered		0	0	
lacadministrator@lacnm.us	Delivered		2	0	
LAKeating248@gmail.com	Delivered		0	0	
lakota77@earthlink.net	Delivered		0	0	
laluzwoodworks@live.com	Delivered		0	0	
lance.tyson@state.nm.us	Delivered		0	0	
landress@eaest.com	Delivered		0	0	
lara@abadieschill.com	Delivered		0	0	
larena@geronimotrail.com	Delivered		0	0	
larryh@aquaenviron.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
laura.gavin@markwest.com	Delivered		0	0	
laura.paskus@gmail.com	Delivered		0	0	
laura.pena@santaana-nsn.gov	Delivered		0	0	
lauren.gomez@intel.com	Delivered		0	0	
lazarus@glorietageo.com	Delivered		0	0	
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lcrowley@fs.fed.us	Delivered		0	0	
lcwaterops@gmail.com	Delivered		2	0	
ldominguez@nmda.nmsu.edu	Delivered		0	0	
ledoux.erica@epa.gov	Delivered		0	0	
lee.killinger@mosaicco.com	Delivered		0	0	
lemayeu@sandia.gov	Delivered		0	0	
leonard.perez@sicpa.com	Delivered		0	0	
lesley.a.mcwhirter@usace.army.mil	Delivered		0	0	
leslie.jakoby@co.laplata.co.us	Delivered		0	0	
leslie@lanl.gov	Delivered		0	0	
lessie.pheil@lpnt.net	Delivered		0	0	
levi.tapia@state.nm.us	Delivered		0	0	
lewis_v@aps.edu	Delivered		0	0	
lfarrell@logosresourcesllc.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
Network subscriber	Delivered		0	0	
lhartman@sterigenics.com	Delivered		0	0	
Network subscriber	Delivered		1	0	
libertywater@mail.com	Delivered		1	0	
linclnco@tularosa.net	Delivery Failure	3001 - 554 5.0.0	0	0	
linda.barker@epelectric.com	Delivered		0	0	
linda.delay@state.nm.us	Delivered		0	0	
linda.wong@intel.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
linsey.hurst@state.nm.us	Delivered		1	0	
Lionelgranger39@hotmail.com	Delivered		1	0	
lisa_winn@xtoenergy.com	Delivered		2	0	
lisaboo66@hotmail.com	Delivered		0	0	
Lisar59@yahoo.com	Delivered		0	0	
ljong@bernco.gov	Delivered		0	0	
ljseth@cybermesa.com	Delivered		1	0	
ljthomason@live.com	Delivered		0	0	

lknutson@hermitspeakwatersheds.org	Delivered		1	0	
lloyd@northstarwater.org	Delivered		14	0	
llucer02@unm.edu	Delivered	Soft Bounce - DN	0	0	
llujan@taospueblo.com	Delivered		0	0	
llweber@dcpmidstream.com	Delivered		0	0	
llyynn77@hotmail.com	Delivered		0	0	
lm@las-cruces.org	Delivered		0	0	
lmartinez@aztecnm.gov	Delivered		0	0	
lmsbsms7552@gmail.com	Delivered		0	0	
lmsjj40@yahoo.com	Delivered		0	0	
locationsmanager@gmail.com	Delivered		0	0	
loehman@unm.edu	Delivered		0	0	
lois@newmex.com	Delivered		1	0	
loren.freyer@lacnm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
loriharris@higher-speed.net	Delivered		0	0	
lphilli@pvtn.net	Delivered		0	0	
lpyle@currycounty.org	Delivered		0	0	
lrose@montand.com	Delivered		1	1	https://www.env
LSmith@ProWestFiltration.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
lttorres77@gmail.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
lucaseherndon@gmail.com	Delivered		0	0	
luciana@lanl.gov	Delivered		0	0	
Network subscriber	Delivered		0	0	
luis.matos@sanjoseca.gov	Delivered		0	0	
lumbertonwater@gmail.com	Delivered		0	0	
lunah3@comcast.net	Delivered		2	0	
lvaltierra@msn.com	Delivered		0	0	
lwa@lwasf.com	Delivered		0	0	
lydiamtz66@gmail.com	Delivered		0	0	
lynette.guevara@state.nm.us	Delivered		0	0	
lynneneibaur@hotmail.com	Delivered		0	0	
m72gutierrez@gmail.com	Delivered		1	0	
Network subscriber	Delivered	Soft Bounce - Ma	0	0	
mac@matisp.net	Delivered		0	0	
macphch@tetratech-ffx.com	Delivered		0	0	
maddy.hayden@state.nm.us	Delivered		0	0	
madpeasant@yahoo.com	Delivered		0	0	
Network subscriber	Delivery Failure	3001 - [Message	0	0	
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maintvosc@outlook.com	Delivered		0	0	
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makeadifferenceinnm@gmail.com	Delivered		0	0	
malia.volke@state.nm.us	Delivered		0	0	
mallensmith@sbcglobal.net	Delivered		0	0	
mamcdonald@ci.santa-fe.nm.us	Delivered		0	0	
mamk@rcn.com	Delivered		0	0	
mansellc@plateautel.net	Delivered		0	0	
marc@foranimals.org	Delivered		0	0	
MarcE.Montoya@state.nm.us	Delivered		1	0	
marcyd@las-cruces.org	Delivered		0	0	
margaret.cone@eccgrp.com	Delivered		0	0	
marieg@nmoga.org	Delivered		1	0	
mariemellob@hotmail.com	Delivered		0	0	
Marise.L.Textor@Andeavor.com	Delivered		1	0	
marjocurgus@hotmail.com	Delivered		0	0	
Mark.Dalzell@us.af.mil	Delivered		0	0	
Network subscriber	Delivery Failure	Soft Bounce - Ma	0	0	
mark.watson@state.nm.us	Delivered		0	0	
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Network subscriber	Delivered		1	0	
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martycarvlin@yahoo.com	Delivered		0	0	
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marvinmendelow@hotmail.com	Delivered	1	0	
Network subscriber	Delivered	0	0	
mary@thecourthousecafe.com	Delivered	0	0	
maryann.mcgraw@state.nm.us	Delivered	0	0	
marybrooks19@comcast.net	Delivered	0	0	
marylouw@donaanacounty.org	Delivered	0	0	
mas@suazolegalgroup.com	Delivered	0	0	
mascolld@yahoo.com	Delivered	0	0	
Network subscriber	Delivered	0	0	
matt.roche@clr.com	Delivered	0	0	
matthew.owens@pnmresources.com	Delivered	0	0	
matthew.wunder@state.nm.us	Delivered	0	0	
matthewmcqueen@aol.com	Delivered	0	0	
matthews.rachel@epa.gov	Delivered	0	0	
maureen.gannon@pnmresources.com	Delivered	0	0	
maureen.murphy@nm.usda.gov	Delivered	0	0	
mawise@nmsu.edu	Delivered	0	0	
mayor@santafenm.gov	Delivered	1	0	
Network subscriber	Delivered	1	0	
mbayer@tierra-row.com	Delivered	0	0	
Network subscriber	Delivered	0	0	
mcelente@trinityconsultants.com	Delivered	4	0	
Mchavez131@outlook.com	Delivered	0	0	
mchavez@enipc.org	Delivered	0	0	
mcrepeau@team-psc.com	Delivered	0	0	
Network subscriber	Delivered	0	0	
mdelacruz@lovington.org	Delivered	2	0	
mdinicola@pa.gov	Delivered	0	0	
Mdmerrett@aol.com	Delivered	0	0	
mdwhitz27@gmail.com	Delivered	0	0	
Meaghan.Conway@state.nm.us	Delivered	0	1	https://www.en
meales@lucid-energy.com	Delivered	1	0	
meg.hennessey@state.nm.us	Delivered	3	0	
megan.rosebrough@intel.com	Delivered	0	0	
Network subscriber	Delivered	0	0	
melanie@nmhba.org	Delivered	0	0	
melenem@qwestoffice.net	Delivered	0	0	
melissa.may@sanjuanswcd.com	Delivered	1	0	
melissa@sfct.org	Delivered	1	0	
meredith.campbell@state.nm.us	Delivered	0	0	
merlelote@hotmail.com	Delivered	0	0	
mfaucher@all-llc.com	Delivered	0	0	
mg930@hotmail.com	Delivered	0	0	
mgallagher@leacounty.net	Delivered	0	0	
Network subscriber	Delivered	1	0	
Network subscriber	Delivered	0	0	
mgonzales@constructco.com	Delivered	1	0	
mgray505@gmail.com	Delivered	0	0	
mgreen@co.mckinley.nm.us	Delivered	0	0	
mguinn@cimarex.com	Delivered	0	0	
mhead@fs.fed.us	Delivered	0	0	
mhfollingstad@gmail.com	Delivered	1	0	
micaela.fischer@nmlegis.gov	Delivered	0	0	
michael.adams@terracon.com	Delivered	0	0	
michael.campana@oregonstate.edu	Delivered	0	0	
michael.green@state.nm.us	Delivered	0	0	
michael.jones@wipp.ws	Delivered	0	0	
michael.sloane@state.nm.us	Delivered	0	0	
michael_duplantis@oxy.com	Delivered	0	0	
michaeldtc@aol.com	Delivered	0	0	
michaelene.kyrala@state.nm.us	Delivered	1	0	
michellebacon@chevron.com	Delivered	0	0	
mickey@newmex.com	Delivered	0	0	
miguel.mendivil@continental-corporation.com	Delivered	0	0	
miguel.montoya@state.nm.us	Delivered	2	0	
mihasm1@hotmail.com	Delivered	1	0	
Network subscriber	Delivered	0	0	
mike.greene@pnm.com	Delivered	0	0	
mike.holder@hollyfrontier.com	Delivered	0	0	

Mike.Meyer@Terracon.com	Delivered		0	0
mike.timmer@nv5.com	Delivered		1	0
mike@hd-env.com	Delivered		0	0
Network subscriber	Delivered		0	0
mikeross4@windstream.net	Delivered		1	0
miori.yoshino@gmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
mjensen@nmelc.org	Delivered		0	0
mjmoore@hnrg.com	Delivered		0	0
mjomech22@gmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
mkeeler@valleywb.net	Delivered		0	0
mkelly@abcwua.org	Delivered		2	0
mkm217@gmail.com	Delivered		0	0
mlouissena33@gmail.com	Delivered		0	0
mltextor@globalessinc.com	Delivered		1	0
MLTextor@MarathonPetroleum.com	Delivered		1	0
mmacias@molzencorbin.com	Delivered		0	0
Network subscriber	Delivered		1	0
mmcdonnell@abcwua.org	Delivered		0	0
mmclain@ameredev.com	Delivered		0	0
mmcreynolds@epcor.com	Delivered		0	0
mmeyer@sundance-inc.net	Delivered		0	0
mmicelli@srnm.org	Delivered		0	0
mmires@r2meng.com	Delivered		0	0
mmorris@enduringresources.com	Delivered	Hard Bounce	0	0
mmsalcido@cityofcarlsbadnm.com	Delivered		0	0
Network subscriber	Delivered		0	0
mnatharius@fs.fed.us	Delivered		0	0
mneibling@gmail.com	Delivered		0	0
mnewman@peabodyenergy.com	Delivered		0	0
MOConnell2@marathonpetroleum.com	Delivered		0	0
mofarmgirl@aol.com	Delivered		0	0
molly.martin@nustarenergy.com	Delivered		0	0
Molly@cvnm.org	Delivered		0	0
Network subscriber	Delivered		1	0
monablaber@gmail.com	Delivered		0	0
Network subscriber	Delivered		5	0
monica.peterson@ch2m.com	Delivered		0	0
monica.sandoval@williams.com	Delivered		0	0
monica.wright@ch2m.com	Delivered		0	0
Network subscriber	Delivered		0	0
morganwoodward19@yahoo.com	Delivered		0	0
Network subscriber	Delivered		0	0
mowen52690@gmail.com	Delivered		0	0
mowens@ee-g.com	Delivered		1	0
Network subscriber	Delivered		0	0
mrashby9@gmail.com	Delivered		0	0
mrife@agc-nm.org	Delivered		0	0
mroberts@targaresources.com	Delivered		0	0
Mryanez@ksilp.com	Delivered		0	0
ms.j.kaplan@gmail.com	Delivered		0	0
msanchez@abcwua.org	Delivered		0	0
msantoro@dakotasoft.com	Delivered		1	0
mschumann@tnc.org	Delivered		0	0
msloane@state.nm.us	Delivered		0	0
mswright@unm.edu	Delivered		0	0
mtnlight@taosnet.com	Delivered		0	0
muenzberg505@msn.com	Delivered		0	0
murlock@raintreecounty.com	Delivered		0	0
murrayfineart@newmexico.com	Delivered		1	0
mwa@abeqas.com	Delivered		0	0
mwalton@quiviracoalition.org	Delivered		0	0
mwiseman@rcac.org	Delivered		1	0
mwsa@nnmt.net	Delivered		0	0
Network subscriber	Delivered		0	0
mykejv@gmail.com	Delivered		1	0
Network subscriber	Delivered		0	0
Network subscriber	Delivered		0	0

nancy.johnson1@hotmail.com	Delivered		0	0
nancy.nething@pnmresources.com	Delivered		0	0
Nansara1@gmail.com	Delivered		1	0
nanu1996@hotmail.com	Delivered		1	0
nastille@fmi.com	Delivered		0	0
nathan.schroeder@santaana-nsn.gov	Delivered		0	0
Network subscriber	Delivered		0	0
Network subscriber	Delivery Failure	3001 - 552 5.2.2	0	0
nblandford@dbstephens.com	Delivered		0	0
nealkingtsv@cs.com	Delivered		0	0
neddy@earthworks.org	Delivered		0	0
nedra.murphy@state.nm.us	Delivered		0	0
needham7112@msn.com	Delivered		0	0
nelson.russell@epamail.epa.gov	Delivered		0	0
news@rrobserver.com	Delivered		0	0
ngarnett@gcc.com	Delivered		0	0
nhines@oilfieldwaterlogistics.com	Delivered		0	0
Niccie.Crespin@comcast.net	Delivered		0	0
nicholas_steele@nps.gov	Delivered		0	0
nick.smokovich@state.nm.us	Delivered		1	0
Network subscriber	Delivery Failure	3001 - 552 5.2.2	0	0
niloofarkanani@gmail.com	Delivered		0	0
nina.carranco@tnc.org	Delivered		0	0
nlemme@fmi.com	Delivered		0	0
nlove@geiconsultants.com	Delivered		0	0
nlynnpruitt@yahoo.com	Delivered		0	0
nm@imsinfo.com	Delivered		0	0
nm@tnc.org	Delivered		0	0
nmcga@nmagriculture.org	Delivered		0	0
nmelc@nmelc.org	Delivered		1	0
nmwatershed@gmail.com	Delivered		0	0
nmwildlife@nmwildlife.org	Delivered		0	0
nnepawq@frontiernet.net	Delivered		0	0
normaphil@yahoo.com	Delivery Failure	3002 - 554 5.0.0	0	0
norvellehome@msn.com	Delivered		1	0
Network subscriber	Delivered		0	0
nsaunders@edf.org	Delivered		0	0
Network subscriber	Delivered		0	0
nunezvt@hotmail.com	Delivered		4	0
Network subscriber	Delivery Failure	3001 - 552 5.2.2	0	0
Network subscriber	Delivered		0	0
nwesterling@fmtn.org	Delivered		0	0
nystrom.thomas@epa.gov	Delivered		0	0
ofthefarland@yahoo.com	Delivered		0	0
ojafnm@gmail.com	Delivered		3	0
okpala.maria@epa.gov	Delivered		0	0
olivia.yu@state.nm.us	Delivered		0	0
omitchell@h2olawers.com	Delivery Failure	2002 - [DNS ERR	0	0
ondrea.c.hummel@usace.army.mil	Delivered		0	0
ondrea.hummel@tetratech.com	Delivered		0	0
oneillarmendarez@gmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
pacarrasco@cityofcarlsbadnm.com	Delivered		1	0
pacgato1@yahoo.com	Delivered		0	0
pachavez@bernco.gov	Delivered		0	0
paige@prescott.cc	Delivered		0	0
palasota8@aol.com	Delivered		0	0
pam@floravistawater.com	Delivered		0	0
pamnajdowski@yahoo.com	Delivered		0	0
panto41815@aol.com	Delivered		1	0
Network subscriber	Delivered		0	0
pat.john@cmc.com	Delivered		1	0
pat.woods@nmlegis.gov	Delivered		0	0
pathwayswc@yahoo.com	Delivery Failure	3002 - 554 5.0.0	0	0
patricia.sciarrotta@gmail.com	Delivered		0	0
patricia.walsh@state.nm.us	Delivered		0	0
patriciacardona24@yahoo.com	Delivered		0	0
patrick.leyba@epelectric.com	Delivered		2	0
Network subscriber	Delivery Failure	Soft Bounce - Ma	0	0

NMED EXHIBIT 18

Network subscriber	Delivered		0	0
patty.hill@xcelenergy.com	Delivered		0	0
paul.frohardt@state.co.us	Delivery Failure	Soft Bounce - DN	0	0
Network subscriber	Delivered		0	0
paul.romero@wilsonco.com	Delivered		1	0
paula@diepolder.biz	Delivered		0	0
Network subscriber	Delivered		0	0
Pbaca@calwater.com	Delivered		0	0
pbahlo@mac.com	Delivered		0	0
pbpfeiffer@yahoo.com	Delivered		0	0
pdiaz@las-cruces.org	Delivered		0	0
pdmohn@netzero.com	Delivered		1	0
pearl1@unm.edu	Delivered		0	0
pengreen@co.santa-fe.nm.us	Delivered		0	0
pete.valencia@mail.house.gov	Delivered		0	0
peter.arnold@aridlands.org	Delivered		0	0
peter.ives@tpl.org	Delivered		0	0
Network subscriber	Delivered		1	0
peter.wirth@nmlegis.gov	Delivered		0	0
petersen.mike.t@gmail.com	Delivered		1	0
pg.designenginuity@gmail.com	Delivered		1	0
phaywood@sfnewmexican.com	Delivered		0	0
phillip.c.boawn@spa02.usace.army.mil	Delivered		0	0
phoenixvigil@yahoo.com	Delivered		0	0
phs@azdeq.gov	Delivered		0	0
Phyllisharper@q.com	Delivered		0	0
pjphillips@paalp.com	Delivered		0	0
planejamento.gov.br@gmail.com	Delivered		0	0
pluehring@fs.fed.us	Delivered		0	0
Network subscriber	Delivered		1	0
pmontoia@fmtn.org	Delivered		2	0
pnylan@southernute-nsn.gov	Delivered		0	0
poi36820@isletapueblo.com	Delivered		0	0
poi36870@isletapueblo.com	Delivered		0	0
poi36871@isletapueblo.com	Delivered		0	0
polafson@co.santa-fe.nm.us	Delivered		0	0
pr@lrpa-usa.com	Delivered		0	0
Network subscriber	Delivered		0	0
Network subscriber	Delivered		0	0
preyes@ecos.org	Delivered		0	0
promero25@msn.com	Delivered		0	0
Provision@nym.hush.com	Delivered		0	0
ptaylor@socorronm.gov	Delivered		0	0
publicworks@cityofelephantbutte.com	Delivered		0	0
pyoung84@live.com	Delivered		1	0
pzacharias@hobbsnm.org	Delivered		0	0
qcmr3john@gmail.com	Delivered		0	0
Network subscriber	Delivered		1	0
quinones@cybermesa.com	Delivered		1	0
r.quant@comcast.net	Delivered		3	0
r@rthicksconsult.com	Delivered		0	0
rachel.cruz@arcadis.com	Delivered		0	0
rachel.jankowitz@state.nm.us	Delivered		0	0
rachel.knapp@krqe.com	Delivered		3	0
raheckes@bernco.gov	Delivered		1	0
ralph.e.arias@usace.army.mil	Delivered		0	0
Network subscriber	Delivered		0	0
Network subscriber	Delivered		0	0
ramon.lucero@soudermiller.com	Delivered		3	0
randy.bates@state.nm.us	Delivered		0	0
randydevinney71@yahoo.com	Delivered		0	0
randykoehn@ruidoso-nm.gov	Delivered		0	0
raquel@santafewatershed.org	Delivered		0	0
rarodriguez@cabq.gov	Delivered		0	0
raul.mendez.2@us.af.mil	Delivered		0	0
raulvargas217@yahoo.com	Delivered		0	0
rauscher.leslie@epa.gov	Delivered		0	0
rbandeen@aol.com	Delivered		0	0
Network subscriber	Delivered		0	0

rbriggs@fmtn.org	Delivered		1	0
rbrokate@dacc.nmsu.edu	Delivered		0	0
Network subscriber	Delivered		1	0
rchurch@redriver.org	Delivered		1	0
rcoleman@awsd.us	Delivered		0	0
rconn@amigosbravos.org	Delivered		1	0
rcsmith3@gmail.com	Delivered		0	0
rebecca.roose@state.nm.us	Delivered		0	0
redean88341@yahoo.com	Delivered		1	0
remereibski@windstream.net	Delivered		7	0
renee.benally@bia.gov	Delivered		1	0
Network subscriber	Delivered		0	0
rfbramble@earthlink.net	Delivered		0	0
rfindling@tnc.org	Delivered		0	0
rgakin@gmail.com	Delivered		0	0
rgallegos@lanl.gov	Delivered		0	0
rgarcia@molzencorbin.com	Delivered		1	0
rgarcia@santafenm.gov	Delivered		5	0
rgriego@co.santa-fe.nm.us	Delivered		0	0
rguillen@dh-united.com	Delivered		1	0
rhanway@las-cruces.org	Delivered		0	0
rhayes@nmsu.edu	Delivered		0	0
rhollander2@cox.net	Delivered		0	0
rhonda.holderman@state.nm.us	Delivered		0	0
rhormell@wildblue.net	Delivered		0	0
rhuizenga@cimarex.com	Delivered		1	0
richard.primrose@quaycounty-nm.gov	Delivered		0	0
richard.vera.civ@mail.mil	Delivered		0	0
Network subscriber	Delivered		0	0
ridgelinemuleys_imtz@yahoo.com	Delivered		0	0
rio@bacavalley.com	Delivered		0	0
rio@tularosa.net	Delivered		0	0
rita.f.crites1.civ@mail.mil	Delivered		0	0
ritadaniels@truetaosradio.com	Delivered		0	0
rivera14@unm.edu	Delivered		0	0
riverfoot505@gmail.com	Delivered		1	0
riversource1@gmail.com	Delivered		1	0
rjankowitz@state.nm.us	Delivered		0	0
rjbajek@cableone.net	Delivered		0	0
rjemison@fs.fed.us	Delivered		0	0
rla@dfn.com	Delivered		0	0
rmartinez@sanipueblo.org	Delivered		0	0
rmitchell@tristategt.org	Delivered		0	0
rmoss@sfnewmexican.com	Delivered		0	0
robbiea@donaanacounty.org	Delivered		0	0
Robc1111@nmsu.edu	Delivered	General Bounce	0	0
Network subscriber	Delivered		0	0
robert.hays@ci-grants.newmexico.gov	Delivered		0	0
robert.kasuboski@cehmm.org	Delivered		0	0
robertmperez@yahoo.com	Delivered		0	0
RobertS@windwardenv.com	Delivered		0	0
Network subscriber	Delivered	Soft Bounce - M	0	0
robinson4651@live.com	Delivered		0	0
Network subscriber	Delivered		0	0
robmtz@co.santa-fe.nm.us	Delivered		0	0
rockogripo@aol.com	Delivered		0	0
Network subscriber	Delivered		0	0
rod@ircables.com	Delivered		0	0
rodriguez_w_thomas@yahoo.com	Delivered		0	0
roger.migchelbrink@stservices.com	Delivered		0	0
rogpete@aol.com	Delivered		0	0
rojavi24@yahoo.com	Delivered		1	0
romero.rosemary@gmail.com	Delivered		1	0
romerogerald@hotmail.com	Delivered		1	0
ron.felix50@gmail.com	Delivered		0	0
ronstrauch61@gmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
royce.beaudry@soudermiller.com	Delivered		1	0
rpederson128@gmail.com	Delivered		0	0

rpetitt@abcwua.org	Delivered		0	0	
rrcarpenter@santafenm.gov	Delivered		0	0	
rreese@trinityconsultants.com	Delivered		0	0	
rromero@nmml.org	Delivered		0	0	
rsalcido@fmtn.org	Delivered		0	0	
rsanchez@sfpueblo.com	Delivered		0	0	
rseale@eprod.com	Delivered		0	0	
rshanks@fs.fed.us	Delivered		0	0	
rswazohinds@pueblooftesuque.org	Delivered		0	0	
rtafoya@angelfirenm.gov	Delivered		0	0	
rtownzen2015@hotmail.com	Delivered		0	0	
rtroy@nmlandconservancy.org	Delivered		0	0	
rubyquail@gmail.com	Delivered		0	0	
rupperts@msn.com	Delivered		0	0	
russfain.fain@gmail.com	Delivered		0	0	
russniel@gmail.com	Delivered		2	0	
RVenegas@marathonpetroleum.com	Delivered		0	0	
rvonrohr@biohabitats.com	Delivered		0	0	
rwbuck1@hotmail.com	Delivered		1	0	
rwwood@santafenm.gov	Delivered		0	0	
ryan.lujan@ch2m.com	Delivered		0	0	
ryan.m.weiss@gmail.com	Delivered		0	0	
ryan@high-watermark.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
s.moggridge@wt-us.com	Delivered		0	0	
safety@firebirdstructures.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
saladen@lanl.gov	Delivered		2	1	https://www.en
Network subscriber	Delivered		0	0	
sallysmithisnow@gmail.com	Delivered		0	0	
sam@814solutions.com	Delivered		0	0	
samantha.j.kretz.nfg@mail.mil	Delivered		0	0	
Network subscriber	Delivered		0	0	
sandra.carson@elkomininggroup.com	Delivered		0	0	
sanjuanwatershedgroup@gmail.com	Delivered		0	0	
santafeclay@gmail.com	Delivered		0	0	
Network subscriber	Delivered		0	0	
santoshmohite777@gmail.com	Delivered		0	0	
sarah.holcomb@state.nm.us	Delivered		2	0	
sarah.johnson@state.co.us	Delivered		0	0	
sarah.mcmahon@pnm.com	Delivered		0	0	
sarah.wood@state.nm.us	Delivered		0	0	
saroj.baxter@state.nm.us	Delivered		3	0	
satobiason@gmail.com	Delivered		0	0	
savannahmtz@gmail.com	Delivered		1	0	
Network subscriber	Delivered		0	0	
sbriner@trinityconsultants.com	Delivered		0	0	
sburtkes@fmi.com	Delivered		0	0	
sbutzier@modrall.com	Delivered		0	0	
scanton@geiconsultants.com	Delivered		1	0	
scott.janoe@bakerbotts.com	Delivery Failure	1003 - 550 5.2.0	0	0	
scott.rader@nov.com	Delivered		0	0	
scovington@formationenv.com	Delivered		0	0	
scurrie@talonlpe.com	Delivered		3	0	
sean.amalla@fortisconstruction.com	Delivered		0	0	
seanforan@cabq.gov	Delivered		0	0	
sebobet@tularosa.net	Delivered		0	0	
Network subscriber	Delivered		0	0	
seligman@energyadvocate.us	Delivered		1	0	
seva.joseph@state.nm.us	Delivered		0	0	
Network subscriber	Delivered		0	0	
sfhacienda@gmail.com	Delivered		0	0	
sfra@sanfranciscoriver.com	Delivered		0	0	
sfromero@fs.fed.us	Delivered		0	0	
sganley@bhinc.com	Delivered		0	0	
sgm87544@gmail.com	Delivered		0	0	
shafii@adeq.state.ar.us	Delivered		0	0	
shanageo@gmail.com	Delivered		0	0	
shanetunnell2015@gmail.com	Delivered		0	0	

Network subscriber	Delivered		0	0
shannon.atencio@state.nm.us	Delivered		0	0
shannon.glendenning@state.nm.us	Delivered		1	0
shanti@engineersinc.com	Delivered		0	0
Network subscriber	Delivered		0	0
shawn.denny@state.nm.us	Delivered		0	0
shawnjim97@gmail.com	Delivered		0	0
shelly.barnes@usace.army.mil	Delivered		0	0
shelly.lemon@state.nm.us	Delivered		20	0
shelly@marroninc.com	Delivery Failure	1003 - 550 5.2.0	0	0
Network subscriber	Delivered		0	0
sheron.graves2@gmail.com	Delivered		0	0
sherrick.roanhorse@pnmresources.com	Delivered		0	0
shinds@animasenvironmental.com	Delivered		0	0
Network subscriber	Delivered		2	0
shirleywinona@hotmail.com	Delivered		0	0
Network subscriber	Delivered		0	0
SHQS@Chevron.com	Delivered		0	0
shughes5012@msn.com	Delivered		0	0
shyla.lavalle@gmail.com	Delivered		0	0
silas.deroma@nnsa.doe.gov	Delivered		0	0
Network subscriber	Delivered		0	0
simbiso84@gmail.com	Delivered		0	0
simplify1023@gmail.com	Delivered		1	0
siona.briley@state.nm.us	Delivered		1	0
Network subscriber	Delivered		0	0
Network subscriber	Delivered		1	0
sjoseph@cawasa.org	Delivered		0	0
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stevel781@gmail.com	Delivered		0	0

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steven.zoncki@datacharter.org	Delivered		0	0
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Steverarch1139@gmail.com	Delivered		0	0
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ted.harrison@commonwealconservancy.org	Delivered		0	0
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timkarpoff@msn.com	Delivered		0	0
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tvigil@pueblooftesuque.org	Delivered		0	0	
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watershop@1405.com	Delivered		0	0	

way2busy2fish@aol.com	Delivered		0	0
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wchristian@dfamilk.com	Delivered		0	0
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webmaster@smrna.org	Delivered		4	0
wendy.pierard@state.nm.us	Delivered		0	0
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William.t.horan.mil@mail.mil	Delivered		0	0
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From: Henderson, Heidi, NMENV
To: Lemon, Shelly, NMENV; Barrios, Kristopher, NMENV; Fullam, Jennifer, NMENV
Subject: FW: [EXT] Bulletin Detail Report: NMED-SWQB announces public comment period for City of Raton WWTP temporary standard
Date: Tuesday, October 1, 2019 1:14:20 PM

FYI

From: New Mexico Environment Department <nmed@public.govdelivery.com>
Sent: Tuesday, October 1, 2019 1:10 PM
To: Henderson, Heidi, NMENV <heidi.henderson@state.nm.us>
Subject: [EXT] Bulletin Detail Report: NMED-SWQB announces public comment period for City of Raton WWTP temporary standard

Having trouble viewing this email? View this report in your account.

GovDelivery

Report Generated: 10/01/2019 01:10 PM MDT

This report automatically generates after a bulletin is sent. View the Bulletin Detail Report online to see the most recent performance metrics for this bulletin.

Subject: NMED-SWQB announces public comment period for City of Raton WWTP temporary standard

Sent: 10/01/2019 10:10 AM CDT

Sent By: Heidi.Henderson@state.nm.us

Sent To: Subscribers of Surface Water

✓ Email
✗ SMS
✗ Facebook
✗ Twitter
✓ RSS

1,706 Recipients

97.0% Delivered

1% Pending
2% Bounced
14% Open Rate
1% Click Rate

Email Delivery Stats

Minutes	Cumulative Attempted
3	95%

Email delivery statistics line / bar chart

5	96%
10	98%
30	99%
60	99%
120	99%

Delivery Metrics - Details

1,706 Total Sent

1,654 (97%) Delivered

14 (1%) Pending

38 (2%) Bounced

1 (0%) Unsubscribed

Bulletin Analytics

388 Total Opens

229 (14%) Unique Opens

18 Total Clicks

11 (1%) Unique Clicks

10 # of Links

Delivery and Performance

Channel	Progress	Percent Delivered	Number of Recipients	Number Delivered	Opened / Unique	Bounced / Failed	Unsubscribed
Email Bulletin	Sending...	96.5%	1,488	1,436	229 / 15.9%	38	1
SMS Message	Delivered	0.0%	0	0	n/a	0	n/a

Bulletin Link Overview

Link URL	Unique Clicks	Total Clicks
https://www.env.nm.gov/surface-water-quality/ts-raton/	10	17
https://public.govdelivery.com/accounts/NMED/subscriber/edit?preferences...	1	1
https://public.govdelivery.com/accounts/NMED/subscriber/one_click_unsubs...	1	1
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STAY CONNECTED:

FEDERAL WATER POLLUTION CONTROL ACT

(33 U.S.C. 1251 et seq.)

AN ACT To provide for water pollution control activities in the Public Health Service of the Federal Security Agency and in the Federal Works Agency, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—RESEARCH AND RELATED PROGRAMS

DECLARATION OF GOALS AND POLICY

SEC. 101. (a) The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. In order to achieve this objective it is hereby declared that, consistent with the provisions of this Act—

(1) it is the national goal that the discharge of pollutants into the navigable waters be eliminated by 1985;

(2) it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983;

(3) it is the national policy that the discharge of toxic pollutants in toxic amounts be prohibited;

(4) it is the national policy that Federal financial assistance be provided to construct publicly owned waste treatment works;

(5) it is the national policy that areawide treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State;

(6) it is the national policy that a major research and demonstration effort be made to develop technology necessary to eliminate the discharge of pollutants into the navigable waters, waters of the contiguous zone and the oceans; and

(7) it is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution.

(b) It is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution, to plan the development and use (including restoration, preservation, and enhancement) of land and water resources, and to consult with the Administrator in the exercise of his authority under this Act. It is the policy of Congress that the States manage the construction grant program under this Act and implement the permit programs under sections 402 and 404 of this Act. It is further the policy of the Congress to support and aid research relating to the prevention, reduction, and elimination of pollution, and to provide Federal technical services and financial aid to State and interstate agencies and municipalities in connection with the prevention, reduction, and elimination of pollution.

(c) It is further the policy of Congress that the President, acting through the Secretary of State and such national and international organizations as he determines appropriate, shall take such action as may be necessary to insure that to the fullest extent possible all foreign countries shall take meaningful action for the prevention, reduction, and elimination of pollution in their waters and in international waters and for the achievement of goals regarding the elimination of discharge of pollutants and the improvement of water quality to at least the same extent as the United States does under its laws.

(d) Except as otherwise expressly provided in this Act, the Administrator of the Environmental Protection Agency (hereinafter in this Act called "Administrator") shall administer this Act.

(e) Public participation in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan, or program established by the Administrator or any State under this Act shall be provided for, encouraged, and assisted by the Administrator and the States. The Administrator, in cooperation with the States, shall develop and publish regulations specifying minimum guidelines for public participation in such processes.

(f) It is the national policy that to the maximum extent possible the procedures utilized for implementing this Act shall encourage the drastic minimization of paperwork and interagency decision procedures, and the best use of available manpower and funds, so as to prevent needless duplication and unnecessary delays at all levels of government.

(g) It is the policy of Congress that the authority of each State to allocate quantities of water within its jurisdiction shall not be superseded, abrogated or otherwise impaired by this Act. It is the further policy of Congress that nothing in this Act shall be construed to supersede or abrogate rights to quantities of water which have been established by any State. Federal agencies shall co-operate with State and local agencies to develop comprehensive solutions to prevent, reduce and eliminate pollution in concert with programs for managing water resources.

(33 U.S.C. 1251)

COMPREHENSIVE PROGRAMS FOR WATER POLLUTION CONTROL

SEC. 102. (a) The Administrator shall, after careful investigation, and in cooperation with other Federal agencies, State water pollution control agencies, interstate agencies, and the municipalities and industries involved, prepare or develop comprehensive programs for preventing, reducing, or eliminating the pollution of the navigable waters and ground waters and improving the sanitary condition of surface and underground waters. In the development of such comprehensive programs due regard shall be given to the improvements which are necessary to conserve such waters for the protection and propagation of fish and aquatic life and wildlife, recmunicipal entity under subsection (a), for the reasonable and necessary costs of administering the grant.

(i) REPORTS.—Not later than December 31, 2003, and periodically thereafter, the Administrator shall transmit to Congress a report containing recommended funding levels for grants under this section. The recommended funding levels shall be sufficient to ensure the continued expeditious implementation of municipal combined sewer overflow and sanitary sewer overflow controls nationwide.

(33 U.S.C. 1301)

TITLE III—STANDARDS AND ENFORCEMENT

EFFLUENT LIMITATIONS

SEC. 301. (a) Except as in compliance with this section and sections 302, 306, 307, 318, 402, and 404 of this Act, the discharge of any pollutant by any person shall be unlawful.

(b) In order to carry out the objective of this Act there shall be achieved—

(1)(A) not later than July 1, 1977, effluent limitations for point sources, other than publicly owned treatment works, (i) which shall require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of this Act, or (ii) in the case of a discharge into a publicly owned treatment works which meets the requirements of subparagraph (B) of this paragraph, which shall require compliance with any applicable pretreatment requirements and any requirements under section 307 of this Act; and

(B) for publicly owned treatment works in existence on July 1, 1977, or approved pursuant to section 203 of this Act prior to June 30, 1974 (for which construction must be completed within four years of approval), effluent limitations based upon secondary treatment as defined by the Administrator pursuant to section 304(d)(1) of this Act; or,

(C) not later than July 1, 1977, any more stringent limitation, including those necessary to meet water quality standards, treatment standards, or schedule of compliance, established pursuant to any State law or regulations, (under authority preserved by section 510) or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to this Act.

(2)(A) for pollutants identified in subparagraphs (C), (D), and (F) of this paragraph, effluent limitations for categories and classes of point sources, other than publicly owned treatment works, which (i) shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(2) of this Act, which such effluent limitations shall require the elimination of discharges of all pollutants if the Administrator finds, on the basis of information available to him (including information de-

NMED EXHIBIT 19

veloped pursuant to section 315), that such elimination is technologically and economically achievable for category or class of point sources as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(2) of this Act, or (ii) in the case of the introduction of a pollutant into a publicly owned treatment works which meets the requirements of subparagraph (B) of this paragraph, shall require compliance with any applicable pretreatment requirements and any other requirement under section 307 of this Act;

[(B) subparagraph (B) repealed by section 21(b) of P.L. 97–117.]

(C) with respect to all toxic pollutants referred to in table 1 of Committee Print Numbered 95–30 of the Committee on Public Works and Transportation of the House of Representatives compliance with effluent limitations in accordance with subparagraph (A) of this paragraph as expeditiously as practicable but in no case later than three years after the date such limitations are promulgated under section 304(b), and in no case later than March 31, 1989;

(D) for all toxic pollutants listed under paragraph (1) of subsection (a) of section 307 of this Act which are not referred to in subparagraph (C) of this paragraph compliance with effluent limitation in accordance with subparagraph (A) of this paragraph as expeditiously as practicable, but in no case later than three years after the date such limitations are promulgated under section 304(b), and in no case later than March 31, 1989;

(E) as expeditiously as practicable but in no case later than three years after the date such limitations are promulgated under section 304(b), and in no case later than March 31, 1989, compliance with effluent limitations for categories and classes of point sources, other than publicly owned treatment works, which in the case of pollutants identified pursuant to section 304(a)(4) of this Act shall require application of the best conventional pollutant control technology as determined in accordance with regulations issued by the Administrator pursuant to section 304(b)(4) of this Act; and

(F) for all pollutants (other than those subject to subparagraphs (C), (D), or (E) of this paragraph) compliance with effluent limitations in accordance with subparagraph (A) of this paragraph as expeditiously as practicable but in no case later than 3 years after the date such limitations are established, and in no case later than March 31, 1989.

(3)(A) for effluent limitations under paragraph (1)(A)(i) of this subsection promulgated after January 1, 1982, and requiring a level of control substantially greater or based on fundamentally different control technology than under permits for an industrial category issued before such date, compliance as expeditiously as practicable but in no case later than three years after the date such limitations are promulgated under section 304(b), and in no case later than March 31, 1989; and

(B) for any effluent limitation in accordance with paragraph (1)(A)(i), (2)(A)(i), or (2)(E) of this subsection established only on the basis of section 402(a)(1) in a permit issued after enactment of the Water Quality Act of 1987, compliance as expeditiously as practicable but in no case later than three years after the date such limitations are established, and in no case later than March 31, 1989.

(c) The Administrator may modify the requirements of subsection (b)(2)(A) of this section with respect to any point source for which a permit application is filed after July 1, 1977, upon a showing by the owner or operator of such point source satisfactory to the Administrator that such modified requirements (1) will represent the maximum use of technology within the economic capability of the owner or operator; and (2) will result in reasonable further progress toward the elimination of the discharge of pollutants.

(d) Any effluent limitation required by paragraph (2) of subsection (b) of this section shall be reviewed at least every five years and, if appropriate, revised pursuant to the procedure established under such paragraph.

(e) Effluent limitations established pursuant to this section or section 302 of this Act shall be applied to all point sources of discharge of pollutants in accordance with the provisions of this Act.

(f) Notwithstanding any other provisions of this Act it shall be unlawful to discharge any radiological, chemical, or biological warfare agent, any high-level radioactive waste, or any medical waste, into the navigable waters.

(g) MODIFICATIONS FOR CERTAIN NONCONVENTIONAL POLLUTANTS.—

(1) GENERAL AUTHORITY.—The Administrator, with the concurrence of the State, may modify the requirements of subsection (b)(2)(A) of this section with respect to the discharge from any point source of ammonia, chlorine, color, iron, and total phenols (4AAP) (when determined by the Administrator to be a pollutant covered by subsection (b)(2)(F)) and any other pollutant which the Administrator lists under paragraph (4) of this subsection.

(2) REQUIREMENTS FOR GRANTING MODIFICATIONS.—A modification under this subsection shall be granted only upon a showing by the owner or operator of a point source satisfactory to the Administrator that—

(A) such modified requirements will result at a minimum in compliance with the requirements of subsection (b)(1)(A) or (C) of this section, whichever is applicable;

(B) such modified requirements will not result in any additional requirements on any other point or nonpoint source; and

(C) such modification will not interfere with the attainment or maintenance of that water quality which shall assure protection of public water supplies, and the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities, in and on the water and such modification will not result in the discharge of pollutants in quantities which may reasonably be anticipated to pose an unacceptable risk to human health or the environment because of bioaccumulation, persistency in the environment, acute toxicity, chronic toxicity (including carcinogenicity, mutagenicity or teratogenicity), or synergistic propensities.

(3) LIMITATION ON AUTHORITY TO APPLY FOR SUBSECTION (c) MODIFICATION.—If an owner or operator of a point source applies for a modification under this subsection with respect to the discharge of any pollutant, such owner or operator shall be eligible to apply for modification under subsection (c) of this section with respect to such pollutant only during the same time-period as he is eligible to apply for a modification under this subsection.

(4) PROCEDURES FOR LISTING ADDITIONAL POLLUTANTS.—

(A) GENERAL AUTHORITY.—Upon petition of any person, the Administrator may add any pollutant to the list of pollutants for which modification under this section is authorized (except for pollutants identified pursuant to section 304(a)(4) of this Act, toxic pollutants subject to section 307(a) of this Act, and the thermal component of discharges) in accordance with the provisions of this paragraph.

(B) REQUIREMENTS FOR LISTING.—

(i) SUFFICIENT INFORMATION.—The person petitioning for listing of an additional pollutant under this subsection shall submit to the Administrator sufficient information to make the determinations required by this subparagraph.

(ii) TOXIC CRITERIA DETERMINATION.—The Administrator shall determine whether or not the pollutant meets the criteria for listing as a toxic pollutant under section 307(a) of this Act.

(iii) LISTING AS TOXIC POLLUTANT.—If the Administrator determines that the pollutant meets the criteria for listing as a toxic pollutant under section 307(a), the Administrator shall list the pollutant as a toxic pollutant under section 307(a).

(iv) NONCONVENTIONAL CRITERIA DETERMINATION.—If the Administrator determines that the pollutant does not meet the criteria for lising as a toxic pollutant under such section and determines that adequate test methods and sufficient data are available to make the determinations required by paragraph (2) of this subsection with respect to the pollutant, the Administrator shall add the pollutant to the list of pollutants specified in paragraph (1) of this subsection for which modifications are authorized under this subsection.

(C) REQUIREMENTS FOR FILING OF PETITIONS.—A petition for lising of a pollutant under this paragraph—

(i) must be filed not later than 270 days after the date of promulgation of an applicable effluent guideline under section 304;

(ii) may be filed before promulgation of such guideline; and

(iii) may be filed with an application for a modification under paragraph (1) with respect to the discharge of such pollutant.

(D) DEADLINE FOR APPROVAL OF PETITION.—A decision to add a pollutant to the list of pollutants for which modifications under this subsection are authorized must be made within 270 days after the date of promulgation of an applicable effluent guideline under section 304.

(E) BURDEN OF PROOF.—The burden of proof for making the determinations under subparagraph (B) shall be on the petitioner.

(5) REMOVAL OF POLLUTANTS.—The Administrator may remove any pollutant from the list of pollutants for which modifications are authorized under this subsection if the Administrator determines that adequate test methods and sufficient data are no longer available for determining whether or not modifications may be granted with respect to such pollutant under paragraph (2) of this subsection.

(h) The Administrator, with the concurrence of the State, may issue a permit under section 402 which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from a publicly owned treatment works into marine waters, if the applicant demonstrates to the satisfaction of the Administrator that—

(1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under section 304(a)(6) of this Act;

(2) the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water;

(3) the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of such monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;

(4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

(5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;

(6) in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant will enforce such requirements, and the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works

were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

(7) to the extent practicable the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works;

(8) there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit;

(9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under section 304(a)(1) of this Act after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged.

For the purposes of this subsection the phrase "the discharge of any pollutant into marine waters" refers to a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines necessary to allow compliance with paragraph (2) of this subsection, and section 101(a)(2) of this Act. For the purposes of paragraph (9), "primary or equivalent treatment" means treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the biological oxygen demanding material and of the suspended solids in the treatment works influent, and disinfection, where appropriate. A municipality which applies secondary treatment shall be eligible to receive a permit pursuant to this subsection which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from any treatment works owned by such municipality into marine waters. No permit issued under this subsection shall authorize the discharge of sewage sludge into marine waters. In order for a permit to be issued under this subsection for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previously discharged effluent from such treatment works. No permit issued under this subsection shall authorize the discharge of any pollutant into saline estuarine waters which at the time of application do not support a balanced indigenous population of shellfish, fish and wildlife, or allow recreation in and on the waters or which exhibit ambient water quality below applicable water quality standards adopted for the protection of public water supplies, shellfish, fish and wildlife or recreational activities or such other standards necessary to assure support and protection of such uses. The prohibition contained in the preceding sentence shall apply without regard to the presence or absence of a causal relationship between such characteristics and the applicant's current or proposed discharge. Notwithstanding any other provisions of this subsection, no permit may be issued under this subsection for discharge of a pollutant into the New York Bight Apex consisting of the ocean waters of the Atlantic Ocean westward of 73 degrees 30 minutes west longitude and northward of 40 degrees 10 minutes north latitude.

(i)(1) Where construction is required in order for a planned or extisting publicly owned treatment works to achieve limitations under subsection (b)(1)(B) or (b)(1)(C) of this section, but (A) construction cannot be completed with the time required in such subsection, or (B) the United States has failed to make financial assistance under this Act available in time to achieve such limitations by the time specified in such subsection, the owner or operator of such treatment works may request the Administrator (or if appropriate the State) to issue a permit pursuant to section 402 of this Act or to modify a permit issued pursuant to that section to extend such time for compliance. Any such request shall be filed with the Administrator (or if appropriate the State) within 180 days after the date of enactment of the Water Quality Act of 1987. The Administrator (or if appropriate the State) may grant such request and issue or modify such a permit, which shall contain a schedule of compliance for the publicly owned treatment works based on the earliest date by which such financial assistance will be available from the United States and construction can be completed, but in no event later than July 1, 1988, and shall contain such other terms and conditions, including those necessary to carry out subsections (b) through (g) of section 201 of this Act, section 307 of this Act, and such interim effluent limitations applicable to that treatment works as the Administrator determines are necessary to carry out the provisions of this Act.

(2)(A) Where a point source (other than a publicly owned treatment works) will not achieve the requirements of subsections (b)(1)(A) and (b)(1)(C) of this section and—

(i) if a permit issued prior to July 1, 1977, to such point source is based upon a discharge into a publicly owned treatment works; or

(ii) if such point source (other than a publicly owned treatment works) had before July 1, 1977, a contract (enforceable against such point source) to discharge into a publicly owned treatment works; or

(iii) if either an application made before July 1, 1977, for a construction grant under this Act for a publicly owned treatment works, or engineering or architectural plans or working drawings made before July 1, 1977, for a publicly owned treatment works, show that such point source was to discharge into such publicly owned treatment works,

and such publicly owned treatment works is presently unable to accept such discharge without construction, and in the case of a discharge to an existing publicly owned treatment works, such treatment works has an extension pursuant to paragraph (1) of this subsection, the owner or operator of such point source may request the Administrator (or if appropriate the State) to issue or modify such a permit pursuant to such section 402 to extend such time for compliance. Any such request shall be filed with the Administrator (or if appropriate the State) within 180 days after the date of enactment of this subsection or the filing of a request by the appropriate publicly owned treatment works under paragraph (1) of this subsection, whichever is later. If the Administrator (or if appropriate the State) finds that the owner or operator of such point source has acted in good faith, he may grant such request and issue or modify such a permit, which shall contain a schedule of compliance for the point source to achieve the requirements of subsections (b)(1)(A) and (C) of this section and shall contain such other terms and conditions, including pretreatment and interim effluent limitations and water conservation requirements applicable to that point source, as the Administrator determines are necessary to carry out the provisions of this Act.

(B) No time modification granted by the Administrator (or if appropriate the State) pursuant to paragraph (2)(A) of this subsection shall extend beyond the earliest date practicable for compliance or beyond the date of any extension granted to the appropriate publicly owned treatment works pursuant to paragraph (1) of this subsection, but in no event shall it extend beyond July 1, 1988, and no such time modification shall be granted unless (i) the publicly owned treatment works will be in operation and available to the point source before July 1, 1988, and will meet the requirements to subsections (b)(1) (B) and (C) of this section after receiving the discharge from that point source; and (ii) the point source and the publicly owned treatment works have entered into an enforceable contract requiring the point source to discharge into the publicly owned treatment works, the owner or operator of such point source to pay the costs required under section 204 of this Act, and the publicly owned treatment works to accept the discharge from the point source; and (iii) the permit for such point source requires point source to meet all requirements under section 307 (a) and (b) during the period of such time modification.

(j)(1) Any application filed under this section for a modification of the provisions of—

(A) subsection (b)(1)(B) under subsection (h) of this section shall be filed not later that [1] the 365th day which begins after the date of enactment of the Municipal Wastewater Treatment Construction Grant Amendments of 1981, except that a publicly owned treatment works which prior to December 31, 1982, had a contractual arrangement to use a portion of the capacity of an ocean outfall operated by another publicly owned treatment works which has applied for or received modification under subsection (h), may apply for a modification of subsection (h) in its own right not later than 30 days after the date of the enactment of the Water Quality Act of 1987, and except as provided in paragraph (5);

(B) subsection (b)(2)(A) as it applies to pollutants identified in subsection (b)(2)(F) shall be filed not later than 270 days after the date of promulgation of an applicable effluent guideline under section 304 or not later than 270 days after the date of enactment of the Clean Water Act of 1977, whichever is later.

(2) Subject to paragraph (3) of this section, any application for a modification filed under subsection (g) of this section shall not operate to stay any requirement under this Act, unless in the judgment of the Administrator such a stay or the modification sought

[1] So in law. Probably should be "than".

will not result in the discharge of pollutants in quantities which may reasonably be anticipated to pose an unacceptable risk to human health or the environment because of bioaccumulation, persistency in the environment, acute toxicity, chronic toxicity (including carcinogenicity, mutagenicity or teratogenicity), or synergistic propensities, and that there is a substantial likelihood that the applicant will succeed on the merits of such application. In the case of an application filed under subsection (g) of this section, the Administrator may condition any stay granted under this paragraph on requiring the filing of a bond or other appropriate security to assure timely compliance with the requirements from which a modification is sought.

(3) COMPLIANCE REQUIREMENTS UNDER SUBSECTION (g).—

(A) EFFECT OF FILING.—An application for a modification under subsection (g) and a petition for listing of a pollutant as a pollutant for which modifications are authorized under such subsection shall not stay the requirement that the person seeking such modification or listing comply with effluent limitations under this Act for all pollutants not the subject of such application or petition.

(B) EFFECT OF DISAPPROVAL.—Disapproval of an application for a modification under subsection (g) shall not stay the requirement that the person seeking such modification comply with all applicable effluent limitations under this Act.

(4) DEADLINE FOR SUBSECTION (g) DECISION.—An application for a modification with respect to a pollutant filed under subsection (g) must be approved or disapproved not later than 365 days after the date of such filing; except that in any case in which a petition for listing such pollutant as a pollutant for which modifications are authorized under such subsection is approved, such application must be approved or disapproved not later than 365 days after the date of approval of such petition.

(5) EXTENSION OF APPLICATION DEADLINE.—

(A) IN GENERAL.—In the 180-day period beginning on the date of the enactment of this paragraph, the city of San Diego, California, may apply for a modification pursuant to subsection (h) of the requirements of subsection (b)(1)(B) with respect to biological oxygen demand and total suspended solids in the effluent discharged into marine waters.

(B) APPLICATION.—An application under this paragraph shall include a commitment by the applicant to implement a waste water reclamation program that, at a minimum, will—

(i) achieve a system capacity of 45,000,000 gallons of reclaimed waste water per day by January 1, 2010; and

(ii) result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the modification.

(C) ADDITIONAL CONDITIONS.—The Administrator may not grant a modification pursuant to an application submitted under this paragraph unless the Administrator determines that such modification will result in removal of not less than 58 percent of the biological oxygen demand (on an annual average) and not less than 80 percent of total suspended solids (on a monthly average) in the discharge to which the application applies.

(D) PRELIMINARY DECISION DEADLINE.—The Administrator shall announce a preliminary decision on an application submitted under this paragraph not later than 1 year after the date the application is submitted.

(k) In the case of any facility subject to a permit under section 402 which proposes to comply with the requirements of subsection (b)(2)(A) or (b)(2)(E) of this section by replacing existing production capacity with an innovative production process which will result in an effluent reduction significantly greater than that required by the limitation otherwise applicable to such facility and moves toward the national goal of eliminating the discharge of all pollutants, or with the installation of an innovative control technique that has a substantial likelihood for enabling the facility to comply with the applicable effluent limitation by achieving a significantly greater effluent reduction than that required by the applicable effluent limitation and moves toward the national goal of eliminating the discharge of all pollutants, or by achieving the required reduction with an innovative system that has the potential for significantly lower costs than the systems which have been determined by the Administrator to be economically achievable, the Administrator (or the State with an approved program under section 402, in consultation with the Administrator) may establish a date for compliance under subsection (b)(2)(A) or (b)(2)(E) of this section no later than two years after the date for compliance with such effluent limitation which would otherwise be applicable under such subsection, if it is also determined that such innovative system has the potential for industrywide application.

(l) Other than as provided in subsection (n) of this section, the Administrator may not modify any requirement of this section as it applies to any specific pollutant which is on the toxic pollutant list under section 307(a)(1) of this Act.

(m)(1) The Administrator, with the concurrence of the State, may issue a permit under section 402 which modifies the requirements of subsections (b)(1)(A) and (b)(2)(E) of this section, and of section 403, with respect to effluent limitations to the extent such limitations relate to biochemical oxygen demand and pH from discharges by an industrial discharger in such State into deep waters of the territorial seas, if the applicant demonstrates and the Administrator finds that—

(A) the facility for which modification is sought is covered at the time of the enactment of this subsection by National Pollutant Discharge Elimination System permit number CA0005894 or CA0005282;

(B) the energy and environmental costs of meeting such requirements of subsections (b)(1)(A) and (b)(2)(E) and section

NMED EXHIBIT 19

403 exceed by an unreasonable amount the benefits to be obtained, including the objectives of this Act;

(C) the applicant has established a system for monitoring the impact of such discharges on a representative sample of aquatic biota;

(D) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

(E) there will be no new or substantially increased discharges from the point source of the pollutant to which the modification applies above that volume of discharge specified in the permit;

(F) the discharge is into waters where there is strong tidal movement and other hydrological and geological characteristics which are necessary to allow compliance with this subsection and section 101(a)(2) of this Act;

(G) the applicant accepts as a condition to the permit a contractural obligation to use funds in the amount required (but not less than $250,000 per year for ten years) for research and development of water pollution control technology, including but not limited to closed cycle technology;

(H) the facts and circumstances present a unique situation which, if relief is granted, will not establish a precedent or the relaxation of the requirements of this Act applicable to similarly situated discharges; and

(I) no owner or operator of a facility comparable to that of the applicant situated in the United States has demonstrated that it would be put at a competitive disadvantage to the applicant (or the parent company or any subsidiary thereof) as a result of the issuance of a permit under this subsection.

(2) The effluent limitations established under a permit issued under paragraph (1) shall be sufficient to implement the applicable State water quality standards, to assure the protection of public water supplies and protection and propagation of a balanced, indigenous population of shellfish, fish, fauna, wildlife, and other aquatic organisms, and to allow recreational activities in and on the water. In setting such limitations, the Administrator shall take into account any seasonal variations and the need for an adequate margin of safety, considering the lack of essential knowledge concerning the relationship between effluent limitations and water quality and the lack of essential knowledge of the effects of discharges on beneficial uses of the receiving waters.

(3) A permit under this subsection may be issued for a period not to exceed five years, and such a permit may be renewed for one additional period not to exceed five years upon a demonstration by the applicant and a finding by the Administrator at the time of application for any such renewal that the provisions of this subsection are met.

(4) The Administrator may terminate a permit issued under this subsection if the Administrator determines that there has been a decline in ambient water quality of the receiving waters during the period of the permit even if a direct cause and effect relationship cannot be shown: *Provided,* That if the effluent from a source with a permit issued under this subsection is contributing to a de-

cline in ambient water quality of the receiving waters, the Administrator shall terminate such permit.

(n) FUNDAMENTALLY DIFFERENT FACTORS.—

(1) GENERAL RULE.—The Administrator, with the concurrance of the State, may establish an alternative requirement under subsection (b)(2) or section 307(b) for a facility that modifies the requirements of national effluent limitation guidelines or categorical pretreatment standards that would otherwise be applicable to such facility, if the owner or operator of such facility demonstrates to the satisfaction of the Administrator that—

(A) the facility is fundamentally different with respect to the factors (other than cost) specified in section 304(b) or 304(g) and considered by the Administrator in establishing such national effluent limitation guidelines or categorical pretreatment standards;

(B) the application—

(i) is based solely on information and supporting data submitted to the Administrator during the rule making for establishment of the applicable national effluent limitation guidelines or categorical pretreatment standard specifically raising the factors that are fundamentally different for such facility; or

(ii) is based on information and supporting data referred to in clause (i) and information and supporting data the applicant did not have a reasonable opportunity to submit during such rulemaking;

(C) the alternative requirement is no less stringent than justified by the fundamental difference; and

(D) the alternative requirement will not result in a non-water quality environmental impact which is markedly more adverse than the impact considered by the Administrator in establishing such national affluent limitation guideline or categorical pretreatment standard.

(2) TIME LIMIT FOR APPLICATIONS.—An application for an alternative requirement which modifies the requirements of an effluent limitation or pretreatment standard under this subsection must be submitted to the Administrator within 180 days after the date on which such limitation or standard is established or revised, as the case may be.

(3) TIME LIMIT FOR DECISION.—The Administrator shall approve or deny by final agency action an application submitted under this subsection within 180 days after the date such application is filed with the Administrator.

(4) SUBMISSION OF INFORMATION.—The Administrator may allow an applicant under this subsection to submit information and supporting data until the earlier of the date the application is approved or denied or the last day that the Administrator has to approve or deny such application.

(5) TREATMENT OF PENDING APPLICATIONS.—For the purposes of this subsection, an application for an alternative requirement based on fundamentally different factors which is pending on the date of the enactment of this subsection shall be treated as having been submitted to the Administrator on

the 180th day following such date of enactment. The applicant may amend the application to take into account the provisions of this subsection.

(6) EFFECT OF SUBMISSION OF APPLICATION.—An application for an alternative requirement under this subsection shall not stay the applicant's obligation to comply with the effluent limitation guideline or categorical pretreatment standard which is the subject of the application.

(7) EFFECT OF DENIAL.—If an application for an alternative requirement which modifies the requirements of an effluent limitation or pretreatment standard under this subsection is denied by the Administrator, the applicant must comply with such limitation or standard as established or revised, as the case may be.

(8) REPORTS.—By January 1, 1997, and January 1 of every odd-numbered year thereafter, the Administrator shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of Representatives a report on the status of applications for alternative requirements which modify the requirements of effluent limitations under section 301 or 304 of this Act or any national categorical pretreatment standard under section 307(b) of this Act filed before, on, or after such date of enactment.

(o) APPLICATION FEES.—The Administrator shall prescribe and collect from each applicant fees reflecting the reasonable administrative costs incurred in reviewing and processing applications for modifications submitted to the Administrator pursuant to subsections (c), (g), (i), (k), (m), and (n) of section 301, section 304(d)(4), and section 316(a) of this Act. All amounts collected by the Administrator under this subsection shall be deposited into a special fund of the Treasury entitled "Water Permits and Related Services" which shall thereafter be available for appropriation to carry out activities of the Environmental Protection Agency for which such fees were collected.

(p) MODIFIED PERMIT FOR COAL REMINING OPERATIONS.—

(1) IN GENERAL.—Subject to paragraphs (2) through (4) of this subsection, the Administrator, or the State in any case which the State has an approved permit program under section 402(b), may issue a permit under section 402 which modifies the requirements of subsection (b)(2)(A) of this section with respect to the pH level of any pre-existing discharge, and with respect to pre-existing discharges of iron and manganese from the remined area of any coal remining operation or with respect to the pH level or level of iron or manganese in any pre-existing discharge affected by the remining operation. Such modified requirements shall apply the best available technology economically achievable on a case-by-case basis, using best professional judgment, to set specific numerical effluent limitations in each permit.

(2) LIMITATIONS.—The Administrator or the State may only issue a permit pursuant to paragraph (1) if the applicant demonstrates to the satisfaction of the Administrator or the State, as the case may be, that the coal remining operation will

result in the potential for improved water quality from the remining operation but in no event shall such a permit allow the pH level of any discharge, and in no event shall such a permit allow the discharges of iron and manganese, to exceed the levels being discharged from the remined area before the coal remining operation begins. No discharge from, or affected by, the remining operation shall exceed State water quality standards established under section 303 of this Act.

(3) DEFINITIONS.—For purposes of this subsection—

(A) COAL REMINING OPERATION.—The term "coal remining operation" means a coal mining operation which begins after the date of the enactment of this subsection at a site on which coal mining was conducted before the effective date of the Surface Mining Control and Reclamation Act of 1977.

(B) REMINED AREA.—The term "remined area" means only that area of any coal remining operation on which coal mining was conducted before the effective date of the Surface Mining Control and Reclamation Act of 1977.

(C) PRE-EXISTING DISCHARGE.—The term "pre-existing discharge" means any discharge at the time of permit application under this subsection.

(4) APPLICABILITY OF STRIP MINING LAWS.—Nothing in this subsection shall affect the application of the Surface Mining Control and Reclamation Act of 1977 to any coal remining operation, including the application of such Act to suspended solids.

(33 U.S.C. 1311)

WATER QUALITY RELATED EFFLUENT LIMITATIONS

SEC. 302. (a) Whenever, in the judgment of the Administrator or as identified under section 304(l), discharges of pollutants from a point source or group of point sources, with the application of effluent limitations required under section 301(b)(2) of this Act, would interfere with the attainment or maintenance of that water quality in a specific portion of the navigable waters which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water, effluent limitations (including alternative effluent control strategies) for such point source or sources shall be established which can reasonably be expected to contribute to the attainment or maintenance of such water quality.

(b) MODIFICATIONS OF EFFLUENT LIMITATIONS.—

(1) NOTICE AND HEARING.—Prior to establishment of any effluent limitation pursuant to subsection (a) of this section, the Administrator shall publish such proposed limitation and within 90 days of such publication hold a public hearing.

(2) PERMITS.—

(A) NO REASONABLE RELATIONSHIP.—The Administrator, with the concurrence of the State, may issue a permit which modifies the effluent limitations required by subsection (a) of this section for pollutants other than toxic pollutants if the applicant demonstrates at such hearing that (whether or not technology or other alternative control strategies are available) there is no reasonable relationship between the economic and social costs and the benefits to be obtained (including attainment of the objective of this Act) from achieving such limitation.

(B) REASONABLE PROGRESS.—The Administrator, with the concurrence of the State, may issue a permit which modifies the effluent limitations required by subsection (a) of this section for toxic pollutants for a single period not to exceed 5 years if the applicant demonstrates to the satisfaction of the Administrator that such modified requirements (i) will represent the maximum degree of control within the economic capability of the owner and operator of the source, and (ii) will result in reasonable further progress beyond the requirements of section 301(b)(2) toward the requirements of subsection (a) of this section.

(c) The establishment of effluent limitations under this section shall not operate to delay the application of any effluent limitation established under section 301 of this Act.

(33 U.S.C. 1312)

WATER QUALITY STANDARDS AND IMPLEMENTATION PLANS

SEC. 303. (a)(1) In order to carry out the purpose of this Act, any water quality standard applicable to interstate waters which was adopted by any State and submitted to, and approved by, or is awaiting approval by, the Administrator pursuant to this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, shall remain in effect unless the Administrator determined that such standard is not consistent with the applicable requirements of this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972. If the Administrator makes such a determination he shall, within three months after the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, notify the State and specify the changes needed to meet such requirements. If such changes are not adopted by the State within ninety days after the date of such notification, the Administrator shall promulgate such changes in accordance with subsection (b) of this section.

(2) Any State which, before the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, has adopted, pursuant to its own law, water quality standards applicable to intrastate waters shall submit such standards to the Administrator within thirty days after the date of enactment of the Federal Water Pollution Control Act Amendments of 1972. Each such standard shall remain in effect, in the same manner and to the same extent as any other water quality standard established under this Act unless the Administrator determines that such standard is inconsistent with the applicable requirements of this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972. If the Administrator makes such a determination he shall not later than the one hun-

dred and twentieth day after the date of submission of such standards, notify the State and specify the changes needed to meet such requirements. If such changes are not adopted by the State within ninety days after such notification, the Administrator shall promulgate such changes in accordance with subsection (b) of this section.

(3)(A) Any State which prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972 has not adopted pursuant to its own laws water quality standards applicable to intrastate waters shall, not later than one hundred and eighty days after the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, adopt and submit such standards to the Administrator.

(B) If the Administrator determines that any such standards are consistent with the applicable requirements of this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, he shall approve such standards.

(C) If the Administrator determines that any such standards are not consistent with the applicable requirements of this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, he shall, not later than the ninetieth day after the date of submission of such standards, notify the State and specify the changes to meet such requirements. If such changes are not adopted by the State within ninety days after the date of notification, the Administrator shall promulgate such standards pursuant to subsection (b) of this section.

(b)(1) The Administrator shall promptly prepare and publish proposed regulations setting forth water quality standards for a State in accordance with the applicable requirements of this Act as in effect immediately prior to the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, if—

(A) the State fails to submit water quality standards within the times prescribed in subsection (a) of this section,

(B) a water quality standard submitted by such State under subsection (a) of this section is determined by the Administrator not to be consistent with the applicable requirements of subsection (a) of this section.

(2) The Administrator shall promulgate any water quality standard published in a proposed regulation not later than one hundred and ninety days after the date he publishes any such proposed standard, unless prior to such promulgation, such State has adopted a water quality standard which the Administrator determines to be in accordance with subsection (a) of this section.

(c)(1) The Governor of a State or the State water pollution control agency of such State shall from time to time (but at least once each three year period beginning with the date of enactment of the Federal Water Pollution Control Act Amendments of 1972) hold public hearings for the purpose of reviewing applicable water quality standards and, as appropriate, modifying and adopting standards. Results of such review shall be made available to the Administrator.

(2)(A) Whenever the State revises or adopts a new standard, such revised or new standard shall be submitted to the Administrator. Such revised or new water quality standard shall consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses. Such standards shall be such as to protect the public health or welfare, enhance the quality of water and serve the purposes of this Act. Such standards shall be established taking into consideration their use and value for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes, and also taking into consideration their use and value for navigation.

(B) Whenever a State reviews water quality standards pursuant to paragraph (1) of this subsection, or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria for all toxic pollutants listed pursuant to section 307(a)(1) of this Act for which criteria have been published under section 304(a), the discharge or presence of which in the affected waters could reasonably be expected to interfere with those designated uses adopted by the State, as necessary to support such designated uses. Such criteria shall be specific numerical criteria for such toxic pollutants. Where such numerical criteria are not available, whenever a State reviews water quality standards pursuant to paragraph (1), or revises or adopts new standards pursuant to this paragraph, such State shall adopt criteria based on biological monitoring or assessment methods consistent with information published pursuant to section 304(a)(8). Nothing in this section shall be construed to limit or delay the use of effluent limitations or other permit conditions based on or involving biological monitoring or assessment methods or previously adopted numerical criteria.

(3) If the Administrator, within sixty days after the date of submission of the revised or new standard, determines that such standard meets the requirements of this Act, such standard shall thereafter be the water quality standard for the applicable waters of that State. If the Administrator determines that any such revised or new standard is not consistent with the applicable requirements of this Act, he shall not later than the ninetieth day after the date of submission of such standard notify the State and specify the changes to meet such requirements. If such changes are not adopted by the State within ninety days after the date of notification, the Administrator shall promulgate such standard pursuant to paragraph (4) of this subsection.

(4) The Administrator shall promptly prepare and publish proposed regulations setting forth a revised or new water quality standard for the navigable waters involved—

(A) if a revised or new water quality standard submitted by such State under paragraph (3) of this subsection for such waters is determined by the Administrator not to be consistent with the applicable requirements of this Act, or

(B) in any case where the Administrator determines that a revised or new standard is necessary to meet the requirements of this Act.

The Administrator shall promulgate any revised or new standard under this paragraph not later than ninety days after he publishes such proposed standards, unless prior to such promulgation, such

State has adopted a revised or new water quality standard which the Administrator determines to be in accordance with this Act.

(d)(1)(A) Each State shall identify those waters within its boundaries for which the effluent limitations required by section 301(b)(1)(A) and section 301(b)(1)(B) are not stringent enough to implement any water quality standard applicable to such waters. The State shall establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters.

(B) Each State shall identify those waters or parts thereof within its boundaries for which controls on thermal discharges under section 301 are not stringent enough to assure protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife.

(C) Each State shall establish for the waters identified in paragraph (1)(A) of this subsection, and in accordance with the priority ranking, the total maximum daily load, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculation. Such load shall be established at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.

(D) Each State shall estimate for the waters identified in paragraph (1)(D) of this subsection the total maximum daily thermal load required to assure protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife. Such estimates shall take into account the normal water temperatures, flow rates, seasonal variations, existing sources of heat input, and the dissipative capacity of the identified waters or parts thereof. Such estimates shall include a calculation of the maximum heat input that can be made into each such part and shall include a margin of safety which takes into account any lack of knowledge concerning the development of thermal water quality criteria for such protection and propagation in the identified waters or parts thereof.

(2) Each State shall submit to the Administrator from time to time, with the first such submission not later than one hundred and eighty days after the date of publication of the first identification of pollutants under section 304(a)(2)(D), for his approval the waters identified and the loads established under paragraphs (1)(A), (1)(B), (1)(C), and (1)(D) of this subsection. The Administrator shall either approve or disapprove such identification and load not later than thirty days after the date of submission. If the Administrator approves such identification and load, such State shall incorporate them into its current plan under subsection (e) of this section. If the Administrator disapproves such identification and load, he shall not later than thirty days after the date of such disapproval identify such waters in such State and establish such loads for such waters as he determines necessary to implement the water quality standards applicable to such waters and upon such identification and establishment the State shall incorporate them into its current plan under subsection (e) of this section.

(3) For the specific purpose of developing information, each State shall identify all waters within its boundaries which it has

not identified under paragraph (1)(A) and (1)(B) of this subsection and estimate for such waters the total maximum daily load with seasonal variations and margins of safety, for those pollutants which the Administrator identifies under section 304(a)(2) as suitable for such calculation and for thermal discharges, at a level that would assure protection and propagation of a balanced indigenous population of fish, shellfish and wildlife.

(4) LIMITATIONS ON REVISION OF CERTAIN EFFLUENT LIMITATIONS.—

(A) STANDARD NOT ATTAINED.—For waters identified under paragraph (1)(A) where the applicable water quality standard has not yet been attained, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section may be revised only if (i) the cumulative effect of all such revised effluent limitations based on such total maximum daily load or waste load allocation will assure the attainment of such water quality standard, or (ii) the designated use which is not being attained is removed in accordance with regulations established under this section.

(B) STANDARD ATTAINED.—For waters identified under paragraph (1)(A) where the quality of such waters equals or exceeds levels necessary to protect the designated use for such waters or otherwise required by applicable water quality standard, any effluent limitation based on a total maximum daily load or other waste load allocation established under this section, or any water quality standard established under this section, or any other permitting standard may be revised only if such revision is subject to and consistent with the antidegradation policy established under this section.

(e)(1) Each State shall have a continuing planning process approved under paragraph (2) of this subsection which is consistent with this Act.

(2) Each State shall submit not later than 120 days after the date of the enactment of the Water Pollution Control Amendments of 1972 to the Administrator for his approval a proposed continuing planning process which is consistent with this Act. Not later than thirty days after the date of submission of such a process the Administrator shall either approve or disapprove such process. The Administrator shall from time to time review each State's approved planning process for the purpose of insuring that such planning process is at all times consistent with this Act. The Administrator shall not approve any State permit program under title IV of this Act for any State which does not have an approved continuing planning process under this section.

(3) The Administrator shall approve any continuing planning process submitted to him under this section which will result in plans for all navigable waters within such State, which include, but are not limited to, the following:

(A) effluent limitations and schedules of compliance at least as stringent as those required by section 301(b)(1), section 301(b)(2), section 306, and section 307, and at least as stringent as any requirements contained in any applicable water quality standard in effect under authority of this section;

(B) the incorporation of all elements of any applicable areawide waste management plans under section 208, and applicable basin plans under section 209 of this Act;

(C) total maximum daily load for pollutants in accordance with subsection (d) of this section;

(D) procedures for revision;

(E) adequate authority for intergovernmental cooperation;

(F) adequate implementation, including schedules of compliance, for revised or new water quality standards, under subsection (c) of this section;

(G) controls over the disposition of all residual waste from any water treatment processing;

(H) an inventory and ranking, in order of priority, of needs for construction of waste treatment works required to meet the applicable requirements of sections 301 and 302.

(f) Nothing in this section shall be construed to affect any effluent limitation, or schedule of compliance required by any State to be implemented prior to the dates set forth in sections 301(b)(1) and 301(b)(2) nor to preclude any State from requiring compliance with any effluent limitation or schedule of compliance at dates earlier than such dates.

(g) Water quality standards relating to heat shall be consistent with the requirements of section 316 of this Act.

(h) For the purposes of this Act the term “water quality standards” includes thermal water quality standards.

(i) COASTAL RECREATION WATER QUALITY CRITERIA.—

(1) ADOPTION BY STATES.—

(A) INITIAL CRITERIA AND STANDARDS.—Not later than 42 months after the date of the enactment of this subsection, each State having coastal recreation waters shall adopt and submit to the Administrator water quality criteria and standards for the coastal recreation waters of the State for those pathogens and pathogen indicators for which the Administrator has published criteria under section 304(a).

(B) NEW OR REVISED CRITERIA AND STANDARDS.—Not later than 36 months after the date of publication by the Administrator of new or revised water quality criteria under section 304(a)(9), each State having coastal recreation waters shall adopt and submit to the Administrator new or revised water quality standards for the coastal recreation waters of the State for all pathogens and pathogen indicators to which the new or revised water quality criteria are applicable.

(2) FAILURE OF STATES TO ADOPT.—

(A) IN GENERAL.—If a State fails to adopt water quality criteria and standards in accordance with paragraph (1)(A) that are as protective of human health as the criteria for pathogens and pathogen indicators for coastal recreation waters published by the Administrator, the Administrator shall promptly propose regulations for the State setting forth revised or new water quality standards for pathogens and pathogen indicators described in paragraph (1)(A) for coastal recreation waters of the State.

(B) EXCEPTION.—If the Administrator proposes regulations for a State described in subparagraph (A) under subsection (c)(4)(B), the Administrator shall publish any revised or new standard under this subsection not later than 42 months after the date of the enactment of this subsection.

(3) APPLICABILITY.—Except as expressly provided by this subsection, the requirements and procedures of subsection (c) apply to this subsection, including the requirement in subsection (c)(2)(A) that the criteria protect public health and welfare.

(33 U.S.C. 1313)

INFORMATION AND GUIDELINES

SEC. 304. (a)(1) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after the date of enactment of this title (and from time to time thereafter revise) criteria for water quality accurately reflecting the latest scientific knowledge (A) on the kind and extent of all identifiable effects on health and welfare including, but not limited to, plankton, fish, shellfish, wildlife, plant life, shorelines, beaches, esthetics, and recreation which may be expected from the presence of pollutants in any body of water, including ground water; (B) on the concentration and dispersal of pollutants, or their byproducts, through biological, physical, and chemical processes; and (C) on the effects of pollutants on biological community diversity, productivity, and stability, including information on the factors affecting rates of eutrophication and rates of organic and inorganic sedimentation for varying types of receiving waters.

(2) The Administrator, after consultation with appropriate Federal and State agencies and other interested persons, shall develop and publish, within one year after the date of enactment of this title (and from time to time thereafter revise) information (A) on the factors necessary to restore and maintain the chemical, physical, and biological integrity of all navigable waters, ground waters, waters of the contiguous zone, and the oceans; (B) on the factors necessary for the protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters and to allow recreational activities in and on the water; and (C) on the measurement and classification of water quality; and (D) for the purpose of section 303, on and the identification of pollutants suitable for maximum daily load measurement correlated with the achievement of water quality objectives.

(3) Such criteria and information and revisions thereof shall be issued to the States and shall be published in the Federal Register and otherwise made available to the public.

(4) The Administrator shall, within 90 days after the date of enactment of the Clean Water Act of 1977 and from time to time thereafter, publish and revise as appropriate information identifying conventional pollutants, including but not limited to, pollut-

NATIONAL STANDARDS OF PERFORMANCE

SEC. 306. (a) For purposes of this section:

(1) The term "standard of performance" means a standard for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.

(2) The term "new source" means any source, the construction of which is commenced after the publication of proposed regulations prescribing a standard of performance under this section which will be applicable to such sources, if such standard is thereafter promulgated in accordance with this section.

(3) The term "source" means any building, structure, facility, or installation from which there is or may be the discharge of pollutants.

(4) The term "owner or operator" means any person who owns, leases, operates, controls, or supervises a source.

(5) The term "construction" means any placement, assembly, or installation of facilities or equipment (including contractual obligations to purchase such facilities or equipment) at the premises where such equipment will be used, including preparation work at such premises.

(b)(1)(A) The Administrator shall, within ninety days after the date of enactment of this title publish (and from time to time thereafter shall revise) a list of categories of sources, which shall, at the minimum, include:

pulp and paper mills;
paperboard, builders paper and board mills;
meat product and rendering processing;
dairy product processing;
grain mills;
canned and preserved fruits and vegetables processing;
canned and preserved seafood processing;
sugar processing;
textile mills;
cement manufacturing;
feedlots;
electroplating;
organic chemicals manufacturing;
inorganic chemicals manufacturing;
plastic and synthetic materials manufacturing;
soap and detergent manufacturing
fertilizer manufacturing;
petroleum refining;
iron and steel manufacturing;
nonferrous metals manufacturing;
phosphate manufacturing;
steam electric powerplants;
ferroalloy manufacturing;
leather tanning and finishing;
glass and asbestos manufacturing;

rubber processing; and
timber products processing.

(B) As soon as practicable, but in no case more than one year, after a category of sources is included in a list under subparagraph (A) of this paragraph, the Administrator shall propose and publish regulations establishing Federal standards of performance for new sources within such category. The Administrator shall afford interested persons an opportunity for written comment on such proposed regulations. After considering such comments, he shall promulgate, within one hundred and twenty days after publication of such proposed regulations, such standards with such adjustments as he deems appropriate. The Administrator shall, from time to time, as technlogy and alternatives change, revise such standards following the procedure required by this subsection for promulgation of such standards. Standards of performance, or revisions thereof, shall become effective upon promulgation. In establishing or revising Federal standards of performance for new sources under this section, the Administrator shall take into consideration the cost of achieving such effluent reduction, and any non-water quality environmental impact and energy requirements.

(2) The Administrator may distinguish among classes, types, and sizes within categories of new sources for the purpose of establishing such standards and shall consider the type of process employed (including whether batch or continuous).

(3) The provisions of this section shall apply to any new source owned or operated by the United States.

(c) Each State may develop and submit to the Administrator a procedure under State law for applying and enforcing standards of performance for new sources located in such State. If the Administrator finds that the procedure and the law of any State require the application and enforcement of standards of performance to at least the same extent as required by this section, such State is authorized to apply and enforce such standards of performance (except with respect to new sources owned or operated by the United States).

(d) Notwithstanding any other provision of this Act, any point source the construction of which is commenced after the date of enactment of the Federal Water Pollution Control Act Amendments of 1972 and which is so constructed as to meet all applicable standards of performance shall not be subject to any more stringent standard of performance during a ten-year period beginning on the date of completion of such construction or during the period of depreciation or amortization of such facility for the purposes of section 167 or 169 (or both) of the Internal Revenue Code of 1954, whichever period ends first.

(e) After the effective date of standards of performance promulgated under this section, it shall be unlawful for any owner or operator of any new source to operate such source in violation of any standard of performance applicable to such source.

(33 U.S.C. 1316)

Lakes Tribes (as defined in 40 CFR 132.2) to conform to section 118 of the Clean Water Act and 40 CFR part 132, are provided in 40 CFR part 132.

[60 FR 15386, Mar. 23, 1995]

§ 131.2 Purpose.

A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria that protect the designated uses. States adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (the Act). ''Serve the purposes of the Act'' (as defined in sections 101(a)(2) and 303(c) of the Act) means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water and take into consideration their use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation.

Such standards serve the dual purposes of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond the technology-based levels of treatment required by sections 301(b) and 306 of the Act.

[48 FR 51405, Nov. 8, 1983, as amended at 80 FR 51046, Aug. 21, 2015]

§ 131.3 Definitions.

(a) *The Act* means the Clean Water Act (Pub. L. 92–500, as amended (33 U.S.C. 1251 *et seq.*)).

(b) *Criteria* are elements of State water quality standards, expressed as constituent concentrations, levels, or narrative statements, representing a quality of water that supports a particular use. When criteria are met, water quality will generally protect the designated use.

(c) *Section 304(a) criteria* are developed by EPA under authority of section 304(a) of the Act based on the latest scientific information on the relationship that the effect of a constituent concentration has on particular aquatic species and/or human health. This information is issued periodically to the States as guidance for use in developing criteria.

(d) *Toxic pollutants* are those pollutants listed by the Administrator under section 307(a) of the Act.

(e) *Existing uses* are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards.

(f) *Designated uses* are those uses specified in water quality standards for each water body or segment whether or not they are being attained.

(g) *Use attainability analysis* is a structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors as described in § 131.10(g).

(h) *Water quality limited segment* means any segment where it is known that water quality does not meet applicable water quality standards, and/or is not expected to meet applicable water quality standards, even after the application of the technology-based effluent limitations required by sections 301(b) and 306 of the Act.

(i) *Water quality standards* are provisions of State or Federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act.

(j) *States* include: The 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, and Indian Tribes that EPA determines to be eligible for purposes of the water quality standards program.

(k) *Federal Indian Reservation, Indian Reservation*, or *Reservation* means all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and including rights-of-way running through the reservation.''

NMED EXHIBIT 20

information which has not been submitted in a previous application.

(c) *Procedure for processing an Indian Tribe's application.* (1) The Regional Administrator shall process an application of an Indian Tribe submitted pursuant to §131.8(b) in a timely manner. He shall promptly notify the Indian Tribe of receipt of the application.

(2) Within 30 days after receipt of the Indian Tribe's application the Regional Administrator shall provide appropriate notice. Notice shall:

(i) Include information on the substance and basis of the Tribe's assertion of authority to regulate the quality of reservation waters; and

(ii) Be provided to all appropriate governmental entities.

(3) The Regional Administrator shall provide 30 days for comments to be submitted on the Tribal application. Comments shall be limited to the Tribe's assertion of authority.

(4) If a Tribe's asserted authority is subject to a competing or conflicting claim, the Regional Administrator, after due consideration, and in consideration of other comments received, shall determine whether the Tribe has adequately demonstrated that it meets the requirements of §131.8(a)(3).

(5) Where the Regional Administrator determines that a Tribe meets the requirements of this section, he shall promptly provide written notification to the Indian Tribe that the Tribe is authorized to administer the Water Quality Standards program.

[56 FR 64895, Dec. 12, 1991, as amended at 59 FR 64344, Dec. 14, 1994]

Subpart B—Establishment of Water Quality Standards

§ 131.10 Designation of uses.

(a) Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. If adopting new or revised designated uses other than the uses specified in section 101(a)(2) of the Act, or removing designated uses, States must submit documentation justifying how their consideration of the use and value of water for those uses listed in this paragraph appropriately supports the State's action. A use attainability analysis may be used to satisfy this requirement. In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.

(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

(c) States may adopt sub-categories of a use and set the appropriate criteria to reflect varying needs of such sub-categories of uses, for instance, to differentiate between cold water and warm water fisheries.

(d) At a minimum, uses are deemed attainable if they can be achieved by the imposition of effluent limits required under sections 301(b) and 306 of the Act and cost-effective and reasonable best management practices for nonpoint source control.

(e) [Reserved]

(f) States may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses, however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season.

(g) States may designate a use, or remove a use that is *not* an existing use, if the State conducts a use attainability analysis as specified in paragraph (j) of this section that demonstrates attaining the use is not feasible because of one of the six factors in this paragraph. If a State adopts a new or revised water quality standard based on a required use attainability analysis, the State shall also adopt the highest attainable use, as defined in §131.3(m).

NMED EXHIBIT 20

(1) Naturally occurring pollutant concentrations prevent the attainment of the use; or

(2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

(6) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

(h) States may not remove designated uses if:

(1) They are existing uses, as defined in §131.3, unless a use requiring more stringent criteria is added; or

(2) Such uses will be attained by implementing effluent limits required under sections 301(b) and 306 of the Act and by implementing cost-effective and reasonable best management practices for nonpoint source control.

(i) Where existing water quality standards specify designated uses less than those which are presently being attained, the State shall revise its standards to reflect the uses actually being attained.

(j) A State must conduct a use attainability analysis as described in §131.3(g), and paragraph (g) of this section, whenever:

(1) The State designates for the first time, or has previously designated for a water body, uses that do not include the uses specified in section 101(a)(2) of the Act; or

(2) The State wishes to remove a designated use that is specified in section 101(a)(2) of the Act, to remove a sub-category of such a use, or to designate a sub-category of such a use that requires criteria less stringent than previously applicable.

(k) A State is not required to conduct a use attainability analysis whenever:

(1) The State designates for the first time, or has previously designated for a water body, uses that include the uses specified in section 101(a)(2) of the Act; or

(2) The State designates a sub-category of a use specified in section 101(a)(2) of the Act that requires criteria at least as stringent as previously applicable; or

(3) The State wishes to remove or revise a designated use that is a non-101(a)(2) use. In this instance, as required by paragraph (a) of this section, the State must submit documentation justifying how its consideration of the use and value of water for those uses listed in paragraph (a) appropriately supports the State's action, which may be satisfied through a use attainability analysis.

[48 FR 51405, Nov. 8, 1983, as amended at 80 FR 51047, Aug. 21, 2015]

§ 131.11 Criteria.

(a) *Inclusion of pollutants:* (1) States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

(2) *Toxic pollutants.* States must review water quality data and information on discharges to identify specific water bodies where toxic pollutants may be adversely affecting water quality or the attainment of the designated water use or where the levels of toxic pollutants are at a level to warrant concern and must adopt criteria for such toxic pollutants applicable to the

the antidegradation policy and implementing method shall be consistent with section 316 of the Act.

(b) The State shall develop methods for implementing the antidegradation policy that are, at a minimum, consistent with the State's policy and with paragraph (a) of this section. The State shall provide an opportunity for public involvement during the development and any subsequent revisions of the implementation methods, and shall make the methods available to the public.

[48 FR 51405, Nov. 8, 1983, as amended at 80 FR 51047, Aug. 21, 2015]

§ 131.13 General policies.

States may, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances. Such policies are subject to EPA review and approval.

§ 131.14 Water quality standards variances.

States may adopt WQS variances, as defined in § 131.3(o). Such a WQS variance is subject to the provisions of this section and public participation requirements at § 131.20(b). A WQS variance is a water quality standard subject to EPA review and approval or disapproval.

(a) *Applicability*. (1) A WQS variance may be adopted for a permittee(s) or water body/waterbody segment(s), but only applies to the permittee(s) or water body/waterbody segment(s) specified in the WQS variance.

(2) Where a State adopts a WQS variance, the State must retain, in its standards, the underlying designated use and criterion addressed by the WQS variance, unless the State adopts and EPA approves a revision to the underlying designated use and criterion consistent with §§ 131.10 and 131.11. All other applicable standards not specifically addressed by the WQS variance remain applicable.

(3) A WQS variance, once adopted by the State and approved by EPA, shall be the applicable standard for purposes of the Act under § 131.21(d) through (e), for the following limited purposes. An approved WQS variance applies for the purposes of developing NPDES permit limits and requirements under 301(b)(1)(C), where appropriate, consistent with paragraph (a)(1) of this section. States and other certifying entities may also use an approved WQS variance when issuing certifications under section 401 of the Act.

(4) A State may not adopt WQS variances if the designated use and criterion addressed by the WQS variance can be achieved by implementing technology-based effluent limits required under sections 301(b) and 306 of the Act.

(b) *Requirements for Submission to EPA*. (1) A WQS variance must include:

(i) Identification of the pollutant(s) or water quality parameter(s), and the water body/waterbody segment(s) to which the WQS variance applies. Discharger(s)-specific WQS variances must also identify the permittee(s) subject to the WQS variance.

(ii) The requirements that apply throughout the term of the WQS variance. The requirements shall represent the highest attainable condition of the water body or waterbody segment applicable throughout the term of the WQS variance based on the documentation required in (b)(2) of this section. The requirements shall not result in any lowering of the currently attained ambient water quality, unless a WQS variance is necessary for restoration activities, consistent with paragraph (b)(2)(i)(A)(*2*) of this section. The State must specify the highest attainable condition of the water body or waterbody segment as a quantifiable expression that is one of the following:

(A) For discharger(s)-specific WQS variances:

(*1*) The highest attainable interim criterion; or

(*2*) The interim effluent condition that reflects the greatest pollutant reduction achievable; or

(*3*) If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.

NMED EXHIBIT 20

(B) For WQS variances applicable to a water body or waterbody segment:

(*1*) The highest attainable interim use and interim criterion; or

(*2*) If no additional feasible pollutant control technology can be identified, the interim use and interim criterion that reflect the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the State adopts the WQS variance, and the adoption and implementation of a Pollutant Minimization Program.

(iii) A statement providing that the requirements of the WQS variance are either the highest attainable condition identified at the time of the adoption of the WQS variance, or the highest attainable condition later identified during any reevaluation consistent with paragraph (b)(1)(v) of this section, whichever is more stringent.

(iv) The term of the WQS variance, expressed as an interval of time from the date of EPA approval or a specific date. The term of the WQS variance must only be as long as necessary to achieve the highest attainable condition and consistent with the demonstration provided in paragraph (b)(2) of this section. The State may adopt a subsequent WQS variance consistent with this section.

(v) For a WQS variance with a term greater than five years, a specified frequency to reevaluate the highest attainable condition using all existing and readily available information and a provision specifying how the State intends to obtain public input on the reevaluation. Such reevaluations must occur no less frequently than every five years after EPA approval of the WQS variance and the results of such reevaluation must be submitted to EPA within 30 days of completion of the reevaluation.

(vi) A provision that the WQS variance will no longer be the applicable water quality standard for purposes of the Act if the State does not conduct a reevaluation consistent with the frequency specified in the WQS variance or the results are not submitted to EPA as required by (b)(1)(v) of this section.

(2) The supporting documentation must include:

(i) Documentation demonstrating the need for a WQS variance.

(A) For a WQS variance to a use specified in section 101(a)(2) of the Act or a sub-category of such a use, the State must demonstrate that attaining the designated use and criterion is not feasible throughout the term of the WQS variance because:

(*1*) One of the factors listed in §131.10(g) is met, or

(*2*) Actions necessary to facilitate lake, wetland, or stream restoration through dam removal or other significant reconfiguration activities preclude attainment of the designated use and criterion while the actions are being implemented.

(B) For a WQS variance to a non-101(a)(2) use, the State must submit documentation justifying how its consideration of the use and value of the water for those uses listed in §131.10(a) appropriately supports the WQS variance and term. A demonstration consistent with paragraph (b)(2)(i)(A) of this section may be used to satisfy this requirement.

(ii) Documentation demonstrating that the term of the WQS variance is only as long as necessary to achieve the highest attainable condition. Such documentation must justify the term of the WQS variance by describing the pollutant control activities to achieve the highest attainable condition, including those activities identified through a Pollutant Minimization Program, which serve as milestones for the WQS variance.

(iii) In addition to paragraphs (b)(2)(i) and (ii) of this section, for a WQS variance that applies to a water body or waterbody segment:

(A) Identification and documentation of any cost-effective and reasonable best management practices for nonpoint source controls related to the pollutant(s) or water quality parameter(s) and water body or waterbody segment(s) specified in the WQS variance that could be implemented to make progress towards attaining the underlying designated use and criterion. A State must provide public notice and comment for any such documentation.

(B) Any subsequent WQS variance for a water body or waterbody segment

NMED EXHIBIT 20

must include documentation of whether and to what extent best management practices for nonpoint source controls were implemented to address the pollutant(s) or water quality parameter(s) subject to the WQS variance and the water quality progress achieved.

(c) *Implementing WQS variances in NPDES permits.* A WQS variance serves as the applicable water quality standard for implementing NPDES permitting requirements pursuant to §122.44(d) of this chapter for the term of the WQS variance. Any limitations and requirements necessary to implement the WQS variance shall be included as enforceable conditions of the NPDES permit for the permittee(s) subject to the WQS variance.

[80 FR 51048, Aug. 21, 2015]

§ 131.15 Authorizing the use of schedules of compliance for water quality-based effluent limits in NPDES permits.

If a State intends to authorize the use of schedules of compliance for water quality-based effluent limits in NPDES permits, the State must adopt a permit compliance schedule authorizing provision. Such authorizing provision is a water quality standard subject to EPA review and approval under section 303 of the Act and must be consistent with sections 502(17) and 301(b)(1)(C) of the Act.

[80 FR 51049, Aug. 21, 2015]

Subpart C—Procedures for Review and Revision of Water Quality Standards

§ 131.20 State review and revision of water quality standards.

(a) *State review.* The State shall from time to time, but at least once every 3 years, hold public hearings for the purpose of reviewing applicable water quality standards adopted pursuant to §§131.10 through 131.15 and Federally promulgated water quality standards and, as appropriate, modifying and adopting standards. The State shall also re-examine any waterbody segment with water quality standards that do not include the uses specified in section 101(a)(2) of the Act every 3 years to determine if any new information has become available. If such new information indicates that the uses specified in section 101(a)(2) of the Act are attainable, the State shall revise its standards accordingly. Procedures States establish for identifying and reviewing water bodies for review should be incorporated into their Continuing Planning Process. In addition, if a State does not adopt new or revised criteria for parameters for which EPA has published new or updated CWA section 304(a) criteria recommendations, then the State shall provide an explanation when it submits the results of its triennial review to the Regional Administrator consistent with CWA section 303(c)(1) and the requirements of paragraph (c) of this section.

(b) *Public participation.* The State shall hold one or more public hearings for the purpose of reviewing water quality standards as well as when revising water quality standards, in accordance with provisions of State law and EPA's public participation regulation (40 CFR part 25). The proposed water quality standards revision and supporting analyses shall be made available to the public prior to the hearing.

(c) *Submittal to EPA.* The State shall submit the results of the review, any supporting analysis for the use attainability analysis, the methodologies used for site-specific criteria development, any general policies applicable to water quality standards and any revisions of the standards to the Regional Administrator for review and approval, within 30 days of the final State action to adopt and certify the revised standard, or if no revisions are made as a result of the review, within 30 days of the completion of the review.

[48 FR 51405, Nov. 8, 1983, as amended at 80 FR 51049, Aug. 21, 2015]

§ 131.21 EPA review and approval of water quality standards.

(a) After the State submits its officially adopted revisions, the Regional Administrator shall either:

(1) Notify the State within 60 days that the revisions are approved, or

(2) Notify the State within 90 days that the revisions are disapproved. Such notification of disapproval shall

specify the changes needed to assure compliance with the requirements of the Act and this regulation, and shall explain why the State standard is not in compliance with such requirements. Any new or revised State standard must be accompanied by some type of supporting analysis.

(b) The Regional Administrator's approval or disapproval of a State water quality standard shall be based on the requirements of the Act as described in §§131.5 and 131.6, and, with respect to Great Lakes States or Tribes (as defined in 40 CFR 132.2), 40 CFR part 132.

(c) *How do I determine which water quality standards are applicable for purposes of the Act?* You may determine which water quality standards are applicable water quality standards for purposes of the Act from the following table:

If—	Then—	Unless or until—	In which case—
(1) A State or authorized Tribe has adopted a water quality standard that is effective under State or Tribal law and has been submitted to EPA before May 30, 2000 . . .	. . . the State or Tribe's water quality standard is the applicable water quality standard for purposes of the Act . . .	. . . EPA has promulgated a more stringent water quality standard for the State or Tribe that is in effect . . .	. . . the EPA-promulgated water quality standard is the applicable water quality standard for purposes of the Act until EPA withdraws the Federal water quality standard.
(2) A State or authorized Tribe adopts a water quality standard that goes into effect under State or Tribal law on or *after* May 30, 2000 . . .	. . . once EPA approves that water quality standard, it becomes the applicable water quality standard for purposes of the Act . . .	. . . EPA has promulgated a more stringent water quality standard for the State or Tribe that is in effect . . .	. . . the EPA promulgated water quality standard is the applicable water quality standard for purposes of the Act until EPA withdraws the Federal water quality standard.

(d) *When do I use the applicable water quality standards identified in paragraph (c) above?* Applicable water quality standards for purposes of the Act are the minimum standards which must be used when the CWA and regulations implementing the CWA refer to water quality standards, for example, in identifying impaired waters and calculating TMDLs under section 303(d), developing NPDES permit limitations under section 301(b)(1)(C), evaluating proposed discharges of dredged or fill material under section 404, and in issuing certifications under section 401 of the Act.

(e) *For how long does an applicable water quality standard for purposes of the Act remain the applicable water quality standard for purposes of the Act?* A State or authorized Tribe's applicable water quality standard for purposes of the Act remains the applicable standard until EPA approves a change, deletion, or addition to that water quality standard, or until EPA promulgates a more stringent water quality standard.

(f) *How can I find out what the applicable standards are for purposes of the Act?* In each Regional office, EPA maintains a docket system for the States and authorized Tribes in that Region, available to the public, identifying the applicable water quality standards for purposes of the Act.

[48 FR 51405, Nov. 8, 1983, as amended at 60 FR 15387, Mar. 23, 1995; 65 FR 24653, Apr. 27, 2000]

§ 131.22 EPA promulgation of water quality standards.

(a) If the State does not adopt the changes specified by the Regional Administrator within 90 days after notification of the Regional Administrator's disapproval, the Administrator shall promptly propose and promulgate such standard.

(b) The Administrator may also propose and promulgate a regulation, applicable to one or more navigable waters, setting forth a new or revised standard upon determining such a standard is necessary to meet the requirements of the Act. To constitute an Administrator's determination that a new or revised standard is necessary to meet the requirements of the Act, such determination must:

(1) Be signed by the Administrator or his or her duly authorized delegate, and

NMED EXHIBIT 20

(l) *Areawide agency.* An agency designated under section 208 of the Act, which has responsibilities for WQM planning within a specified area of a State.

(m) *Best Management Practice (BMP).* Methods, measures or practices selected by an agency to meet its nonpoint source control needs. BMPs include but are not limited to structural and nonstructural controls and operation and maintenance procedures. BMPs can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

(n) *Designated management agency (DMA).* An agency identified by a WQM plan and designated by the Governor to implement specific control recommendations.

[50 FR 1779, Jan. 11, 1985, as amended at 54 FR 14359, Apr. 11, 1989]

§ 130.3 Water quality standards.

A water quality standard (WQS) defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States and EPA adopt WQS to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (CWA). *Serve the purposes of Act* (as defined in sections 101(a)(2) and 303(c) of the Act) means that WQS should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water and take into consideration their use and value for public water supplies, propagation of fish, shellfish, wildlife, recreation in and on the water, and agricultural, industrial and other purposes including navigation.

Such standards serve the dual purposes of establishing the water quality goals for a specific water body and serving as the regulatory basis for establishment of water quality-based treatment controls and strategies beyond the technology-based level of treatment required by sections 301(b) and 306 of the Act. States shall review and revise WQS in accordance with applicable regulations and, as appropriate, update their Water Quality Management (WQM) plans to reflect such revisions. Specific WQS requirements are found in 40 CFR part 131.

§ 130.4 Water quality monitoring.

(a) In accordance with section 106(e)(1), States must establish appropriate monitoring methods and procedures (including biological monitoring) necessary to compile and analyze data on the quality of waters of the United States and, to the extent practicable, ground-waters. This requirement need not be met by Indian Tribes. However, any monitoring and/or analysis activities undertaken by a Tribe must be performed in accordance with EPA's quality assurance/quality control guidance.

(b) The State's water monitoring program shall include collection and analysis of physical, chemical and biological data and quality assurance and control programs to assure scientifically valid data. The uses of these data include determining abatement and control priorities; developing and reviewing water quality standards, total maximum daily loads, wasteload allocations and load allocations; assessing compliance with National Pollutant Discharge Elimination System (NPDES) permits by dischargers; reporting information to the public through the section 305(b) report and reviewing site-specific monitoring efforts.

[50 FR 1779, Jan. 11, 1985, as amended at 54 FR 14359, Apr. 11, 1989]

§ 130.5 Continuing planning process.

(a) *General.* Each State shall establish and maintain a continuing planning process (CPP) as described under section 303(e)(3)(A)–(H) of the Act. Each State is responsible for managing its water quality program to implement the processes specified in the continuing planning process. EPA is responsible for periodically reviewing the adequacy of the State's CPP.

(b) *Content.* The State may determine the format of its CPP as long as the mininum requirements of the CWA and this regulation are met. The following processes must be described in each State CPP, and the State may include other processes at its discretion.

NMED EXHIBIT 21

(1) The process for developing effluent limitations and schedules of compliance at least as stringent as those required by sections 301(b) (1) and (2), 306 and 307, and at least stringent as any requirements contained in applicable water quality standards in effect under authority of section 303 of the Act.

(2) The process for incorporating elements of any applicable areawide waste treatment plans under section 208, and applicable basin plans under section 209 of the Act.

(3) The process for developing total maximum daily loads (TMDLs) and individual water quality based effluent limitations for pollutants in accordance with section 303(d) of the Act and §130.7(a) of this regulation.

(4) The process for updating and maintaining Water Quality Management (WQM) plans, including schedules for revision.

(5) The process for assuring adequate authority for intergovernmental cooperation in the implementation of the State WQM program.

(6) The process for establishing and assuring adequate implementation of new or revised water quality standards, including schedules of compliance, under section 303(c) of the Act.

(7) The process for assuring adequate controls over the disposition of all residual waste from any water treatment processing.

(8) The process for developing an inventory and ranking, in order of priority of needs for construction of waste treatment works required to meet the applicable requirements of sections 301 and 302 of the Act.

(9) The process for determining the priority of permit issuance.

(c) *Regional Administrator review.* The Regional Administrator shall review approved State CPPs from time to time to ensure that the planning processes are consistent with the Act and this regulation. The Regional Administrator shall not approve any permit program under Title IV of the Act for any State which does not have an approved continuing planning process.

§ 130.6 Water quality management plans.

(a) *Water quality management (WQM) plans.* WQM plans consist of initial plans produced in accordance with sections 208 and 303(e) of the Act and certified and approved updates to those plans. Continuing water quality planning shall be based upon WQM plans and water quality problems identified in the latest 305(b) reports. State water quality planning should focus annually on priority issues and geographic areas and on the development of water quality controls leading to implementation measures. Water quality planning directed at the removal of conditions placed on previously certified and approved WQM plans should focus on removal of conditions which will lead to control decisions.

(b) *Use of WQM plans.* WQM plans are used to direct implementation. WQM plans draw upon the water quality assessments to identify priority point and nonpoint water quality problems, consider alternative solutions and recommend control measures, including the financial and institutional measures necessary for implementing recommended solutions. State annual work programs shall be based upon the priority issues identified in the State WQM plan.

(c) *WQM plan elements.* Sections 205(j), 208 and 303 of the Act specify water quality planning requirements. The following plan elements shall be included in the WQM plan or referenced as part of the WQM plan if contained in separate documents when they are needed to address water quality problems.

(1) *Total maximum daily loads.* TMDLs in accordance with sections 303(d) and (e)(3)(C) of the Act and §130.7 of this part.

(2) *Effluent limitations.* Effluent limitations including water quality based effluent limitations and schedules of compliance in accordance with section 303(e)(3)(A) of the Act and §130.5 of this part.

(3) *Municipal and industrial waste treatment.* Identification of anticipated municipal and industrial waste treatment works, including facilities for treatment of stormwater-induced combined sewer overflows; programs to

NMED EXHIBIT 21

(1) The process for developing effluent limitations and schedules of compliance at least as stringent as those required by sections 301(b) (1) and (2), 306 and 307, and at least stringent as any requirements contained in applicable water quality standards in effect under authority of section 303 of the Act.

(2) The process for incorporating elements of any applicable areawide waste treatment plans under section 208, and applicable basin plans under section 209 of the Act.

(3) The process for developing total maximum daily loads (TMDLs) and individual water quality based effluent limitations for pollutants in accordance with section 303(d) of the Act and §130.7(a) of this regulation.

(4) The process for updating and maintaining Water Quality Management (WQM) plans, including schedules for revision.

(5) The process for assuring adequate authority for intergovernmental cooperation in the implementation of the State WQM program.

(6) The process for establishing and assuring adequate implementation of new or revised water quality standards, including schedules of compliance, under section 303(c) of the Act.

(7) The process for assuring adequate controls over the disposition of all residual waste from any water treatment processing.

(8) The process for developing an inventory and ranking, in order of priority of needs for construction of waste treatment works required to meet the applicable requirements of sections 301 and 302 of the Act.

(9) The process for determining the priority of permit issuance.

(c) *Regional Administrator review.* The Regional Administrator shall review approved State CPPs from time to time to ensure that the planning processes are consistent with the Act and this regulation. The Regional Administrator shall not approve any permit program under Title IV of the Act for any State which does not have an approved continuing planning process.

§ 130.6 Water quality management plans.

(a) *Water quality management (WQM) plans.* WQM plans consist of initial plans produced in accordance with sections 208 and 303(e) of the Act and certified and approved updates to those plans. Continuing water quality planning shall be based upon WQM plans and water quality problems identified in the latest 305(b) reports. State water quality planning should focus annually on priority issues and geographic areas and on the development of water quality controls leading to implementation measures. Water quality planning directed at the removal of conditions placed on previously certified and approved WQM plans should focus on removal of conditions which will lead to control decisions.

(b) *Use of WQM plans.* WQM plans are used to direct implementation. WQM plans draw upon the water quality assessments to identify priority point and nonpoint water quality problems, consider alternative solutions and recommend control measures, including the financial and institutional measures necessary for implementing recommended solutions. State annual work programs shall be based upon the priority issues identified in the State WQM plan.

(c) *WQM plan elements.* Sections 205(j), 208 and 303 of the Act specify water quality planning requirements. The following plan elements shall be included in the WQM plan or referenced as part of the WQM plan if contained in separate documents when they are needed to address water quality problems.

(1) *Total maximum daily loads.* TMDLs in accordance with sections 303(d) and (e)(3)(C) of the Act and §130.7 of this part.

(2) *Effluent limitations.* Effluent limitations including water quality based effluent limitations and schedules of compliance in accordance with section 303(e)(3)(A) of the Act and §130.5 of this part.

(3) *Municipal and industrial waste treatment.* Identification of anticipated municipal and industrial waste treatment works, including facilities for treatment of stormwater-induced combined sewer overflows; programs to

NMED EXHIBIT 22

provide necessary financial arrangements for such works; establishment of construction priorities and schedules for initiation and completion of such treatment works including an identification of open space and recreation opportunities from improved water quality in accordance with section 208(b)(2) (A) and (B) of the Act.

(4) *Nonpoint source management and control.* (i) The plan shall describe the regulatory and non-regulatory programs, activities and Best Management Practices (BMPs) which the agency has selected as the means to control nonpoint source pollution where necessary to protect or achieve approved water uses. Economic, institutional, and technical factors shall be considered in a continuing process of identifying control needs and evaluating and modifying the BMPs as necessary to achieve water quality goals.

(ii) Regulatory programs shall be identified where they are determined to be necessary by the State to attain or maintain an approved water use or where non-regulatory approaches are inappropriate in accomplishing that objective.

(iii) BMPs shall be identified for the nonpoint sources identified in section 208(b)(2)(F)–(K) of the Act and other nonpoint sources as follows:

(A) *Residual waste.* Identification of a process to control the disposition of all residual waste in the area which could affect water quality in accordance with section 208(b)(2)(J) of the Act.

(B) *Land disposal.* Identification of a process to control the disposal of pollutants on land or in subsurface excavations to protect ground and surface water quality in accordance with section 208(b)(2)(K) of the Act.

(C) *Agricultural and silvicultural.* Identification of procedures to control agricultural and silvicultural sources of pollution in accordance with section 208(b)(2)(F) of the Act.

(D) *Mines.* Identification of procedures to control mine-related sources of pollution in accordance with section 208(b)(2)(G) of the Act.

(E) *Construction.* Identification of procedures to control construction related sources of pollution in accordance with section 208(b)(2)(H) of the Act.

(F) *Saltwater intrusion.* Identification of procedures to control saltwater intrusion in accordance with section 208(b)(2)(I) of the Act.

(G) *Urban stormwater.* Identification of BMPs for urban stormwater control to achieve water quality goals and fiscal analysis of the necessary capital and operations and maintenance expenditures in accordance with section 208(b)(2)(A) of the Act.

(iv) The nonpoint source plan elements outlined in §130.6(c) (4)(iii)(A)(G) of this regulation shall be the basis of water quality activities implemented through agreements or memoranda of understanding between EPA and other departments, agencies or instrumentalities of the United States in accordance with section 304(k) of the Act.

(5) *Management agencies.* Identification of agencies necessary to carry out the plan and provision for adequate authority for intergovernmental cooperation in accordance with sections 208(b)(2)(D) and 303(e)(3)(E) of the Act. Management agencies must demonstrate the legal, institutional, managerial and financial capability and specific activities necessary to carry out their responsibilities in accordance with section 208(c)(2)(A) through (I) of the Act.

(6) *Implementation measures.* Identification of implementation measures necessary to carry out the plan, including financing, the time needed to carry out the plan, and the economic, social and environmental impact of carrying out the plan in accordance with section 208(b)(2)(E).

(7) *Dredge or fill program.* Identification and development of programs for the control of dredge or fill material in accordance with section 208(b)(4)(B) of the Act.

(8) *Basin plans.* Identification of any relationship to applicable basin plans developed under section 209 of the Act.

(9) *Ground water.* Identification and development of programs for control of ground-water pollution including the provisions of section 208(b)(2)(K) of the Act. States are not required to develop ground-water WQM plan elements beyond the requirements of section 208(b)(2)(K) of the Act, but may develop a ground-water plan element if they determine it is necessary to address a

NMED EXHIBIT 22

ground-water quality problem. If a State chooses to develop a ground-water plan element, it should describe the essentials of a State program and should include, but is not limited to:

(i) Overall goals, policies and legislative authorities for protection of ground-water.

(ii) Monitoring and resource assessment programs in accordance with section 106(e)(1) of the Act.

(iii) Programs to control sources of contamination of ground-water including Federal programs delegated to the State and additional programs authorized in State statutes.

(iv) Procedures for coordination of ground-water protection programs among State agencies and with local and Federal agencies.

(v) Procedures for program management and administration including provision of program financing, training and technical assistance, public participation, and emergency management.

(d) *Indian Tribes.* An Indian Tribe is eligible for the purposes of this rule and the Clean Water Act assistance programs under 40 CFR part 35, subparts A and H if:

(1) The Indian Tribe has a governing body carrying out substantial governmental duties and powers;

(2) The functions to be exercised by the Indian Tribe pertain to the management and protection of water resources which are held by an Indian Tribe, held by the United States in trust for Indians, held by a member of an Indian Tribe if such property interest is subject to a trust restriction on alienation, or otherwise within the borders of an Indian reservation; and

(3) The Indian Tribe is reasonably expected to be capable, in the Regional Administrator's judgment, of carrying out the functions to be exercised in a manner consistent with the terms and purposes of the Clean Water Act and applicable regulations.

(e) *Update and certification.* State and/or areawide agency WQM plans shall be updated as needed to reflect changing water quality conditions, results of implementation actions, new requirements or to remove conditions in prior conditional or partial plan approvals. Regional Administrators may require that State WQM plans be updated as needed. State Continuing Planning Processes (CPPs) shall specify the process and schedule used to revise WQM plans. The State shall ensure that State and areawide WQM plans together include all necessary plan elements and that such plans are consistent with one another. The Governor or the Governor's designee shall certify by letter to the Regional Administrator for EPA approval that WQM plan updates are consistent with all other parts of the plan. The certification may be contained in the annual State work program.

(f) *Consistency.* Construction grant and permit decisions must be made in accordance with certified and approved WQM plans as described in §§130.12(a) and 130.12(b).

[50 FR 1779, Jan. 11, 1985, as amended at 54 FR 14360, Apr. 11, 1989; 59 FR 13818, Mar. 23, 1994]

§ 130.7 Total maximum daily loads (TMDL) and individual water quality-based effluent limitations.

(a) *General.* The process for identifying water quality limited segments still requiring wasteload allocations, load allocations and total maximum daily loads (WLAs/LAs and TMDLs), setting priorities for developing these loads; establishing these loads for segments identified, including water quality monitoring, modeling, data analysis, calculation methods, and list of pollutants to be regulated; submitting the State's list of segments identified, priority ranking, and loads established (WLAs/LAs/TMDLs) to EPA for approval; incorporating the approved loads into the State's WQM plans and NPDES permits; and involving the public, affected dischargers, designated areawide agencies, and local governments in this process shall be clearly described in the State Continuing Planning Process (CPP).

(b) Identification and priority setting for water quality-limited segments still requiring TMDLs.

(1) Each State shall identify those water quality-limited segments still requiring TMDLs within its boundaries for which:

NMED EXHIBIT 22

NMED EXHIBIT 22

NEW MEXICO ENVIRONMENT DEPARTMENT

Surface Water Quality Bureau

Public Involvement Plan (PIP): Nutrient Temporary Standard for the Raton WWTP (NPDES Permit No. NM0020273)

September 2019

APPROVAL PAGE

Shelly Lemon — Digitally signed by Shelly Lemon Date: 2019.09.23 13:41:31 -06'00'

Shelly Lemon — Date
Chief, Surface Water Quality Bureau

Jennifer Fullam for Kris Barrios — Digitally signed by Jennifer Fullam for Kris Barrios Date: 2019.09.25 09:47:48 -06'00'

Kris Barrios — Date
Program Manager, Surface Water Quality Bureau

I. Public Involvement Plan (PIP) Overview

The New Mexico Environment Department (Department), Surface Water Quality Bureau (Bureau) developed this Public Involvement Plan (PIP) for the discharger-specific nutrient temporary standard proposal developed for the City of Raton Wastewater Treatment Plant (National Pollutant Discharge Elimination System [NPDES] permit no. NM0020273) (hereafter Raton WWTP). The Bureau encourages the public to learn about and get involved in regulatory decision-making opportunities. The purpose of this PIP is to provide public participation opportunities and information that may be needed to participate in the rule-making process. This PIP integrates information about the community and identifies resources needed by the Bureau to successfully incorporate community participation activities into the decision-making process for the TMDLs. The PIP identifies the Department staff and resources needed to accomplish these activities. The Bureau will meet the public participation requirements for the Raton WWTP Nutrient Temporary Standard by following this PIP, which includes all applicable policy, regulatory and statutory public participation requirements.

In developing this PIP, community participation needs were assessed to ensure appropriate promotion of public outreach by identifying whether there is a combination of environmental and demographic factors (i.e., low income community, minority community, limited English proficiency individuals, Linguistically Isolated Households, etc.) that may impact public participation.[1] This assessment identifies community outreach needs, provides for public access opportunities, and underscores the provision of adequate public access to information about the Raton WWTP Nutrient Temporary Standard.

As much as possible, public participation and informational activities related to the Raton WWTP Nutrient Temporary Standard will be held within the timelines outlined in the table below. This timeline is tentative and subject to change. Per federal requirement, a 30-day public review and comment period is allotted.

More detailed information about planned Bureau outreach is available in this PIP.

Activity	Dates**
Notice PIP (invite public input)	October 2019
Public Comment Period	30-day review October 1-31, 2019
Public Meeting (optional+)	October 2019
Request WQCC Hearing	November 12, 2019
Hearing Notice in NM Register and one newspaper of general circulation	December 2019
WQCC Hearing	April 2020

\+ "Optional" public participation actions are not required by any regulation but may be implemented by the SWQB if considerable public interest is expressed.

** Dates are tentative and subject to change.

This PIP is a "living" document that may be amended after considering public comments and feedback. The Bureau Chief provides final approval of the PIP and amendments.

[1] See IV. Location and Demographics – Demographic Summary below.

II. Bureau Contacts

If you have questions regarding the Raton WWTP Temporary Standard, the public review and approval process, the Bureau's website, or this PIP, please contact:

Shelly Lemon, Bureau Chief
Surface Water Quality Bureau
1190 St. Francis Dr.
Santa Fe, NM 87505

Phone: (505) 827-2819
Email: Shelly.Lemon@state.nm.us

Jennifer Fullam, WQS Coordinator
Surface Water Quality Bureau
1190 St. Francis Dr.
Santa Fe, NM 87505

Phone: (505) 827-2637
Email: Jennifer.Fullam@state.nm.us

A. Non-English Language Speaker Assistance and Accommodations

Non-English speakers may call the Bureau contact listed in this PIP and request language assistance services, such as an interpreter, so they can learn more about the Raton Wastewater Treatment Plant nutrient temporary standard proposal.

- The Bureau will send a notice in English and Spanish to the Bureau's email listserv announcing the comment period for the Raton WWTP Nutrient Temporary Standard.
- The Bureau will publish the hearing notice for the Raton WWTP Temporary Standard.
- Notices and outreach materials will be in English and Spanish and will include information on how non-English speaking persons or persons with disabilities can obtain assistance.
- If non-English speaking individuals contact the Bureau, bureau staff will work with the Department's interpreter to provide language assistance, either through immediately available staff, or through contracted translation services.
- If individuals with accessibility needs contact the Bureau, bureau staff will work with the Department's Non-Discrimination Coordinator to address the request.
- If a non-English speaking individual provides written comment during the public comment period for consideration during the public comment period, the Bureau will communicate the response to the LEP individual in the preferred language.

B. Department Websites

New Mexico Environment Department - https://www.env.nm.gov/
Surface Water Quality Bureau - https://www.env.nm.gov/surface-water-quality/

C. Water Quality Standards Website

The Bureau maintains a website location for Water Quality Standards (see website address below). The website will be kept up to date and has information about the site and important documents.
https://www.env.nm.gov/surface-water-quality/wqs/
https://www.env.nm.gov/surface-water-quality/ts-raton/ (specific to the Raton WWTP Temporary Standard)

III. Regulatory Framework

In 2017, the New Mexico Water Quality Control Commission (Commission or WQCC) approved the New Mexico water quality standards (WQS) regulation creating a framework for adopting temporary standards. In promulgating this regulation, the Commission sought to address situations where water quality-based effluent limits are not achievable by creating a clear path to compliance that is achievable and affordable in the near-term and encourages improvements to water quality. The New Mexico temporary standards regulation is based on the U.S. Environmental Protection Agency (EPA) regulation on water quality standard variances at 40 *Code of Federal Regulations* (CFR) 131.14. EPA approved the New Mexico regulation as Clean Water Act (CWA) effective on August 11, 2017.

A temporary standard could be an appropriate tool for implementing New Mexico's WQS when a petitioner demonstrates that the underlying designated use and criterion are not attainable now or within a defined period of time but may be attainable in the future. The purpose of this proposal is to apply the State's framework established in 20.6.4 NMAC to the Raton WWTP to request a temporary standard from the underlying water quality standards for plant nutrients (i.e., total phosphorus and total nitrogen). Once a temporary standard has been adopted by the Commission and approved by EPA under CWA section 303(c), it is effective for CWA purposes and serves as the applicable water quality standard from which federal NPDES permits must derive from and comply with as enforceable limits and conditions.

The public participation requirements of specific water quality programs are specified in 40 CFR Section 25.4 and described in the Water Quality Management Plan and Continuous Planning Process (WQMP/CPP)[2]. At a minimum, the public participation process for New Mexico's water quality programs consists of the following:

- Providing the public with the information and assistance necessary for meaningful involvement;
- Providing a central location of reports, studies, plans, and other documents;
- Maintaining a list of affected or interested parties and stakeholders; and
- Notifying stakeholders in a timely fashion prior to consideration of major decisions (generally at least 30 days).

To fulfill this requirement, the Bureau invites the public to comment on the draft Raton WWTP Nutrient Temporary Standard proposal for consideration and inclusion in the final proposal. If you would like to comment directly to the Bureau, please send written comments to the Bureau contacts listed above in Section II.

IV. Location and Demographics

The temporary standard is a discharger-specific nutrient temporary standard for the Raton WWTP in Colfax County, New Mexico. The WWTP discharges to Doggett Creek which is a tributary to Raton Creek, Chicorica Creek, and the Canadian River. Doggett Creek (AU ID NM-2305.A_255) is located in the Raton Creek 12-digit hydrologic unit code (HUC) 110800010104 in northeastern New Mexico.

Demographic Summary

Demographic indicators were obtained from EPA EJSCREEN, an environmental justice screening and mapping tool, available on-line at https://www.epa.gov/ejscreen. EJSCREEN is based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports. Users choose the geographic area of interest by indicating a point, line or polygon on the map; users may also choose to select a "buffer" area (up to 10 miles) around the point, line or polygon to better capture the affected community. EJSCREEN then provides a report that describes demographic and environmental information for that area, with or without an assigned buffer**.** The 2012-2016 ACS Report link in EJSCREEN provides a report with U.S. Census Bureau American Community Survey (ACS) data in PDF

[2] The specific public outreach requirements for monitoring surveys are contained in Section XIV of the WQMP/CPP (https://www.env.nm.gov/surface-water-quality/protocols-and-planning/)

format. The 2012-2016 ACS, through EJSCREEN, provided quantitative information regarding demographic indicators.

Summary of Site-Specific EJSCREEN Inputs for Raton WWTP Nutrient Temporary Standard

- Community of Concern = Raton, New Mexico
- Buffer = 4-mile radius around the discharge for the WWTP

The 2012-2016 ACS Report indicates that the total population of the area of interest is 6,875. The total number of households is 3,057. The per capita income is $18,916 which is 61% of the U.S. per capita income of $31,177 (Source: U.S. Census, 2013-2017, Per capita income in past 12 months, April 2018 to April 2019, in 2017 dollars, https://www.census.gov/quickfacts/fact/table/US/SEX255217).

The percent minority population and percent of population by race is 60% minority; 85% of the community identifies as white and 11% identify exclusively as some other race. The percent of persons that communicate in a language other than English (non-English) at home is 20% (1,260 individuals), with 5% (326 individuals) speaking English "less than very well." From the Bureau's EJScreen analysis, there are 148 Linguistically Isolated Households in this community (116 or 78% of which speak Spanish). These results indicate that the percentage of non-English-speaking communication in this community is significant and various demographic factors (i.e. low-income community, minority community, limited English proficiency individuals, Linguistically Isolated Households, etc.) will likely impact public participation.

It is important for the Bureau to incorporate the linguistic and communication needs of New Mexico communities when conducting public outreach and participation activities. To help accomplish this, for this activity, the Bureau will provide information in Spanish and in English for public comment notices, public meeting notices, and other announcements (radio broadcasts, brochures, signs, postcards, etc.), and strive to make public participation efforts as inclusive as possible within Bureau budget and time limitations.

V. Public Participation & Outreach Activities

The public may ask questions about the Raton WWTP Nutrient Temporary Standard at any time. Interested community members do not need to wait for a formal public comment period to contact the Bureau. However, the Bureau emphasizes that to be included in the administrative record, comments solicited by public notices must be submitted during the noticed comment periods and hearings, and in accordance with the public notice.

Specific outreach activities related to the Raton WWTP Nutrient Temporary Standard include:

- Developing a public notice announcing the opening of the 30-day public comment period,
- Posting this notice to the Bureau's website,
- Emailing this public notice to Bureau's extensive email list through the GovDelivery e-mail delivery service (1,719 email addresses as of September 18, 2019), and

Copies of the Raton WWTP Nutrient Temporary Standard may be obtained via download from the Bureau's website at https://www.env.nm.gov/surface-water-quality/ts-raton/ or by contacting Jennifer Fullam at (505) 827-2637, Jennifer.Fullam@state.nm.us, NMED SWQB, P.O. Box 5469, Santa Fe, New Mexico, 87502. Additionally, the public may request to review document at the Bureau or one of the information repositories listed below.

Based on the demographics report discussed in the PIP, basic information about public involvement opportunities will be in both English and Spanish. This information will include how to request materials in Spanish or to speak with Bureau staff through an interpreter. Further details about public participation for this activity are outlined below.

A. Postal Mailing or E-Mailing of Notices to Persons on the Surface Water Quality Bureau's Email List

The Bureau maintains an extensive email list (1,719 email addresses as of September 18, 2019),) that includes individuals interested in surface water quality issues and activities. This list is a combination of all previously interested persons who requested the Bureau provide them with information about surface water quality in New Mexico. The Bureau regularly maintains contact information which is updated or supplemented, if additional information is found. Interested persons providing both an address and email may receive physical mail and an email. Additional individuals, organizations, and other interested parties are added to the email list as requested.

B. Email Updates

The Bureau's email list is regularly updated and is available on the Bureau's website at: https://www.env.nm.gov/surface-water-quality/ by clicking on the "*Subscribe to SWQB News*" button on the bottom of the home page. The Bureau's website liaison is Heidi Henderson at 505-827-2901 (or email heidi.henderson@state.nm.us).

C. Public Meeting Notices, Public Comment Notices, and Other Notices

Based on the Bureau's evaluation of the community, public notices will be translated into Spanish and English. In addition, the Bureau may post notices on the Department's Events Calendar at: https://www.env.nm.gov/events/.

D. Informational Pamphlets

The Bureau may develop informational pamphlets for the Raton WWTP Nutrient Temporary Standard. To the extent such informational pamphlets are produced, the Bureau may determine whether they will be available in languages other than English, online (e.g., Bureau website) and in print (hardcopy) at the information repositories listed in this PIP. They may also be distributed via email to interested organizations and individuals, including those who sign up for email notices through the website.

E. Public Comment Period

The 30-day public comment period on the Raton WWTP Nutrient Temporary Standard is planned to start October 1, 2019, and end October 31, 2019, at 5:00 p.m.

F. Other Outreach

Other means of outreach such as flyers announcing public comment periods may be posted in locations throughout the community (e.g., local businesses, schools, libraries) and on the Department's website, at the Bureau's discretion after consideration of public interest and input.

G. Information Repositories

Copies of the Raton WWTP Nutrient Temporary Standard may be obtained via download from the

Bureau's website at https://www.env.nm.gov/surface-water-quality/ts-raton/, or by contacting Jennifer Fullam at (505) 827-2637, Jennifer.Fullam@state.nm.us, NMED SWQB, P.O. Box 5469, Santa Fe, New Mexico, 87502.

Post offices, community centers and public libraries, at the Bureau's discretion after consideration of public interest and input, may serve as access areas for the Bureau to leave hard copies of important documents and information about how to comment on the Raton WWTP Nutrient Temporary Standard. The following is a list of locations where hard copies will be available to the community:

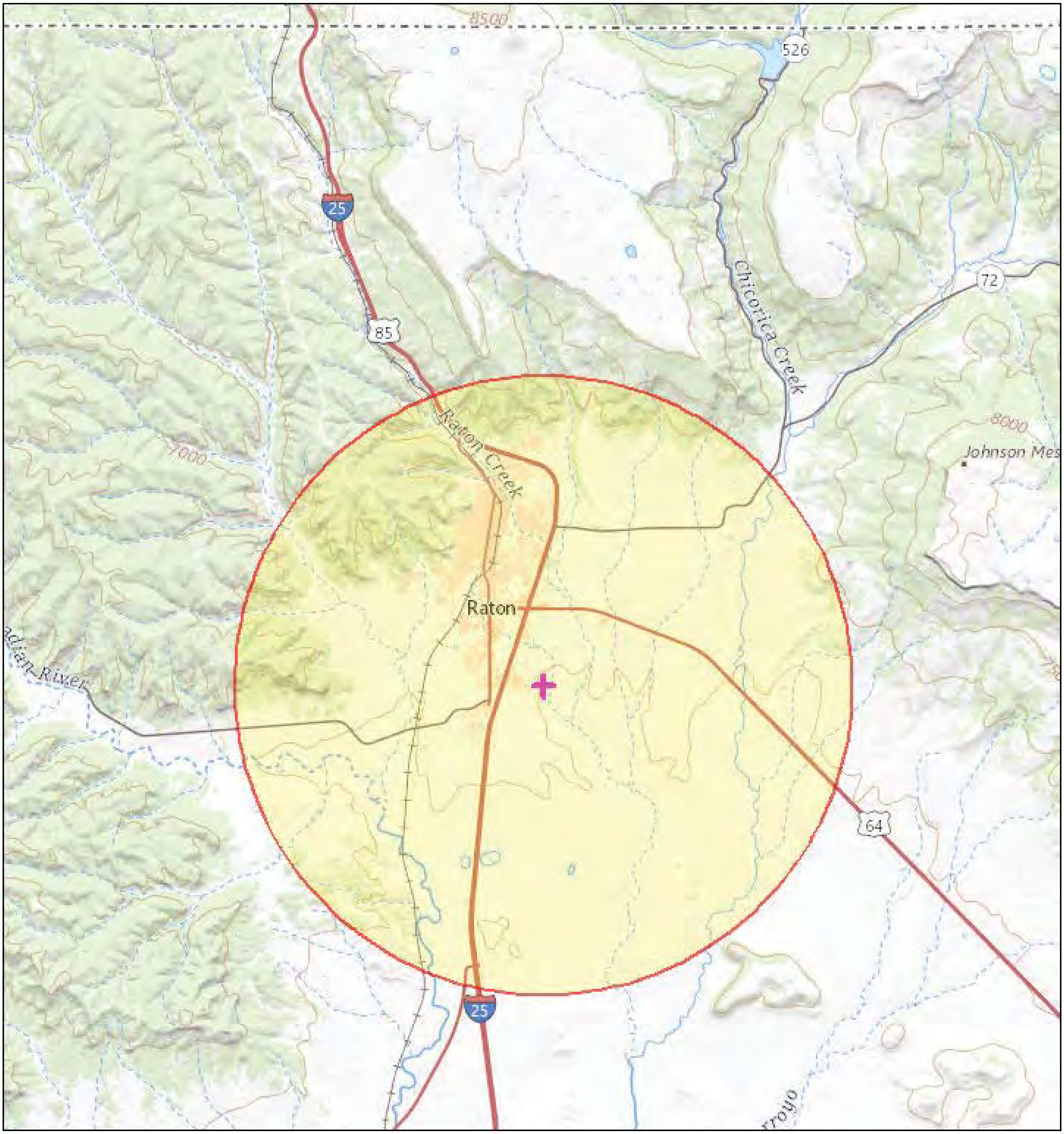
None identified at this time.

H. WQS Proceedings, Outcomes and Responses to Comments

Following close of the public comment period and prior to the hearing to adopt the proposed language, the Bureau will review the comments and prepare a document entitled "Response to Comments." The "Response to Comments" will be sent to respondents that submitted comment and included as an Exhibit in the hearing for the adoption of the temporary water quality standard under Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC). All filings for the hearing will be available to the public via download from the Commission website, or upon request. The Commission hearing will be open to the public. Their exact schedule and proposed agendas are maintained on the Commission's website[3]. The Standards for Interstate and Intrastate Surface Waters, as approved by the Commission, will then be filed with the States Records and Archives for publication in the New Mexico Register and made effective for State purposes. The effective rule is then submitted to the U.S. Environmental Protection Agency Region 6 for review and approval for purposes of the Clean Water Act.

[3] https://www.env.nm.gov/water-quality-control-commission/wqcc/

Raton WWTP with 4-mile Buffer



September 9, 2019

1:144,448

0 1.25 2.5 5 mi

0 2 4 8 km

Buffer Area

Digitized Point

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S.

NMED EXHIBIT 23

EJSCREEN 2018

2020

Nutrient Temporary Standards for:
City of Raton Wastewater Treatment Plant
NPDES Permit No. NM0020273 to Doggett Creek

NMED EXHIBIT 24

Prepared by

New Mexico Environment Department

Surface Water Quality Bureau

Public Draft Released: October 1, 2019

Water Quality Control Commission Approval Date: Month Day, 2020

U.S. EPA Approval Date: Month Day, 2020

Revision Date(s): ____

For additional information please visit:

https://www.env.nm.gov/surface-water-quality/

~or~

1190 St. Francis Drive Santa Fe, New Mexico 87505

Table of Contents

Background

Nutrients are one of the leading causes of water quality impairment in New Mexico waters. According to the state's 2018-2020 Integrated Report, nutrients are the second leading cause of impairment in New Mexico perennial rivers and streams and the fourth leading cause of impairment in lakes and reservoirs, impairing 1,140 miles and 5,750 acres, respectively. Nutrient pollution in waterbodies results in large daily swings of dissolved oxygen (DO), which can change aquatic community dynamics. In some cases, these changes can result in nuisance algal blooms that lead to fish kills and other harmful effects, such as harmful algal blooms, considerably reduced recreational opportunities, and taste and odor problems in drinking water.

New Mexico's Narrative Nutrient Criterion and Nutrient Thresholds

Water quality standards regulations in 20.6.4 NMAC include a narrative criterion for distinguishing nutrient conditions that contribute to production of undesirable or nuisance aquatic life. The criterion states, "*Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state*" (20.6.4.13.E NMAC). The state interprets this narrative criterion using numeric nutrient threshold values, which are based on reference conditions and applied to specific site classes in perennial, wadable streams, as shown in Table 1.

Table 1. New Mexico Nutrient Thresholds for Each Site Class (Jessup 2015)

	TN (mg/L)			TP (mg/L)		
	TN Flat	TN Moderate	TN Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
Threshold	0.69	0.42	0.30	0.105	0.061	0.030

Notes: mg/L = milligram per liter; TN = total nitrogen; TP = total phosphorus.

Facilities discharging to surface waters covered by the thresholds will likely need water quality-based effluent limits (WQBELs) for nutrients. Because of the limited available dilution in many receiving waters, some facilities will have WQBELs (whether based on total maximum daily loads or not) that require the threshold concentrations to be met "end-of-pipe." However, these required WQBELs might not be economically or technologically achievable for many permittees.

New Mexico's Temporary Standards Regulation

In 2017, the New Mexico Water Quality Control Commission (Commission) approved the New Mexico water quality standards (WQS) regulation creating a framework for adopting temporary standards. In promulgating this regulation, the Commission sought to address situations where WQBELs are not achievable by creating a clear path to compliance that is achievable and affordable in the near-term and encourages improvements to water quality. The New Mexico temporary standards regulation is based on the U.S. Environmental Protection Agency (EPA) regulation on WQS variances at 40 *Code of Federal Regulations* (CFR) 131.14. EPA approved the New Mexico regulation as Clean Water Act (CWA) effective on August 11, 2017.

A temporary standard could be an appropriate tool for implementing New Mexico's WQS when a petitioner demonstrates that the underlying designated use and criterion, including numeric interpretations of narrative criteria, are not attainable now or within a defined period of time but may be attainable in the future. A temporary standard may be appropriate when all of the following are met:

1. Existing or proposed discharge control technologies will comply with applicable technology-based effluent limitations, feasible technological controls and other management alternatives;
2. The underlying designated use and criterion, including numeric interpretations of narrative criteria, are not attainable now or within a defined period of time, but may be attainable in the longer term;
3. It is feasible to make incremental improvements in water quality during the proposed term of the temporary standard;
4. The temporary standard will not result in any lowering of currently attained ambient water quality, unless the temporary standard will be used for restoration activities (20.6.4.10.F(1)(b) NMAC, 40 CFR 131.14(b)(2)(i)(A)(2)).

As discussed above, New Mexico's temporary standards regulation at 20.6.4.10(F) NMAC is based on the EPA regulation on WQS variances at 40 CFR 131.14. The New Mexico regulation defines a temporary standard as "a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition (HAC) during the term of the temporary standard" (20.6.4.10.F.12 NMAC). For a temporary standard that applies to a specific discharger, the HAC, which may be considered synonymous with New Mexico's definition of "highest degree of protection feasible in the short-term," must be a quantifiable expression that is one of the following (40 CFR 131.14(b)(1)(ii)(A)):

1. The highest attainable interim criterion; or
2. The interim effluent condition that reflects the greatest pollutant reduction achievable; or
3. If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the state adopts the WQS variance (temporary standard), and the adoption and implementation of a pollutant minimization program (PMP)[1].

By reflecting the HAC, a temporary standard provides a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. Note also that if a temporary standard has a term longer than 5 years, the HAC must be re-evaluated at least once every five (5) years with the opportunity for public input (40 CFR 131.14(b)(1)(v)).

The New Mexico regulations state that "Any person may petition the commission to adopt a temporary standard applicable to all or part of a surface water of the state as provided for in this section and applicable subsections in 40 CFR 131.14" (20.6.4.10.F.1 NMAC). These regulations also specify that the petitioner for a temporary standard must demonstrate that attainment of the underlying designated use and criterion is not attainable in the short term based on one of the following seven factors:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or
2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or

[1] A PMP is a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings (40 CFR 131.3(p)).

3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or
4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
5. Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6. Controls more stringent than those required by sections 301(b) and 306 of the CWA would result in substantial and widespread economic and social impact; or
7. Due to the implementation of actions necessary to facilitate restoration such as through dam removal or other significant wetland or water body reconfiguration activities as demonstrated by the petition and supporting work plan requirements in Paragraphs (4) and (5) of Subsection F of 20.6.4.10 NMAC (in federal regulation at 40 CFR 131.14(b)(2)(i)(A)(2) “Actions necessary to facilitate lake, wetland, or stream restoration through dam removal or other significant reconfiguration activities preclude attainment of the designated use and criterion while the actions are being implemented.”).

New Mexico’s regulation outlines documentation requirements for a temporary standard petition submitted to the Water Quality Control Commission (WQCC) to demonstrate how the proposed temporary standard meets the requirements, including demonstrating that attainment of the underlying designated use and criterion is not feasible and that the proposed temporary standard represents the HAC.

Purpose

The purpose of this proposal is to apply the State’s framework established in 20.6.4 NMAC to the City of Raton Wastewater Treatment Plant (National Pollutant Discharge Elimination System [NPDES] permit no. NM0020273) (hereafter Raton WWTP) to request a temporary standard from the underlying water quality standards for plant nutrients (i.e., total phosphorus and total nitrogen). Once a temporary standard has been adopted by the WQCC and approved by EPA under CWA section 303(c), it is effective for CWA purposes and serves as the applicable WQS from which federal CWA permits must derive from and comply with as enforceable limits and conditions (20.6.4.12 NMAC).

Attainment of the underlying designated use and criterion is not feasible for the Raton WWTP, and the temporary standard represents the highest attainable condition during the term of the temporary standard. All other designated uses and associated criteria not specified in this temporary standard remain applicable for all CWA and New Mexico Water Quality Act (WQA) purposes and are required through NPDES permit no. NM0020273.

Discharger/Receiving Waters:
The only discharger to be permitted under the terms and conditions of this temporary standard is the Raton WWTP (NM0020273) within the City of Raton in Colfax County, New Mexico. The WWTP discharges to Doggett Creek which is a tributary to Raton Creek, Chicorica Creek, and the Canadian River. Doggett Creek (AU ID NM-2305.A_255) is located in the Raton Creek 12-digit hydrologic unit code (HUC) 110800010104 in northeastern New Mexico. There are no other permitted discharges to Doggett Creek; however, the City of Raton Water Treatment Facility (NPDES #NM0029891) is permitted to discharge to Raton Creek approximately four miles upstream of its confluence with Doggett Creek.

Site Background

Raton is the county seat of Colfax County and is located approximately six and a half miles south of Raton Pass on the Colorado-New Mexico border. Other nearby towns include Maxwell (25 miles), Cimarron (40 miles), Springer (40 miles), and Folsom (35 miles) in New Mexico and Trinidad (20 miles) in Colorado. According to the U.S. Census of 2000, the City covers eight square miles with 7,282 people, 3,035 households, and 1,981 families residing within the city's boundaries. Almost 31% of the households had children under the age of 18 living with them; 31% of the households were individuals with 14% of those households being individuals 65 years of age or older; and 35% of the households were non-families. The median income for a household in the City was $27,028, the median income for a family was $31,762, and the per capita income was $14,223. About 15% of families and 17% of the population were below the poverty line in 2000. Since then, the population of Raton dropped to 6,885 in the 2010 Census and was estimated to have dropped to 6,066 by July 1, 2018. The adjusted median household income based on January 2017$ is $29,773.

Watershed Description

Doggett Creek is part of the larger Canadian Headwaters watershed, which is bounded by the Sangre de Cristo Mountains to the west and the Great Plains to the east. From a point south-southeast of Maxwell, NM to its headwaters, the HUC drains approximately 1,725 square miles. Elevation ranges from 11,610 feet above sea level at Vermejo Peak to 5,640 feet at USGS Gage 07211500 near Taylor Springs, NM. Tributaries in this watershed include: Caliente Canyon Creek, York Canyon Creek, Leandro Creek, Vermejo River, VanBremmer Creek, Raton Creek, Chicorica Creek, Uña de Gato Creek, Blosser Arroyo, and Tinaja Creek. The upper portion of Leandro Creek in Valle Vidal Unit of the Carson National Forest is designated as an Outstanding National Resource Water (ONRW). However, Leandro Creek is a tributary to the Vermejo River, which enters the Canadian River south of Maxwell, NM, approximately 30 miles south of the Raton WWTP discharge, and is not expected to be influenced or impacted by this temporary standard.

The geology of the Canadian Headwaters watershed is characterized by sandstone, shale, mudstone, and claystone that are flanked by limestone or calcareous rocks in the west and mafic volcanic rocks in the east. Land cover in the New Mexico portion of watershed is 49% grassland, 31% evergreen forest, 15% shrub/scrub and 2% deciduous forest. Much of the land ownership is private with the exceptions of Maxwell National Wildlife Refuge and a small portion of the Valle Vidal in the headwaters of Leandro Creek. The average annual precipitation in Colfax County is 16.34 inches. Average annual snowfall in the watershed is 72 inches (or 7.2 inches of precipitation).

Water Quality Standards and Designated Uses

Doggett Creek is classified as a perennial water in New Mexico's surface water quality standards[2] (20.6.4.99 NMAC) with designated uses of warmwater aquatic life, livestock watering, wildlife habitat and primary contact. Doggett Creek is listed on the 2018-2020 Integrated List[3] as impaired due to nutrients and *E. coli* bacteria. The nutrient impairment was first identified in 1998 with data from the 1980s and 1990s. Subsequent sampling results from 2006 and 2015-2016 confirmed the nutrient impairment. Doggett Creek was most recently sampled during NMED's 2015-2016 Canadian watershed survey. Total nitrogen and total phosphorus thresholds were exceeded in 100% of the samples at the

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[2] https://www.env.nm.gov/surface-water-quality/wqs/

[3] https://www.env.nm.gov/surface-water-quality/303d-305b/

station below the Raton WWTP, with a documented diel dissolved oxygen (DO) swing of 13.41 mg/L and periodic DO concentrations below 5.0 mg/L for greater than 4 hours.

Currently Attained Water Quality

Based on current effluent limitations in NPDES permit no. NM0020273 and the Raton Creek Watershed Total Maximum Daily Load Implementation Plan for the City of Raton WWTP (Appendix D), implementation of this temporary standard will not result in the lowering of existing water quality. The temporary standard includes an implementation schedule for improvements (Appendix C). The current effluent quality will be improved during the term of the temporary standard as described in this proposal. In addition, according to the NPDES permit, the City of Raton is required to conduct a Whole Effluent Toxicity (WET) Test once per year.

Biological Evaluation of Threatened and Endangered Species

Since the unattainable water quality standard is an *aquatic life criterion*, NMED and EPA must ensure that granting the variance is not likely to jeopardize the continued existence of any threatened or endangered species listed under the Endangered Species Act or result in the destruction or adverse modification of such species' critical habitat (per OAR-340-041-0059(1)(b)(B)). Threatened and endangered species in the Raton Creek watershed include the New Mexican Meadow Jumping Mouse (*Zapus hudsonius luteus*), Canada Lynx (*Lynx canadensis*), North American Wolverine (*Gulo gulo luscus*), Mexican Spotted Owl (*Strix occidentalis lucida*), Piping Plover (*Charadrius melodus*), and Southwestern Willow Flycatcher (*Empidonax trailii extimus*). There are no critical habitats identified in this watershed (USFWS Information for Planning and Consultation, IPaC, *https://ecos.fws.gov/ipac/*).

It is not anticipated that granting this temporary standard will jeopardize threatened and endangered species or result in the destruction or adverse modification of critical habitat. Nor should the temporary standard jeopardize natural communities of conservation concern (e.g., emergent wetland, riverine wetland, prairie, glade, fen) because habitat will not be impacted, and water quality will improve.

TEMPORARY STANDARD DEMONSTRATION

Existing and Planned Controls and Current Performance

The Raton Wastewater Treatment Plant (WWTP) is an activated sludge system using an enhanced sequential batch reactor (SBR) (intermittent cycle extended aeration system or ICEAS). The facility operates in a biological nutrient removal (BNR) mode by alternating phases of aeration and anoxic/anaerobic cycles. The secondary effluent from the SBR process is decanted to an effluent equalization basin. The effluent from the equalization basin flows by gravity to either the reuse facility or to ultra-violet (UV) Disinfection. The effluent going through the UV Disinfection is discharged to Doggett Creek. The facility has a design flow of 0.9 million gallons per day (MGD). Its effluent discharge volume averages approximately 0.36 MGD with a maximum weekly average discharge of 0.62 MGD. NMED consulted with the Office of the State Engineer (OSE) to determine whether water rights may constrain treatment options for Raton. OSE confirmed that Raton WWTP does not have any return flow obligations.

Raton’s current NPDES permit (NPDES permit no. NM0020273; issued July 1, 2015) has performance-based 30-day average effluent limits expressed in terms of both concentration and mass. These limits are 10 mg/L and 46.7 lbs/day total nitrogen (TN) and 3.0 mg/L and 14.0 lbs/day total phosphorus (TP).

Although these limits are performance-based, they were included in the NPDES permit to protect and maintain existing water quality and prevent further degradation of the receiving water. Discharge monitoring data for the period from January 2017 through September 2018 indicate a long-term average effluent TN concentration of approximately 7.3 mg/L and a long-term average TP concentration of approximately 2.37 mg/L.

Anticipating that its future NPDES permits will include effluent limits based on New Mexico's numeric nutrient thresholds, Raton is examining how the use of chemical precipitation (alum) would affect its treatment system and its effluent pollutant concentrations. Chemical precipitation is one potential treatment option for phosphorus removal. Raton is still at the pilot scale; therefore, the facility has not used chemical precipitation for the full waste stream.

Technology-Based Effluent Limits for Nutrients

There are no technology-based requirements for nutrients applicable to publicly owned treatment works. Therefore, technology-based effluent limits are not sufficient to meet water quality standards.

Water Quality-Based Effluent Limits for Nutrients

The Raton WWTP discharges to Doggett Creek, a tributary to Raton Creek, Chicorica Creek, and the Canadian River. New Mexico's narrative nutrient criterion applies to this receiving water, and NMED uses the threshold values for TN and TP in Table 1 to interpret this criterion. NMED has determined that the receiving water falls within the TN Flat class for total nitrogen and the TP Flat-Moderate class for total phosphorus. Thus, the following nutrient threshold concentrations would be used to interpret the narrative criterion and derive the WQBEL:

- TN = 0.69 mg/L
- TP = 0.061 mg/L

The nutrient threshold values are being interpreted as 30-day average values and, therefore, WQBELs may be appropriately expressed as average monthly limits. In the case of Raton, the receiving water has no allowance for mixing because the effluent composes the bulk of flow in Doggett Creek. Thus, the threshold values are applied as "end of pipe" WQBELs. In other words, the average monthly limits for TN and TP are equal to the TN and TP thresholds expressed above.

Potential Technology Options to Attain the Applicable Water Quality Standard

Appropriate technology options were selected by considering:

- current wastewater treatment plant processes and configuration along with known upgrades being considered (advanced SBR; investigating chemical precipitation for TP removal),
- current effluent concentrations for TN and TP as well as any existing effluent limitations, and
- comparison of design flow and long-term effluent volume (average 30-day discharge is 0.36 million gallons per day (mgd); maximum weekly average discharge is 0.62 mgd; design flow is 0.9 mgd) – the maximum weekly average discharge was used for cost estimations.

With the exception of reverse osmosis (RO), all of the target effluent concentrations for the various treatment options are well above the levels needed to meet WQBELs that would achieve the threshold values. RO is the only technology that approaches the underlying numeric nutrient thresholds. However even with RO, attainment of the underlying nutrient thresholds (Table 1) is uncertain. It was assumed that the RO system would be added to the end of the existing treatment process and that 100% of the effluent would be treated through the RO system. Because RO is the only option that would allow the facility to approach the underlying designated use and criterion, this option was further considered in the attainability analysis described below.

Factor Precluding Attainment of the Applicable Water Quality Standard

The basis for this temporary standard request is 40 CFR § 131.10(g) Factor 6, "controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact," as supported by the June 26, 2018 *Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico* ("the Report") prepared by Tetra Tech and ECONorthwest for EPA and NMED, and included as Appendix A of this document.

Reverse osmosis, which could potentially attain the underlying designated use and criteria (i.e., nutrient thresholds), is not economically feasible to install and operate and would lead to substantial and widespread social and economic impacts throughout the community. EPA's Interim Economic Guidance[4] describes substantial and widespread economic and social impacts as two separate analyses. For public-sector entities, substantial impacts refer to the financial impacts on the community, taking into consideration current socioeconomic conditions. Widespread impacts, on the other hand, refer to changes in the community's socioeconomic conditions.

Substantial Impact Analysis

Whether or not the community faces substantial impacts from additional pollution control options needed to meet the underlying designated use and TN and TP thresholds depends on both the cost of the additional pollution control and the general financial and economic health of the community. The Report estimated the cost of RO based on the average weekly effluent flow of 0.62 mgd, normalized to January 2017$, and annualized capital costs using a discount rate of 5 percent and a term of 20 years. These costs were added to the annual operation and maintenance (O&M) cost estimates to determine total annual costs. The cost estimate for RO is shown in Table 2.

Table 2. Estimated Costs for Reverse Osmosis (January 2017$)

Technology	Target Effluent Concentration	Capital Cost	O&M Cost	Annualized Costs[1]	Reference
Reverse Osmosis	< 1.0 mg/L TN < 0.01 mg/L TP	$10,750,800	$847,916	$1,710,130	Falk et al. 2011

[1]Annualized costs are based on a discount rate, *i*, of 5%, and term, *n*, of 20 years.

Sewage authorities charge for services, and thus can recover pollution control costs through user fees. The most recent information on the population, number of households, and median household income (MHI) in Raton was collected and used to evaluate the potential impact to the community of installing additional pollution controls at the WWTP. The expected annual cost per household after installing RO would be $822.06 assuming that 100% of the costs of the project are borne by households. This cost includes the current annual pollution control cost per household ($230.16) plus the estimated annual incremental pollution control cost per household for RO ($591.90).

[4] Available online at https://www.epa.gov/wqs-tech/economic-guidance-water-quality-standards.

EPA's Interim Economic Guidance describes two tests for determining whether the socioeconomic impact of requiring a pollution control measure would be *substantial*:

- Municipal Preliminary Screener (MPS)
- Secondary Test Indicators

The MPS estimates the total annual pollution control costs per household (existing costs plus those attributable to the proposed project) as a percentage of MHI:

MPS = Average Total Pollution Control Cost per Household/MHI

The analysis proceeds to the Secondary Test if:

- The total annual cost per household exceeds 2.0 percent of MHI—EPA's Interim Economic Guidance suggests the project is likely to result in a substantial economic impact.
- The total annual cost per household is between 1.0 and 2.0 percent of MHI—EPA's Interim Economic Guidance suggests the project may result in a substantial economic impact.

The existing annual sewer cost per household in Raton of $230.16 is 0.8% of MHI ($29,773). Requiring RO would increase the annual costs per household to $822.06, which is 2.8% of MHI, suggesting that the additional treatment is likely to result in a substantial economic impact to the community, therefore the analysis proceeds to the Secondary Test.

The Secondary Test is designed to build upon the characterization of the financial burden identified in the MPS. The Secondary Test indicators for Raton are shown in Table 3.

Table 3. Secondary Test Indicators

Indicator	Value for Raton
Debt Indicators	
Bond Rating (if available)	Not available*
Overall Net Debt as a Percent of Full Market Value of Taxable Property	$5,073,348
Socioeconomic Indicators	
Unemployment Rate	6.1%
Adjusted Median Household Income (January 2017)	$29,773
Financial Management Indicators	
Property Tax Revenue as a Percent of Full Market Value of Taxable Property	$637,160
Property Tax Collection Rate	99%

*Raton does not have a bond rating.

Using the Secondary Test Indicators in Table 3, an average secondary test score of 2.0 was calculated, which indicates socioeconomic conditions that are at the low end of the mid-range category. The Substantial Impacts Matrix from EPA's Interim Guidance was used to determine if RO would result in substantial impacts. The MPS score is considered jointly with the secondary test score to determine the degree of impact. Evaluating the MPS and Secondary Test scores suggests that installation of RO would likely result in substantial economic impacts to the community (highlighted cell in Table 4).

Table 4. Assessment of Substantial Impacts Matrix for Installing RO

MPS: 2.8%			
Secondary Test Score: 2.0			
Secondary Test Score	MPS		
	< 1.0%	1.0%–2.0%	> 2.0%
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X
Greater than 2.5	✓	✓	?

Key:
✓: Impact is not likely to be substantial
X: Impact is likely to be substantial
?: Impact is unclear
X: Raton score

Widespread Impact Analysis

The EPA considers widespread impacts to occur if the project will have significant adverse impacts on the local, surrounding community. There are several key factors suggestive of Raton's disadvantaged condition which would contribute to the widespread impact on the community. The widespread impact analysis considered several indicators, including:

- Estimated change in MHI;
- Estimated change in unemployment rate;
- Estimated change in overall net debt as a percent of full market value of taxable property;
- Estimated change in the percentage of households below the poverty line;
- Impact on commercial development potential; and,
- Impact on property values.

Summary of Widespread Indicators for the City of Raton:

- The pollution control project (RO) needed for Raton to meet WQBELs based on New Mexico's numeric nutrient thresholds would increase the average household annual sewer rates from approximately $230, or 0.8% of median annual household income, to approximately $822, or 2.8% of median annual household income. The magnitude of the changes in the percent of MHI for pollution control costs associated with meeting the underlying designated use and criterion (RO) is significant, with sewer fees more than tripling.
- The community median annual household income (MHI) was approximately $29,600 in 2016, which is substantially lower than the statewide median annual household income of approximately $45,700. Raton's MHI is consistently substantially lower than national and state averages and has shown stagnant or declining conditions while state and national levels have increased slightly. In addition, wages for jobs in Raton are generally lower than wages in the state as a whole.
- Another factor suggesting that the substantial economic impacts associated with installing RO would be widespread is that the impacts would occur across the entire community. Almost all households and businesses in the community pay for wastewater treatment. The increase in wastewater treatment rates necessary to install RO would apply to all rate payers and thus to almost the entire community. A substantial community-wide increase in wastewater treatment rates would likely have broad negative effects on community financial health. Such broad negative effects on community financial health would likely alter the ways in which people live, work, play, relate to one another, and organize their activities.

Achieving WQBELs derived from the underlying designated use and criterion through treatment would necessitate the installation and operation of RO at the Raton WWTP and would lead to substantial and widespread economic and social impacts to the community.

All analyses can be found in the *Substantial and Widespread Impacts Report* in Appendix A.

Feasibility of Other Potential Options for Achieving the Applicable Water Quality Standard

An alternate discharge location is not a feasible alternative because the downstream water (Raton Creek) is also impaired for nutrients and would not offer much, if any, dilution capacity. However, the City currently reuses a portion of effluent for non-potable reuse at a golf course during summer and fall months. The reuse varies on average between 40 to 50 percent of the influent flow. The City is collecting data to explore the option of a zero discharge/seasonal discharge permit. Monthly average of the influent and reclaim flow data for the periods extending from March to November 2017 and from March to September 2018 were analyzed. In 2017, forty-one percent (41%) of influent flow was directed to reclaim use. In 2018, fifty-five percent (55%) of the influent was directed to reclaim use.

Seasonal Discharge / Zero Discharge Options
The City is evaluating 100% re-use of the WWTP flow during the summer/fall months followed by a seasonal effluent nutrient limit for discharge during the winter months. This approach would require the City to upgrade or add a polishing filter, increase the capacity of the reuse pumps, and increase the size of pipes to minimize pipe losses for 100% effluent re-use. However, during winter months, the WWTP would still need to discharge effluent to Doggett Creek because land application would be constrained due to freezing temperatures. Alternatively, as part of this temporary standard proposal, the City will identify and evaluate costs for sending the effluent to a water resource recovery facility in the winter for additional treatment, processing, and re-use in other capacities. This seasonal combination would result in zero discharge and eliminate the need for a NPDES permit for the WWTP but may not be economically or logistically feasible.

Highest Attainable Effluent Condition (HAC)

A temporary standard is a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition during the term of the temporary standard. The permit limitations expressed during the term of this temporary standard represent the highest attainable condition (HAC) that can be achieved without causing substantial and widespread economic and social impact.

EPA considers the HAC to mean the condition that is both feasible to attain and is closest to the protection afforded by the designated use and criteria. New Mexico defines the HAC as the highest degree of protection feasible in the short term, and the condition that will be the basis for effluent limits during the term of the temporary standard. The HAC options described below are presented in the form of the *interim effluent condition reflecting the greatest pollutant reduction achievable*.

Summary of Options Evaluated
Treatment options evaluated as candidates for establishing the HAC include optimization of Raton's existing treatment system and technologies (other than RO) that would provide additional reductions in the effluent concentrations of TN and TP. The cost per household was calculated for six potential combinations of treatment options for TN and TP shown in Table 5. The table shows the incremental

annual cost per household of each treatment combination option, total annual pollution control costs per household (including existing annual costs of $230.16 per household), the resulting percentage of MHI for pollution control, and the corresponding increase in annual sewer bills for households in Raton.

There are several factors to consider when evaluating the range of options in Table 5 to determine the HAC for Raton. If the total annual cost per household (existing annual cost plus the incremental cost related to the proposed project) is well below 1.0 percent of MHI, EPA's Interim Economic Guidance suggests the project will likely not impose a substantial economic impact on the community. Typically, the analysis would not proceed further. However, if the total annual cost per household is fairly close to 1.0 percent of MHI, the project may impose a substantial economic impact on the community due to the community's unique circumstances. In such cases, the unique circumstances should be documented in order to determine the HAC.

Table 5. Annual Pollution Control Cost Per Household (2017$) of TN and TP Treatment Combination Options for Raton

Cost Element	Option A Additional Optimization (TEC = 5.0 mg/L TN) and Chemical Precipitation (TEC = 0.5 mg/L TP)	Option B Denitrification Filters (TEC = 3.0 mg/L TN) and No additional TP treatment (TEC = 2.2 mg/L TP)	Option C Denitrification Filters (TEC = 3.0 mg/L TN) and Chemical Precipitation (TEC = 0.5 mg/L TP)	Option D Optimize Cycle Times (TEC = 7.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)	Option E Additional Optimization (TEC = 5.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)	Option F Denitrification Filters (TEC = 3.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)
Capital Cost	$681,360	$1,336,200	$1,557,540	$2,252,160	$2,712,180	$3,588,360
Annual O&M Cost	$150,439	$249,115	$330,001	$472,784	$542,337	$721,899
Total Annualized Cost	$205,113	$356,335	$454,982	$653,503	$759,969	$1,009,838
Incremental Annual Cost Per Household[1]	$70.97	$123.30	$157.43	$226.13	$262.97	$349.42
Existing Annual Pollution Control Costs Per Household	$230.16	$230.16	$230.16	$230.16	$230.16	$230.16
Total Annual Pollution Control Costs Per Household[2]	$301.13	$353.46	$387.59	$456.29	$493.13	$579.58
% of MHI for Pollution Control[3]	1.01	1.19	1.30	1.53	1.66	1.94
% Increase in Annual Sewer Bill	31	54	68	98	114	152
NMED Interpretation of Results	Impact Unclear	Impact Unclear	Substantial	Substantial	Substantial	Substantial

[1] 2,890 households

[2]Annualized at 5% over 20 years.

[3]Based on adjusted (January 2017$) MHI of $29,773.

Other relevant financial or demographic information should be considered that illustrates the unique or atypical circumstances faced by Raton to evaluate its financial capability. Raton's MHI of approximately $29,600 per year in 2016 was below both state ($45,700/year) and national ($55,300/year) medians for the same year and has been declining since 2014. In addition, the city's population and thus the WWTP's revenue base is declining, so that remaining residents will shoulder a higher proportion of the cost burden for WWTP operation every year (i.e., total annual cost per household will increase as population decreases). If the population continues to decline as projected, the percentage of MHI that a given upgrade represents in 2018 will increase over time. The remaining life of the plant's equipment is estimated to be 20 years, and significant cost efficiencies may be gained by incorporating nutrient removal technology as equipment is upgraded as opposed to improving old equipment and processes that will be replaced within a few years. Raton also has indicated in discussions that it has other ongoing and upcoming significant debt obligations related to necessary drinking water and sewer infrastructure upgrades further impeding their financial capability. Accordingly, it was concluded that the costs to implement Options D, E and F would likely cause substantial impacts to the community. Since the widespread indicators do not change depending on the technology option being considered, it was also concluded that the substantial impacts from Options D, E and F would also be widespread throughout the community. Furthermore, Option B was eliminated from consideration because there was no additional treatment required for total phosphorus.

Total residential share of costs between 1.0% and 1.9% of median household income (MHI) are categorized in EPA's Financial Capability Assessment Guidance as having a "medium" burden for the Residential Indicator (RI). Raton's consultant provided a technical memorandum (Appendix B) that further evaluates the feasibility of Options A and C. Several conclusions were drawn.

First, effluent phosphorus concentration is dependent on the amount of particulate phosphorus in the total suspended solids (TSS). Typically, the effluent particulate phosphorus in the TSS varies from one to three percent. This percentage is shifted towards the high end for a WWTP without enhanced phosphorus removal, such as the Raton WWTP. Since the ICEAS process does not have a clarifier and the solids separation is limited to the efficiency of the settle/decant phases of the SBR cycle, a target effluent condition of 0.5 mg/L of total phosphorus may not be regularly attained. Therefore, the target effluent condition (i.e., highest attainable condition), was changed to 1.0 mg/L TP to be consistent with treatment variability.

Second, the required treatment plant improvements necessary to attain TN concentrations of 5 mg/L or less and TP concentrations of 1 mg/L or less require capital equipment expenditures and ongoing operating expenditures. Due to certain process limitations associated with the SBR equipment, it is apparent that the operations expenditures end up comprising the majority of the annual amortized costs, and hence, contributing more to the calculated percentage of MHI increases.

Finally, a comparison of MHI impacts outlined in the Section 4 of the technical memorandum shows that Option C cost impacts are over 5 times more expensive than Option A, resulting in MHI percentage impacts ranging from 1.13 to 1.58 percent, indicating a likely significant impact to the community. Since the widespread indicators do not change depending on the technology option being considered, it was also concluded that the substantial impacts from Option C would also be widespread.

Therefore, based on the widespread and substantial analyses for the six technology options, the ability to make incremental improvements to water quality, and the desire to minimize impacts to the community and ensure an affordable, realistic, and manageable plan, a modified version of Option A was identified as the highest attainable condition for Raton WWTP (NPDES permit no. NM0020273) and is represented by the target effluent concentrations (TECs) presented in Table 6.

Table 6. Highest Attainable Conditions

Pollutant Parameter	Highest Attainable Effluent Condition (mg/L)[1]
Total Nitrogen (TN)	5.0, long-term average; 8.0, 30-day average
Total Phosphorus (TP)	1.0, long-term average; 1.6, 30-day average

1 See Appendix E for conversion from long-term average to 30-day average.

As discussed above, the modified Option A TECs for total nitrogen and total phosphorus are 5.0 mg/L and 1.0 mg/L, respectively. Those TECs represent expected long-term average performance. Consistent with the same principles used to derive NPDES average monthly limits from long-term averages, the long-term average TECs here are converted to highest attainable 30-day interim effluent conditions. Using Table 5-2 from EPA's Technical Support Document for Water Quality-based Toxics Control, a multiplier of 1.6, based on a default coefficient of variation of 0.6, the 95th percentile probability basis, and two samples per month (Appendix E), converts the long-term average TECs to the values provided in Table 6. It is assumed EPA Region 6 will use these 30-day interim effluent condition values as average monthly limit values in the NPDES permit. Where necessary, the state authorizes the use of permit compliance schedules to provide time to meet any WQBEL derived from the highest attainable condition for this temporary standard, consistent with 40 CFR Part 122.47.

Stakeholder Outreach & Public Participation

Initial public participation ahead of the New Mexico Water Quality Control Commission (WQCC) hearing followed public participation processes detailed in the Water Quality Management Plan – Continuing Planning Process (WQMP-CPP[5]). Temporary standard requests require the same opportunity for public review and comment as a formal rule making.

During permit renewal, NPDES permit no. NM0020273, which will reflect the conditions and requirements of the approved temporary standard, will be public noticed. Pursuant to federal regulations at 40 CFR 124.10(c), the EPA provides notice of draft NPDES permits to the applicant; various local, state, federal, tribal and pueblo government agencies; and other interested parties, and it allows at least 30 days of public comment. During each subsequent permit renewal, the revised permit issued under the terms and conditions of the approved temporary standard will be noticed for a 30-day public review and comment period.

The temporary standard also will be located in 20.6.4 NMAC and is subject to additional public review during all subsequent triennial reviews until expiration of the temporary standard.

[5] https://www.env.nm.gov/surface-water-quality/wqmp-cpp/

Re-Evaluation of Temporary Standard

Pursuant to 20.6.4.10(F) NMAC, all temporary standards are subject to a required review during each succeeding review of water quality standards. Furthermore, the term for this temporary standard exceeds five years, therefore, a re-evaluation of the HAC and the financial need for the temporary standard will occur no less than once every five years from the effective date of the temporary standard. The re-evaluation will use all existing and readily available information in accordance with 40 CFR 131.14(b)(1)(v). If additional requirements or a new, more stringent HAC are identified, the permit will be issued with those additional requirements or new higher attainable condition. During the re-evaluation, NMED will also reassess the financial capability of the City of Raton by re-evaluating the municipal preliminary screener (MPS) and secondary test scores for Raton with updated information, as available. If new information determines that the substantial and widespread social and economic impacts are no longer indicated, NMED will work with the City of Raton to determine feasible improvements and an implementation schedule for the City to meet the underlying water quality standards for total nitrogen and total phosphorus.

The State will accommodate public input on the re-evaluation through the public participation process during the triennial review, or through the public notice and comment period for the draft NPDES permit renewal as described in the section above. NMED will submit the initial results of the re-evaluation to the WQCC. In addition, pursuant to 20.6.4.10(F) NMAC, the discharger will provide a written report to the WQCC documenting the progress of proposed actions, pursuant to the reporting schedule stipulated in the approved temporary standard. The purpose of the review is to determine progress consistent with the original conditions of the petition for the duration of the temporary standard. If the discharger cannot demonstrate that sufficient progress has been made the WQCC may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard.

After public participation and WQCC review and approval, the State considers the re-evaluation to be "complete." NMED will then submit the re-evaluation to EPA within 30 days of completion. If NMED, or the discharger, does not complete their review at the frequency specified, or does not submit the re-evaluation to EPA within 30 days of completion, the temporary standard will no longer be the applicable water quality standard until NMED and the discharger complete and submit the re-evaluation to EPA.

Timeline for Proposed Actions

The term of this temporary standard is 20 years. This term is only as long as necessary to achieve the highest attainable condition and is consistent with the documentation submitted by the state to justify the term of the temporary standard. NMED has determined the implementation schedule submitted by the City of Raton (Appendix C) and presented in Table 7 to be a reasonable and justified schedule for this temporary standard and will allow the City time to plan and distribute budgets, fees, and expenditures to lessen the impact to the City's utility budget, and promote community support and encourage success of this proposal. The 20-year timeline provides for planning, pilot tests, funding efforts, and construction while minimizing the impact to city and utility budgets as well as to ratepayers during a weakened economy. The schedule proposes both operational optimization and modification of the existing treatment facility in two phases (Phase 1: Coagulation for phosphorus removal and Phase 2: Aeration control upgrades for nitrogen removal), which are dependent on several factors including:

- The overall utility budget, including other priorities, and depressed economic condition in Raton;
- Time needed to complete and approve final designs;

- Time needed to successfully secure financing;
- Successful bidding and construction processes within budget;
- Staff training for complete facility optimization of new and existing processes; and
- Evaluation of progress necessary to comply with the temporary standard.

In Phase 1, the City will incorporate chemical addition into its treatment scheme. Pilot testing of coagulant addition for phosphorus removal will determine the type of coagulant to be used. It is anticipated that initial testing will be with aluminum sulfate since it is the coagulant that Raton utilizes for drinking water treatment. Based on the coagulant selected, the existing solids handling system might require additional attention to determine its ability to handle the increased chemical sludge, including the impact to the effective treatment volume of the aeration basins. Any potential modifications to the sludge handling system and aeration basins due to increased chemical sludge will be added to Phase 2 to determine the overall cost. The potential process changes in addition to the time required to plan for the Phase 2 budget prevents concurrent undertaking of Phase 1 and Phase 2.

Phase 2 involves aeration control upgrades for nitrogen removal and refinement of chemical addition for phosphorus removal, as identified in Phase 1. In general, Phase 2 upgrades include the following:

- Replace the existing ICEAS system (SBR) programmable logic controller (PLC) and upgrade to Xylem's proposed current Biologic Nutrient Removal (BNR) PLC control logic, NURO Controller
- Install ammonia, nitrate, temperature, and DO sensors and transmitters to provide the necessary data and allow the new NURO control logic to optimize the existing process for nitrification and denitrification, while preventing excess blower run times during low loads.
- Reduce the number of "Air Off-Cycles" in the SBR process to enhance the nitrification process. The justification behind reducing the total amount of off-cycle time is that the denitrification process is faster as compared to nitrification process and the decant cycle time will also contribute to the available denitrification time.
- Update the controller logic to operate the aeration blowers based on the dissolved oxygen (DO) input from the SBR basins. Changes to the aeration cycles in response to demand, might require improvements to/retrofits to the existing aeration blowers.
- The addition of variable-frequency drives (VFDs) to the aeration blowers will enable the NURO controller to maintain DO setpoints in the SBR basins. The Xylem BioWin modeling indicates that oxygen carryover from the aeration ON periods to the aeration OFF periods will occur inhibiting denitrification.
- If the aeration blower motors are not suitable for VFDs, either the motor or the entire blower will require replacement.
- Installation of a combination ammonium/nitrate probe located approximately two thirds of the distance down the length of the SBR basin (toward the decanter end).
- Installation of an online phosphate probe to allow continuous online monitoring of phosphate in the SBR basins.
- External alkalinity addition, if required
- External carbon addition will likely be required to provide the necessary carbon required during the denitrification process. The supplemental carbon should be introduced at the beginning of the last Air OFF period for a given total cycle.
- Installation of a coagulation feed system for chemical removal of phosphorus.

Implementation of the temporary standard and associated tasks requires both capital and operational expenses from Raton's utility budget. The schedule proposes to re-evaluate the progress during each review of water quality standards and no less than once every five years from the effective date of the temporary standard. The City will keep NMED updated as the design and funding portions of each project phase progresses.

Table 7. Proposed Actions and Implementation Schedule

Task	Target Completion Date
NPDES Permit Application/Renewal - Continued Optimization Efforts of Existing System - PER for SBR Upgrades to Achieve Nutrient Removal Goal - Pilot Testing of Coagulation - Zero Discharge Feasibility Study	January 2020 – January 2023
- Design for Phase 1 (coagulation for phosphorus removal) - Funding Applications - Zero Discharge Feasibility Study - continued	January 2023 – January 2025
NPDES Permit Application/Renewal - Evaluate Nutrient Temporary Standard Progress incl. Zero Discharge - Complete Final Phase 1 Design - Bidding & Contract Award - Construction of Phase 1 - Construction Completion & Start Up	January 2025 – January 2029
- Optimization of New Processes - Evaluate Process Changes - Review & Evaluate PER Goals/Objectives and Plans	January 2029 – January 2030
NPDES Permit Application/Renewal - Evaluate Nutrient Temporary Standard Progress - Design Phase 2 (aeration control upgrade for nitrogen removal)	January 2030 – January 2031
- Pursue Funding - Complete Final Phase 2 Design	January 2031 – January 2032
- Bidding & Contract Award - Construction of Phase 2 - Construction Completion & Start Up	January 2032 – January 2035
NPDES Permit Application/Renewal - Evaluate Nutrient Temporary Standard Progress - Optimization of New Processes - Evaluate Process Changes - Review & Evaluate PER Goals/Objectives and Plans	January 2035 – January 2037
- Continued Optimization - Evaluate Nutrient Temporary Standard Progress End of Temporary Standard and End of Facility Life	January 2037 – January 2040

Regulation Language in 20.6.4 NMAC

A temporary standard is a time-limited designated use and criterion that reflects the highest attainable condition during the term specified in this temporary standard. If approved by the EPA, this temporary standard will be the applicable water quality standard in effect for the purposes of developing CWA Section 301(b)(1)(C) NPDES permit limits. The temporary standard may also be used for purposes of CWA Section 401 certifications. Where necessary, the State authorizes the use of permit compliance schedules to provide time to meet any WQBEL derived from the highest attainable condition for this temporary standard, consistent with 40 CFR Part 122.47. The underlying designated use and associated criteria remain applicable for all other CWA purposes, and all other uses and associated criteria not specified in this temporary standard remain applicable for all CWA purposes.

To implement the discharger-specific temporary standards for the City of Raton Wastewater Treatment Plant, NPDES No. NM0020273, a water quality standards segment was created for Doggett Creek, as follows:

20.6.4.318 CANADIAN RIVER BASIN: Doggett creek.

A. **Designated uses:** Warmwater aquatic life, livestock watering, wildlife habitat and primary contact.

B. **Criteria:** The use-specific criteria in 20.6.4.900 NMAC are applicable to the designated uses, except that the following site-specific criteria apply: the monthly geometric mean of E. coli bacteria 206 cfu/100 mL or less, single sample 940 cfu/100 mL or less.

C. **Discharger-specific temporary standard:**

(1) **Discharger:** City of Raton wastewater treatment plant

(2) **NPDES permit number:** NM0020273, Outfall 001

(3) **Receiving waterbody:** Doggett creek, 20.6.4.318 NMAC

(4) **Discharge latitude/longitude:** 36° 52' 13.91" N / 104° 25' 39.18" W

(5) **Pollutant(s):** nutrients; total nitrogen and total phosphorus

(6) **Factor of issuance:** substantial and widespread economic and social impacts (40 CFR 131.10(g)(6))

(7) **Highest attainable condition:** interim effluent condition of 8.0 mg/L total nitrogen and 1.6 mg/L total phosphorus as 30-day averages. The highest attainable condition shall be either the highest attainable condition identified at the time of the adoption, or any higher attainable condition later identified during any reevaluation, whichever is more stringent (40 CFR 131.14(b)(1)(iii)).

(8) **Effective date of temporary standard:** XX-XX-XXXX. This temporary standard becomes effective for Clean Water Act purposes on the date of EPA approval.

(9) **Expiration date of temporary standard:** no later than 20 years from the effective date.

(10) **Reevaluation period:** at each succeeding review of water quality standards and at least once every five years from the effective date of the temporary standard (20.6.4.10.F(8) NMAC, 40 CFR 131.14(b)(1)(v)). If the discharger cannot demonstrate that sufficient progress has been made the commission may revoke approval of the temporary standard or provide additional conditions to the approval of the temporary standard. If the reevaluation is not completed at the frequency specified or the Department does not submit the reevaluation to EPA within 30 days of completion, the underlying designated use and criterion will be the applicable water quality standard for Clean Water Act purposes until the Department completes and submits the reevaluation to EPA. Public input on the reevaluation will be invited during NPDES permit renewals or triennial reviews, as applicable, in accordance with the State's most current approved water quality management plan and continuing planning process.

(11) **Timeline for proposed actions.** Tasks and target completion dates are listed in the most recent, WQCC-approved version of the New Mexico Environment Department, Surface Water Quality Bureau's "Nutrient Temporary Standards for City of Raton Wastewater Treatment Plant, NPDES No. NM0020273 to Doggett Creek."

<u>Appendices</u>

Appendix A: Raton Temporary Standard Final Report
Appendix B: City of Raton and FEI Engineer Technical Memorandum
Appendix C: City of Raton/Raton Water Works Nutrient Removal Schedule
Appendix D: Total Maximum Daily Load (TMDL) Implementation Plan for Raton WWTP
Appendix E: Calculation of the Highest Attainable Interim Effluent Conditions

APPENDIX A

Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico

Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico

Prepared by

Tetra Tech, Inc. and ECONorthwest

for

U.S. Environmental Protection Agency, Standards and Health Protection Division &

New Mexico Environment Department

June 26, 2018

NMED EXHIBIT 24

Disclaimer

The U.S. Environmental Protection Agency (EPA) provided New Mexico with this report as technical assistance to inform a future water quality standards (WQS) variance demonstration under 40 CFR 131.14, which the state calls "temporary standards" under state law. EPA's technical assistance does not imply EPA Clean Water Act (CWA) 303(c) approval or acceptance of the results or conclusions of temporary standard petitions based on this report. Any changes to New Mexico water quality standards based on this report would have to be submitted to the EPA separately for review. This report is intended for the state and discharger's use for its own purposes and decision-making.

This report does not have bearing on current EPA policy or bind EPA to any changes in policy or specific actions in the future. Further, this report does not impose legally binding requirements on the EPA, states, tribes, or the regulated community, nor does it confer legal rights or impose legal obligations on any member of the public. The CWA provisions and the EPA regulations described in this document contain legally binding requirements. This report does not constitute a regulation, nor does it change or substitute for any CWA provision or EPA regulation.

Substantial and Widespread Economic and Social Impact and Highest Attainable Condition Analysis Report for Raton, New Mexico

Contents

Acronyms

AACEI	Association for the Advancement of Cost Engineering International
ACS	American Community Survey
BNR	Biological nutrient removal
CFR	*Code of Federal Regulations*
CWA	Clean Water Act
DO	Dissolved oxygen
EBPR	Enhanced biological phosphorus removal
EPA	U.S. Environmental Protection Agency
HAC	Highest attainable condition
ICEAS	Intermittent Cycle Extended Aeration System
MGD	Million gallons per day
MHI	Median household income
MPS	Municipal preliminary screener
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and maintenance
OSE	Office of the State Engineer
PMP	Pollutant Minimization Program
RO	Reverse osmosis
SCADA	Supervisory Control and Data Acquisition
SBR	Sequential batch reactor
TEC	Target effluent concentration
TKN	Total Kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
WERF	Water Environment Research Foundation
WQBEL	Water quality-based effluent limit
WQS	Water quality standards
WWTF	Wastewater treatment facility

1 Purpose

In 2017, the New Mexico Environment Department's (NMED's) Water Quality Control Commission (Commission) approved the New Mexico water quality standards (WQS) regulation creating a framework for adopting temporary standards. In promulgating this regulation, the Commission sought to address situations where water quality-based effluent limits (WQBELs) are not achievable by creating a clear path to compliance that is achievable and affordable in the near-term and encourages improvements to water quality. The New Mexico temporary standards regulation is based on the U.S. Environmental Protection Agency (EPA) regulation on WQS variances at 40 *Code of Federal Regulations* (CFR) 131.14. EPA approved the New Mexico regulation as Clean Water Act- (CWA-) effective.

The purpose of this report is to apply the framework established in the New Mexico temporary standards regulation to the City of Raton Wastewater Treatment/Reclamation Facility (National Pollutant Discharge Elimination System [NPDES] Permit #NM0020273) (hereafter Raton WWTF). To meet this objective, the report provides:

- A brief characterization of the Raton WWTF's current performance and the controls that would be required to meet WQBELs derived from the applicable nutrient thresholds
- Estimates of the cost to the Raton WWTF of attaining New Mexico's WQS for total nitrogen (TN) and total phosphorus (TP) and an analysis of affordability for the community
- Estimates of various levels of incremental TN and TP reduction that the Raton WWTF could achieve through several potential technological upgrades, the estimated cost of these upgrade options, and an analysis of their affordability for the community

This report can be used towards Raton WWTF's demonstration that attaining the designated use and criterion through various treatment or control options may not be feasible throughout the proposed term of the temporary standard because controls more stringent than those required by sections 301(b) and 306 of the CWA would result in substantial and widespread economic and social impact. The report also provides information on treatment and control options that may help the Raton WWTF identify the current highest attainable condition (HAC) for the facility. In its petition for a temporary standard, the Raton WWTF would need to verify the assumptions made in this analysis and assess other options that are not included in this desk study.

The report does not provide all the information needed to show that the underlying WQS are not attainable now or within a limited period of time or to identify the HAC and justify the duration of the temporary standard. The analysis considers only options for optimizing existing wastewater treatment processes or modifying treatment processes to achieve greater pollutant reductions. It does not consider other options such as pollutant minimization, discharge relocation, or elimination of the discharge to surface waters. The Raton WWTF should consider these options, in addition to treatment options, when petitioning the Commission for a temporary standard, to determine eligibility for a temporary standard, and to evaluate whether any of these options or combination of options would allow the receiving water to achieve the underlying WQS or would result in an interim effluent condition that reflects the HAC.

The options evaluated in this report are intended to capture scenarios where there continues to be a discharge to the stream. In the event that the Raton WWTF identifies a different affordable option leading to a decision that the facility no longer discharges TN and TP at levels that would cause, have the reasonable potential to cause, or contribute to an excursion of New Mexico's WQS (e.g., if the facility identified an option to switch to land application resulting in zero discharge), then a temporary standard would not be necessary.

See section 7 for additional detail on the limitations of this analysis.

2 Background

Nutrients are one of the leading causes of water quality impairment in New Mexico waters. According to the state's 2016–2018 Integrated Report, nutrients are the second leading cause of impairment in New Mexico perennial rivers and streams and the fourth leading cause of impairment in lakes and reservoirs, impairing 1,288 miles and 12,913 acres, respectively. Nutrient pollution in waterbodies results in large daily swings of dissolved oxygen (DO), which can change aquatic community dynamics. In some cases, these changes can result in algal blooms that lead to fish kills and other harmful effects, such as harmful algal blooms, considerably reduced recreational opportunities, and taste and odor problems in drinking water.

2.1 New Mexico Narrative Nutrient Criterion and Nutrient Thresholds

WQS regulations in the New Mexico Administrative Code (NMAC) include a narrative criterion for distinguishing nutrient conditions that contribute to production of undesirable or nuisance aquatic life. The criterion states, "Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state" (20.6.4.13.E NMAC). The state interprets this narrative criterion using nutrient threshold values, which are based on reference conditions and applied to specific site classes in perennial, wadable streams, as shown in Table 1.

Table 1. New Mexico Nutrient Thresholds for Each Site Class (Jessup 2015)

	TN (mg/L)			TP (mg/L)		
	TN Flat	TN Moderate	TN Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
Threshold	0.65	0.37	0.30	0.084	0.061	0.03

Notes: mg/L = milligram per liter; TN = total nitrogen; TP = total phosphorus.

Most facilities discharging to catchments covered by the thresholds would need WQBELs for nutrients. Because of the limited available dilution in many receiving waters, some facilities will have WQBELs (whether based on total maximum daily loads or not) that require the threshold concentrations to be met "end-of-pipe." These required WQBELs might not be economically or technologically achievable for many permittees.

2.2 New Mexico's Temporary Standards Regulation

A temporary standard could be an appropriate tool for implementing New Mexico's WQS when a petitioner demonstrates that the underlying WQS, including numeric interpretations of narrative criteria, are not attainable now or within a defined period of time, but may be attainable in the future. A temporary standard may be appropriate when:

1) Existing or proposed discharge control technologies will comply with applicable technology-based effluent limitations, feasible technological controls and other management alternatives;
2) The underlying WQS, including numeric interpretations of narrative criteria, are not attainable now or within a defined period of time, but may be attainable in the longer term;
3) It is feasible to make incremental improvements in water quality during the proposed term of the temporary standard;
4) The temporary standard will not result in any lowering of currently attained ambient water quality, unless the temporary standard will be used for restoration activities.

As discussed in section 1 above, New Mexico's temporary standards regulation at 20.6.4.10(F) NMAC is based on the EPA regulation on WQS variances at 40 CFR 131.14. The New Mexico regulation defines a temporary standard as "a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the HAC during the term of the temporary standard" (20.6.4.10.F.12 NMAC). For a temporary standard that applies to a specific discharger(s), the HAC, which may be considered synonymous with New Mexico's definition of "highest degree of protection feasible in the short-term," must be a quantifiable expression that is one of the following (40 CFR 131.14(b)(1)(ii)(A)):

1) The highest attainable interim criterion; or
2) The interim effluent condition that reflects the greatest pollutant reduction achievable; or
3) If no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the state adopts the WQS variance (temporary standard), and the adoption and implementation of a pollutant minimization program (PMP).[1]

By reflecting the HAC, a temporary standard provides a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. Note also that if a temporary standard has a term longer than 5 years, the HAC must be reevaluated at least once every 5 years.

The New Mexico regulations state that, "Any person may petition the commission to adopt a temporary standard applicable to all or part of a surface water of the state as provided for in this section and applicable subsections in 40 CFR 131.14" (20.6.4.10.F.1 NMAC). These regulations also specify that the petitioner for a temporary standard must demonstrate that attainment of the underlying WQS is not attainable in the short term based on one of the following seven factors:

1) Naturally occurring pollutant concentrations prevent the attainment of the use; or
2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or
3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

[1] A PMP is a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings (40 CFR 131.3(p)).

4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or
5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or
6) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact; or
7) Due to the implementation of actions necessary to facilitate restoration such as through dam removal or other significant wetland or water body reconfiguration activities as demonstrated by the petition and supporting work plan requirements in Paragraphs (4) and (5) of Subsection F of 20.6.4.10 NMAC (in federal regulation at 40 CFR 131.14(b)(2)(i)(A)(2) "Actions necessary to facilitate lake, wetland, or stream restoration through dam removal or other significant reconfiguration activities preclude attainment of the designated use and criterion while the actions are being implemented.").

New Mexico's regulation outlines documentation requirements for a temporary standard petition submitted to the Commission to demonstrate how the proposed temporary standard meets the requirements, including demonstrating that attainment of the underlying WQS is not feasible and that the proposed temporary standard represents the HAC.

3 Existing Performance and Controls Needed to Meet Water Quality Standards

The initial steps in a temporary standard demonstration for the Raton WWTF based on factor 6 of the federal regulation (substantial and widespread economic and social impact) are (1) understanding the existing controls and effluent quality; (2) calculating the WQBELs that are derived from and comply with the applicable underlying WQS (40 CFR 122.44(d)(1)(vii)(A)); and (3) identifying the treatment technology needed for Raton to achieve effluent quality that meets these WQBELs.

3.1 Existing and Planned Controls and Current Performance

The Raton WWTF is an activated sludge system using an enhanced sequential batch reactor (SBR) (intermittent cycle extended aeration system or ICEAS). The facility operates in a biological nutrient removal (BNR) mode by alternating phases of aeration and anoxic/anaerobic cycles. The facility has a design flow of 0.9 million gallons per day (MGD). Its effluent volume averages approximately 0.36 MGD with a maximum weekly average flow of 0.62 MGD. NMED consulted with the Office of the State Engineer (OSE) to determine whether water rights may constrain treatment options for Raton. OSE confirmed that Raton WWTP does not have any return flow obligations. Eliminating the discharge to surface waters is an approach that Raton could consider; however, this report does not analyze options for eliminating the discharge to surface waters.

Raton's current NPDES permit (NPDES Permit #NM0020273) has performance-based 30-day average effluent limits expressed in terms of both concentration and mass. These limits are 10 mg/L and 46.7 lb/day TN and 3.0 mg/L and 14.0 lb/day TP. Although these limits are performance-based, they were included in the NPDES permit to protect and maintain water quality and prevent further degradation of the receiving waters. Discharge monitoring data for the period 2012 through 2015 indicate an average effluent TN concentration of approximately 7.4 mg/L and an average TP concentration of approximately 2.2 mg/L.

Anticipating that its future NPDES permits will include effluent limits based on New Mexico's new numeric nutrient thresholds, Raton is conducting studies to examine how the use of chemical precipitation (alum) would affect its treatment system and its effluent pollutant concentrations. Chemical precipitation is one potential treatment option for phosphorus removal. Raton's study is still at the pilot scale; therefore, the facility has not used chemical precipitation for the full waste stream.

3.2 Water Quality-Based Effluent Limits Derived from and Complying with the Applicable Water Quality Standards

The Raton WWTF discharges to Doggett Creek, a tributary to Raton Creek, Chicorica Creek, and the Canadian River. New Mexico's narrative nutrient criterion applies to this receiving water, and NMED uses the threshold values for TN and TP in Table 1 to interpret this criterion. NMED has determined that the receiving water falls within the TN Flat class for total nitrogen and the TP Flat-Moderate class for total phosphorus. Thus, the following nutrient threshold concentrations would be used to interpret the narrative criterion and derive the WQBEL:

- TN = 0.65 mg/L
- TP = 0.061 mg/L

Tetra Tech determined the WQBELs that would apply to Raton based on the underlying WQS using the nutrient threshold values and the procedure outlined in Appendix A. The nutrient threshold values are being interpreted as 30-day average values and, therefore, WQBELs may be appropriately expressed as average monthly limits. In the case of Raton, the receiving water has no allowance for mixing because the effluent composes the bulk of flow in Doggett Creek. Thus, the threshold values are applied as "end of pipe" WQBELs. In other words, the average monthly limits for TN and TP, as shown in Table 2, are equal to the TN and TP thresholds.

Table 2. Nutrient WQBELs for Raton Based on Underlying WQS

	TN	TP
Average Monthly Limit	0.65 mg/L	0.061 mg/L

3.3 Treatment Technology Selection

To select appropriate treatment technologies for Raton WWTF, Tetra Tech considered the potential performance of Raton's existing ICEAS treatment system and options available for optimizing or upgrading activated sludge systems like Raton's (Table 3). There are numerous technology options available to wastewater treatment plants for nutrient removal. Tetra Tech conducted a desk study to determine potential treatment options and the expected effluent concentrations of TN and TP for each option considered.

Table 3. Facility Treatment Selection

Facility Treatment Category	Treatment Technology Options for Total Nitrogen Removal	Treatment Technology Options for Total Phosphorus Removal
Activated Sludge	• Optimization of existing activated sludge process to promote nitrification/denitrification • Biological nitrogen removal • Denitrification filters • Reverse osmosis	• Enhanced biological phosphorus removal • Chemical precipitation • Chemical precipitation with tertiary filtration • Reverse osmosis

The primary factors for characterizing and estimating performance capabilities for Raton's existing treatment system were the narrative descriptions of the existing system, current effluent concentrations, and current NPDES permit limits, as summarized in Section 3.1 above. The identification of appropriate target effluent concentrations (TECs) (i.e., effluent condition expected with implementation of the various technology options) resulting from modifications or additions to the existing treatment system to achieve additional TN and TP removal was based on:

1) Actual current treatment performance. If Raton was already meeting a TEC, or should meet a TEC based on its upgrade plans, no estimate was provided for that TEC.
2) Threshold TECs expected to be achievable for standard treatment processes for nutrient removal.
3) WQBELs calculated from the underlying WQS (as described in section 3.2 above).

For the purpose of deriving effluent limits, these TECs are intended to be implemented as long-term averages because they are based on a mix of studies that included long-term averages. A permit writer may calculate average monthly, annual average, or 12-month rolling average WQBELs from these long-term average TECs.

3.3.1 Total Nitrogen Reduction Options Evaluated

As shown in Table 3, Tetra Tech analyzed several treatment options for additional TN removal at Raton. Performance levels, or TECs, for TN represented by these treatment options are presented in Table 4.

Table 4. Total Nitrogen TEC Options for Raton WWTF

TEC	Treatment Technology Options
7.0 mg/L TN	Optimization of existing SBR (ICEAS) process to promote nitrification/denitrification
5.0 mg/L TN	Upgrade Supervisory Control and Data Acquisition (SCADA) system, install new mixers and blowers
3.0 mg/L TN	Biological nitrogen removal: -nitrification/denitrification via anoxic/oxic zone or cycle retrofits and/or -addition of a denitrification filter, or -optimization if approaching limit of technology
< 1.0 mg/L	Reverse osmosis

Optimization of Existing Sequential Batch Reactor (7.0 mg/L TN)

An effluent TN of 7.0 mg/L generally is achievable by activated sludge systems after optimizing existing treatment processes. Optimization typically involves improved control of existing aeration systems using DO, oxidation reduction potential, and/or other measures integrated with existing or new aerator controls. A TEC of 7.0 mg/L is based on the median TN achieved after optimization of 22 WWTFs from across the United States as described in two separate studies of facility optimization (USEPA 2015; Water Planet 2016).

Based on current treatment performance (a 3-year average concentration of 7.4 mg/L), Tetra Tech assumes that the Raton WWTF could be optimized to meet a long-term average TEC of 7.0 mg/L TN. Raton's current NPDES permit contains an effluent limit of 10 mg/L TN expressed as a 30-day average limit, and the WWTF is designed and operated for nitrogen removal. Because the facility consistently complies with the TN effluent limitation, it should be capable of meeting the TEC of 7.0 mg/L TN by optimizing the existing treatment system without having to invest in additional upgrades. While Tetra Tech assumed no additional costs for this option based on Raton's current performance, it is important to note that actual optimization costs could vary widely, are facility-specific, and can be difficult to generalize. The determination that the Raton WWTF could achieve an average TEC of 7.0 mg/L TN is based on a desk study with limited information about operation of the facility; before submitting its petition for a temporary standard, Raton should verify this assumption and adjust the analysis as appropriate.

Additional Optimization (5.0 mg/L TN)

Raton should be capable of a higher level of performance to achieve a long-term average TEC of 5.0 mg/L TN following efforts to optimize the existing treatment processes and upgrade and modernize existing systems. The existing system at Raton is configured for nitrogen removal and achieves effluent TN concentrations below 6 mg/L at times. Nitrogen removal is achieved via a combination of nutrient uptake and the nitrification and denitrification processes. Upgrades to supervisory control and data acquisition (SCADA) software systems (Sagues 2013), investments in new, more energy efficient blowers, and new, efficient mixers for use while the system is in anoxic/anaerobic modes would result in achieving the TEC of 5.0 mg/L. Tetra Tech based this estimated level of performance on effluent concentrations for TN from other optimized SBR treatment systems (Klebs 2005; USEPA 2015).

Denitrification Filters (3.0 mg/L TN)

Raton should be able to achieve a long-term average TEC of 3.0 mg/L TN with an investment in additional treatment systems/facilities. The TEC of 3.0 mg/L TN is defined based on widely-accepted performance expectations for systems specifically designed for BNR. Achieving 3.0 mg/L TN generally requires investing in additional treatment facilities (e.g., denitrification filters, reactors, mixers, recycle lines). These approaches leverage BNR-sequential nitrification and denitrification, which can be achieved using unaerated (anoxic) and aerated (oxic) zones or cycles. Tetra Tech estimated that Raton could achieve a TEC of 3.0 mg/L TN after first optimizing the existing treatment system (cycle times, blowers, mixers, instrumentation), as described above in the discussion of the Additional Optimization (5.0 mg/L) option, and then installing denitrification filters in the existing basin for further TN removal.

Reverse Osmosis (< 1.0 mg/L TN)

Reverse osmosis (RO) is a technology that uses a high-pressure pump to increase the pressure on the feed side and forces wastewater across a semi-permeable RO membrane, leaving pollutants behind in the reject stream. Based on Water Environment Research Foundation (WERF) studies on environmental and economic sustainability of treatment technologies that could be implemented by WWTFs to meet nutrient limits at various levels (Falk et al. 2011), Tetra Tech estimated that installation of RO would reduce effluent concentrations to < 1.0 mg/L TN. Thus, RO is the only option that would provide effluent quality sufficient to approach compliance with the WQBEL derived from New Mexico's threshold value, though the ability to consistently achieve the WQBEL of 0.65 mg/L as a monthly average is uncertain, even with RO.

3.3.2 Total Phosphorus Reduction Options Evaluated

Tetra Tech also analyzed several treatment options for additional TP removal at the Raton WWTF. For TP, each increment of reduction typically requires significant changes in technology and associated costs. The treatment options evaluated, and the various performance levels or TECs they represent, are shown in Table 5.

Table 5. Total Phosphorus TEC Options for Raton WWTF

TEC	Treatment Technology Options
0.5 mg/L TP	Chemical precipitation or Enhanced biological phosphorus removal—anaerobic selector technology with tertiary filtration
0.1 mg/L TP	Chemical precipitation with tertiary filtration
< 0.01 mg/L	Reverse osmosis

Chemical Precipitation (0.5 mg/L TP)

Raton could expect to achieve a long-term average effluent concentration of 0.5 mg/L TP through enhanced biological phosphorus removal (EBPR) with tertiary filtration (e.g., moving bed filters, media filters, cloth/screen filters) or chemical precipitation (Ohio EPA 2013). Because Raton is testing and considering installing a chemical (alum) precipitation system and the capital costs of chemical removal systems for TP reductions generally are lower than the costs for EBPR, Tetra Tech did not estimate the cost of an EBPR upgrade for this analysis.

Chemical treatment is the most common method used for phosphorus removal to meet effluent concentrations below 1.0 mg/L (MPCA 2006). Chemical treatment for phosphorus removal involves the addition of metal salts to react with soluble phosphate. This process forms solid precipitates that are removed by solids separation processes, such as clarification. As discussed below, tertiary filtration may be added to achieve lower TP effluent concentrations. The most common metal salts used are in the form of alum (aluminum sulfate), sodium aluminate, ferric chloride, ferric sulfate, ferrous sulfate, and ferrous chloride.

Less complicated than biological approaches, the chemical treatment design approach consists of a mass balance between chemical addition, the stoichiometry of the chemical added and phosphorus removed, and the phosphorus concentration after chemical addition.

When examining chemical addition, facilities should be evaluated for two scenarios:

1) Effluent polishing in the secondary process: The chemical addition point is in the secondary treatment process, where it is added to the mixed liquor stream just before the secondary clarifier.
2) Two-point chemical addition: Chemical is applied in both the primary clarifier feed and also just before the secondary clarifier. Two-point addition is popular for many applications because it achieves the most efficient use of chemicals for phosphorus precipitation.

With chemical addition, sludge production increases in the wastewater treatment unit process where the chemical is applied. Sludge production has been noted to increase by 40 percent in the primary treatment process and 26 percent in activated sludge plants.

Chemical Precipitation Plus Filtration (0.1 mg/L TP)

Raton should be able to achieve a TEC of 0.1 mg/L TP as a long-term average by investing in chemical precipitation with the addition of tertiary filtration. Using this treatment approach, phosphorus that has been adsorbed to solid particles is removed from the wastewater with filtration, rather than with clarification alone. This technology is often capable of reducing TP concentrations to 0.05 mg/L or even less, but a desk study is not sufficient to determine whether concentrations approaching this level could be reliably achieved at a specific facility such as Raton WWTF.

Reverse Osmosis (< 0.01 mg/L)

Based on a WERF report (Falk et al. 2011), Tetra Tech estimated that installation of RO would reduce effluent concentrations to < 0.01 mg/L TP. Therefore, RO would be required for Raton to discharge at concentrations for TP that achieve the WQBEL derived from New Mexico’s nutrient threshold value.

4 Engineering Cost Estimation

After determining potential treatment options and the expected effluent concentrations of TN and TP for each option, the next step in Tetra Tech’s analysis was to estimate the cost of each option. For each option considered for Raton, Tetra Tech estimated capital and operation and maintenance (O&M) costs. These cost estimates were used later in the economic and social impact analysis to justify the need for a temporary standard and in the analysis of treatment options that could be used to identify the HAC.

4.1 Engineering Cost Assumptions

For each treatment technology option considered, Tetra Tech conducted an engineering cost estimation using CapdetWorks, which is a software tool for preliminary design and cost estimation of wastewater treatment plant construction project alternatives. CapdetWorks is based on the CAPDET program originally developed by the U.S. Army Corps of Engineers (Corps) and later upgraded based on an agreement between the Corps and EPA. CapdetWorks designs unit processes in a given layout based on influent characteristics and then estimates the cost of the design. The program uses defaults for each unit process to produce an acceptable design and to make the software easy to use for developing planning-level cost estimates for a new facility or an upgrade to an existing facility. The design override tab provides the ability to fine-tune a suggested design. The program focuses on estimating the costs of the treatment system components, rather than on the details of the design or the expected effluent quality.

Tetra Tech applied CapdetWorks to estimate capital and O&M costs for Raton by considering different treatment systems added to the existing treatment train to achieve various levels of treatment for TN and TP. To estimate costs for process upgrades to instrumentation, mixers, and aeration that were not part of a new treatment unit, a full treatment system similar to Raton's at an influent flow of 0.62 MGD was developed and costed using CapdetWorks. The specific capital and O&M costs for upgraded instrumentation, aeration, and mixing for this configuration were then extracted from the total cost of the treatment system estimated by CapdetWorks. CapdetWorks includes all treatment options costed in this analysis except RO. Cost estimates for RO were calculated separately using existing, published information from WERF on treatment costs (Falk et al. 2011).

Costs were updated to 2017 dollars, and capital costs were annualized and added to the O&M costs to obtain a total annualized cost for each level of treatment. In estimating these costs, Tetra Tech made assumptions, detailed below, concerning the required accuracy of the cost estimates, the Raton WWTF influent concentrations and effluent flow that will be treated for nutrient removal, and the interest rates and amortization period for financing any capital costs.

4.1.1 Accuracy of Estimates

CapdetWorks accounts for changing costs over time in its costing algorithms by using several equipment-related cost indices to adjust costs to the present. CapdetWorks allows users to choose from multiple equipment costing databases. Tetra Tech used the Hydromantis 2014 USA Average database for cost estimates.[2] The cost estimates in the database are obtained from construction and equipment cost indices published on a regular basis in several popular trade publications (Marshall and Swift, *Engineering News Record*, *Chemical Engineering* magazine). The cost indices tab in CapdetWorks allows the user to update cost estimates to reflect current year dollars. For this analysis, Tetra Tech converted 2014$ to 2017$. Tetra Tech used the average cost of electricity in New Mexico when estimating energy costs.

Using the algorithms and current costing indices in CapdetWorks along with energy costs specific to New Mexico provides information sufficient to develop Class 4 cost estimates as described by the Association for the Advancement of Cost Engineering International (AACEI) (formerly known as the American Association of Cost Engineers). Class 4 cost estimates generally are prepared based on limited information and used for purposes including detailed planning, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval. The accuracy of the Class 4 cost estimates is estimated to be in the range of -30 percent to +50 percent (AACEI 2005).

The cost estimates for RO are consistent with Class 5 cost estimates as described by AACEI. These estimates are less precise than the estimates for other treatment options because they are based on the WERF study (Falk et al. 2011) of the performance and cost of hypothetical treatment trains, without benefit of a detailed analysis of current influent quality and performance for the Raton WWTF to factor into the analysis. AACEI indicates that the accuracy of Class 5 cost estimates is in the range of -50 percent to +100 percent. Class 5 estimates typically are prepared for strategic business planning

[2] CapdetWorks is a Hydromantis product.

purposes (e.g., assessment of initial viability; evaluation of alternate schemes; project screening; evaluation of resources needs and budgeting; long range capital planning).

As stated in EPA's Interim Economic Guidance (USEPA 1995), the first step of an economic analysis is to evaluate and verify project costs. Because the strength of the analysis is dependent upon the accuracy of the estimates, it is important for Raton to consider site specific information, if available. This would allow Raton to fine-tune this analysis to any site-specific factors that were not identified in this report and make more accurate estimates of the costs that the city would incur to install the technology options.

4.1.2 Influent Concentrations and Treated Flow

CapdetWorks considers both influent concentrations of parameters of concern and the treated effluent volume to produce a specific layout of treatment processes and estimate costs. Flow data are included in the discharge monitoring report records for Raton; however, influent concentrations of TN and TP are not available. Tetra Tech used the CapdetWorks default influent concentration of 8 mg/L TP. CapdetWorks does not provide a default influent TN concentration, but it does provide default influent concentrations for various nitrogen species and assumes no nitrification has occurred prior to treatment. The default concentrations, which were used in the analysis, are:

- total Kjeldahl nitrogen (TKN) = 40 mg/L
- soluble TKN = 28 mg/L
- ammonia = 25 mg/L
- nitrate = 0 mg/L
- nitrite = 0 mg/L.

TN is the sum of TKN, nitrate, and nitrite which, in this case, is 40 mg/L.

The effluent volume used to calculate pollution control costs should reasonably represent expectations for flow for the duration of the temporary standard and should be supported by a reasonable explanation for the selection made for the analysis. In the evaluation for Raton, Tetra Tech assumed that facility flows will remain constant; there is no explicit consideration for population change (growth or decline). Raton WWTF managers indicated the population of Raton is declining. Based on U.S. Census Bureau records, EPA confirmed that Raton's population has been declining by an average of 21–26 households per year since 1980.[3]

For Raton, Tetra Tech, in consultation with NMED and EPA, determined that the selected flow value would be the lesser of:

- the maximum of the average weekly effluent flows observed from a representative period of record (generally 3 to 5 years) or
- the design flow (average monthly, if available).

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[3] http://population.us/nm/raton/ shows Raton's population at 8,225 in 1980—the year the decline started—then 6,885 in 2010, and 6,326 in 2014. https://www.census.gov/quickfacts/fact/table/ratoncitynewmexico/PST045216 shows an estimated 2.15 persons per household (2012–2016). Based on this information, the average number of households lost per year was 20.8 from 1980 to 2010 (8225-6885)/2.15/30 and 26.0 from 1980–2014 (8225-6326)/2.15/34. This assumes the number of persons per household is constant and was the same in 1980.

The nutrient threshold values that are the basis for effluent limits derived from the underlying WQS are being interpreted as 30-day average values. Although it would be reasonable to use a measure of average monthly effluent flow to establish treatment costs for attaining these standards, using the weekly average flow provides a "factor of safety" that accounts for intra-month variability in flows, as well as the possibility of future growth during the term of a proposed temporary standard.

The design flow for the Raton WWTF is 0.9 MGD, while the maximum of the average weekly effluent flows was 0.62 MGD over a period from 2014 to 2017. Therefore, a flow of 0.62 MGD was used for costing purposes. In Raton's case, the maximum of weekly average flows is currently well below the design flow for the facility. As noted above, the population of Raton has been declining in recent years; therefore, it is appropriate for calculations for the temporary standards analysis to reflect the costs to treat nutrient pollution at an effluent flow that is below the facility's treatment capacity. This approach assumes that treatment and controls for nutrients is scalable. In other words, if, in the future, actual flow increases and approaches the design flow for the rest of the facility, treatment for nutrient removal could be scaled up to treat a higher flow volume.

4.1.3 Interest Rates and Amortization Period

CapdetWorks estimates both capital and O&M costs for each treatment process included in the treatment train. Estimated capital costs were converted to annual costs using standard engineering economics tables assuming an interest rate, *i*, of 5 percent and a term, *n*, of 20 years. Annualized capital costs were added to the annual O&M cost estimates to determine overall annualized costs.

4.2 Cost Estimate for Each Pollutant Reduction Option Evaluated

Tetra Tech estimated the cost of each technology option on the basis of the standard of practice for each at the average weekly effluent flow of 0.62 MGD. In all cases, cost data were normalized to January 2017$ by multiplying costs by the ratio of the January 2017 cost index to the 2014 cost index in the CapdetWorks model. For RO, where CapdetWorks was not used to estimate costs, cost data were normalized to January 2017$ by multiplying costs by the ratio of the January 2017 cost index to the historical cost index for the study in question (RSMeans construction cost indexing data were used). Tetra Tech annualized capital costs using a discount rate of 5 percent and a term of 20 years, as discussed in Section 4.1.3 above. These costs were added to the annual O&M cost estimates to determine total annual costs. The cost estimates for each treatment technology option evaluated are shown in Table 6.

Table 6. Estimated Costs of Technology Options (January 2017$)

Technology	TEC	Capital Cost	O&M Cost	Annualized Costs[1]	Reference
Optimization of Existing SBR	TEC 7.0 TN	$0	$0	$0	
Additional Optimization	TEC 5.0 TN	$460,020	$69,553	$106,427	CapdetWorks
Denitrification Filters	TEC 3.0 TN	$1,336,200	$249,115	$356,278	CapdetWorks
Chemical Precipitation	TEC 0.5 TP	$221,340	$80,886	$98,637	CapdetWorks
Chemical Precipitation & Filtration	TEC 0.1 TP	$2,252,160	$472,784	$653,408	CapdetWorks
Reverse Osmosis	TEC < 1.0 mg/L TN TEC < 0.01 mg/L TP	$10,750,800	$847,916	$1,710,130	Falk et al. 2011

[1]Annualized costs are based on a discount rate, *i*, of 5%, and term, *n*, of 20 years.

When estimating the cost of upgrading of instrumentation, blowers, and mixers to achieve a TN concentration of 5.0 mg/L, Tetra Tech used default power consumption and instrumentation costs in the CapdetWorks cost indices. This TEC represents an additional level of treatment between optimization of the existing treatment system and addition of denitrification filters. There is not a linear correlation between moving from a TEC of 7.0 mg/L to 5.0 mg/L to 3.0 mg/L TN and the estimated costs of treatment. If Raton proceeds in a stepwise manner, with 5.0 mg/L TN as an intermediate step on the way to ultimately achieving a TEC of 3.0 mg/L TN, additional analysis and engineering will be required between achieving 5.0 mg/L TN and achieving 3.0 mg/L TN. This additional analysis and engineering accounts for a higher overall cost when taking a stepwise approach to achieving 3.0 mg/L TN.

5 "Factor 6" Justification for a Temporary Standard: Substantial and Widespread Impact Analysis

Consistent with the federal regulations on variances, New Mexico's regulations require that the need for a temporary standard be justified using one of the factors referenced in 40 CFR 131.14 and discussed in section 2.2. Factor 6 states, "controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact." EPA's Interim Economic Guidance describes substantial and widespread economic and social impacts as two separate analyses. For public-sector entities, substantial impacts refer to the financial impacts on the community, taking into consideration current socioeconomic conditions. Widespread impacts, on the other hand, refer to changes in the community's socioeconomic conditions. Demonstration of substantial impacts alone is not sufficient. Rather, to justify the need for a temporary standard, the applicant must also demonstrate that any substantial financial impacts to the community would also result in widespread socioeconomic impacts to the community.

After identifying pollution control options available to Raton and the cost of those options, the next step in the analysis is to determine whether compliance with the WQBELs needed to meet WQS would result in substantial impacts. This step requires compiling information to characterize the community, the existing cost of pollution control, and the additional treatment costs that would be needed to meet the WQBELs based on the numeric nutrient thresholds, and then calculating the total cost of pollution control (existing pollution control costs plus additional treatment costs) per household needed to meet the calculated WQBELs. Tetra Tech used EPA's Interim Economic Guidance spreadsheet tool for "UAAs and Variances – Public Sector[4]" to determine whether the total cost of pollution control would have substantial impacts to the community. If the analysis demonstrates the total cost of pollution control would be substantial, the analysis considers whether those substantial impacts would also be widespread. Output from the spreadsheet tool for RO can be found in Appendix B.

5.1 Community Characteristics and Cost Allocation for Reverse Osmosis Pollution Control

Sewage authorities charge for services, and thus can recover pollution control costs through user fees. Tetra Tech collected the most recent information on the population, number of households, and median household income (MHI) in Raton and used that information to evaluate the potential impact to the community of installing additional pollution controls at the WWTF (Table 7).

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[4] Available online at https://www.epa.gov/wqs-tech/economic-guidance-water-quality-standards.

Table 7. Community Characteristics

Characteristic	Value	Source
Population	6,348	U.S. Census Bureau, Population 2012–2016 American Community Survey (ACS) 5-year estimate
Number of Households	2,890	U.S. Census Bureau, 2012–2016 ACS 5-year estimate
Adjusted Median Household Income (January 2017)	$29,773	U.S. Census Bureau, 2012–2016 ACS 5-year estimate

According to the *2016 Public Water and Wastewater User Charge Survey for December 2015 Rates* (NMED 2017), each household in Raton paid $230.16 per year in sewer costs (based on a residential use rate of 6,000 gallons per month). Ratepayers pay 100% of the cost of pollution control. Whether or not the community faces substantial impacts from additional pollution control options for TN and TP depends on both the cost of the additional pollution control (i.e., technology option(s)) and the general financial and economic health of the community.

5.2 Annual Cost Per Household for Reverse Osmosis (Total Nitrogen < 1.0 mg/L; Total Phosphorus < 0.01 mg/L)

Tetra Tech determined that RO is the treatment technology option that comes closest to meeting the WQBELs derived from NMED's numeric nutrient thresholds. RO can achieve a TN effluent concentration of < 1.0 mg/L (potentially still above the threshold) and TP effluent concentration of < 0.01 mg/L (below the threshold). The engineering cost estimates for implementing RO at Raton (Table 6) are summarized in Table 8 below. This table also includes the cost per household based on the community characteristics provided in Table 7 and the existing annual pollution control costs per household of $230.16.

Table 8. Cost of Reverse Osmosis

Cost Element	Amount (2017$)
Capital Cost	$10,750,800
Annual O&M Cost	$847,916
Total Annualized Cost	$1,710,588
Existing Annual Pollution Control Cost Per Household	$230.16
Annual Incremental Pollution Control Cost Per Household	$591.90
Annual Pollution Control Cost Per Household	**$822.06**

As shown in Table 8, the expected annual cost per household after installing RO would be $822.06 assuming that 100 percent of the costs of the project are borne by households. This cost includes the current annual pollution control cost per household ($230.16) plus the estimated annual incremental pollution control cost per household for RO ($591.90).

5.3 Substantial Impact Analysis: Reverse Osmosis Pollution Control to Meet Water Quality-Based Effluent Limits

EPA's Interim Economic Guidance describes two tests for determining whether the socioeconomic impact of requiring a pollution control measure would be *substantial*:

- Municipal Preliminary Screener (MPS)
- Secondary Test Indicators

These tests are discussed in more detail in the following sections.

5.3.1 Municipal Preliminary Screener

The first step in EPA's Interim Economic Guidance to determine whether the socioeconomic impact of requiring a pollution control measure is substantial is to calculate the MPS. The MPS can help determine whether or not the community can clearly pay for the pollution control project. If the MPS suggests a community can clearly pay for the pollution control project, then a temporary standard is not likely justified based on a "factor 6" substantial and widespread economic and social impact demonstration, and performing the Secondary Test may not be necessary.

The MPS estimates the total annual pollution control costs per household (existing costs plus those attributable to the proposed project) as a percentage of MHI:

MPS = Average Total Pollution Control Cost per Household/MHI

The analysis proceeds to the Secondary Test if:

- The total annual cost per household exceeds 2.0 percent of MHI—EPA's Interim Economic Guidance suggests the project is likely to result in a substantial economic impact.
- The total annual cost per household is between 1.0 and 2.0 percent of MHI—EPA's Interim Economic Guidance suggests the project may result in a substantial economic impact.

If the total annual cost per household (existing annual cost plus the incremental cost related to the proposed project) is well below 1.0 percent of MHI, EPA's Interim Economic Guidance suggests the project will likely not impose a substantial economic impact on the community. Typically, the analysis would not proceed further. However, if the total annual cost per household is less than but fairly close to 1.0 percent of MHI, the project may impose a substantial economic impact on the community due to the community's unique circumstances. In such cases, the unique circumstances should be documented, and the analysis proceeds to the Secondary Test.

The existing annual sewer cost per household in Raton of $230.16 is 0.8% of MHI ($29,773). Requiring RO would increase the annual costs per household to $822.06, which is 2.8% of MHI, suggesting that the additional treatment is likely to result in a substantial economic impact to the community, and the analysis proceeds to the Secondary Test.

5.3.2 Secondary Test Indicators

The Secondary Test is designed to build upon the characterization of the financial burden identified in the MPS. EPA's Interim Economic Guidance recommends using six Secondary Test indicators:

Debt Indicators

- Bond Rating (if available)—a measure of credit worthiness of the community.
- Overall Net Debt as a Percent of Full Market Value of Taxable Property—a measure of debt burden on residents within the community.

Socioeconomic Indicators

- Unemployment Rate—a measure of the general economic health of the community.
- MHI—a measure of the wealth of the community.

Financial Management Indicators

- Property Tax Revenue as a Percent of Full Market Value of Taxable Property—a measure of the funding capacity available to support debt based on the wealth of the community.
- Property Tax Collection Rate—a measure of how well the local government is administered.

The Secondary Test indicators for Raton are shown in Table 9.

Table 9. Secondary Test Indicators

Indicator	Value for Raton
Debt Indicators	
Bond Rating (if available)	Not available*
Overall Net Debt as a Percent of Full Market Value of Taxable Property	$5,073,348
Socioeconomic Indicators	
Unemployment Rate	6.1%
Adjusted Median Household Income (January 2017)	$29,773
Financial Management Indicators	
Property Tax Revenue as a Percent of Full Market Value of Taxable Property	$637,160
Property Tax Collection Rate	99%

*Raton does not have a bond rating.

EPA's Interim Economic Guidance provides recommendations on how to score each Secondary Test indicator value. The guidance recommends assigning a score of 1 to an indicator assessed as weak, a 2 to an indicator assessed as mid-range, and a 3 to an indicator assessed as strong. After assigning each Secondary Test indicator value a score, the guidance recommends calculating a cumulative score that is the average of all the individual scores (summing the individual scores and dividing by the number of scores). Using the Secondary Test Indicators in Table 9, Tetra Tech calculated an average secondary test score of 2.0, which indicates socioeconomic conditions that are mid-range between weak and strong.

5.3.3 Substantial Impacts Matrix Assessment

EPA's Interim Economic Guidance recommends that the MPS and the average Secondary Test score be considered together to assess whether substantial impacts are likely to occur from the pollution control project. In the matrix, which is provided as Table 10, an "X" indicates that the impact is likely to be substantial. The closer the community is to the upper right-hand corner of the matrix, the greater the impact. A "✓" indicates that the impact is not likely to be substantial. The closer to the lower left-hand corner of the matrix, the smaller or more insignificant the impact. A "?" indicates that the impact is unclear. EPA's Interim Economic Guidance recommends communities in the "?" category with results for both the MPS and the Secondary Test that are borderline should move into the category closest to it. If results are not borderline, other factors such as the impact on low or fixed income households, the presence of a failing local industry, and other projects the community would have to forgo to comply with WQS should be considered. Evaluating the MPS and the average Secondary Test score suggests that

NMED EXHIBIT 24

installation of RO would likely result in substantial economic impacts to the community (highlighted cell in Table 10).

Table 10. Assessment of Substantial Impacts Matrix for Installing RO (Raton's Position Highlighted in Orange)

MPS: 2.8%			
Secondary Test Score: 2.0			
Secondary Test Score	MPS		
	< 1.0%	1.0%–2.0%	> 2.0%
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X
Greater than 2.5	✓	✓	?

Key:
✓: Impact is not likely to be substantial
X: Impact is likely to be substantial
?: Impact is unclear
X: Raton score

5.4 Widespread Impact Analysis: Reverse Osmosis Pollution Control to Meet Water Quality-Based Effluent Limits

Because the financial analysis demonstrates that the economic impacts of installing RO would likely be substantial for Raton, the analysis moves on to the second step of the demonstration—an analysis of whether those substantial impacts would likely be widespread in the community. ECONorthwest conducted the widespread impact analysis, considering several indicators, including:

- Estimated change in MHI;
- Estimated change in the unemployment rate;
- Estimated change in overall net debt as a percent of full market value of taxable property;
- Estimated change in the percentage of households below the poverty line;
- Impact on commercial development potential; and
- Impact on property values.

At a minimum, the analysis should define the affected community (i.e., the geographic area where project costs pass through to the local economy), consider the baseline economic health of the community, and evaluate how the proposed project would affect the socioeconomic well-being of the community.

Raton is in northeastern New Mexico, near the Colorado border. It occupies approximately 8 square miles in Colfax County,[5] a largely rural county. Raton is more than three hours from Albuquerque or Denver, the nearest major metropolitan areas. As of 2016, the population was approximately 6,350 people, with one-third white and nearly two-thirds Hispanic, and the median age was 45.5 (compared to 37.2 for New Mexico as a whole). The area and population affected by the water quality compliance costs under review correspond to the WWTF's service area. There are no other major population centers in close proximity

[5] Data for this section come from the U.S. Census Bureau ACS data for 2016. ACS data are accessible via many pathways, including directly from the U.S. Census Bureau (https://www.census.gov/programs-surveys/acs/data.html) and third party aggregators such as Census Reporter (https://censusreporter.org/).

to Raton. Raton is the county seat for Colfax County, and Raton has approximately half the total county population, while comprising less than 1 percent of the total county area.

The substantial impact analysis indicates that the pollution control project (RO) needed for Raton to meet WQBELs based on New Mexico's numeric nutrient thresholds would increase the average household annual sewer rates from approximately $230, or 0.8% of median annual household income, to approximately $822, or 2.8% of median annual household income. The magnitude of the changes in the percent of MHI for pollution control costs associated with meeting the underlying WQS (RO) is significant, with sewer fees more than tripling.

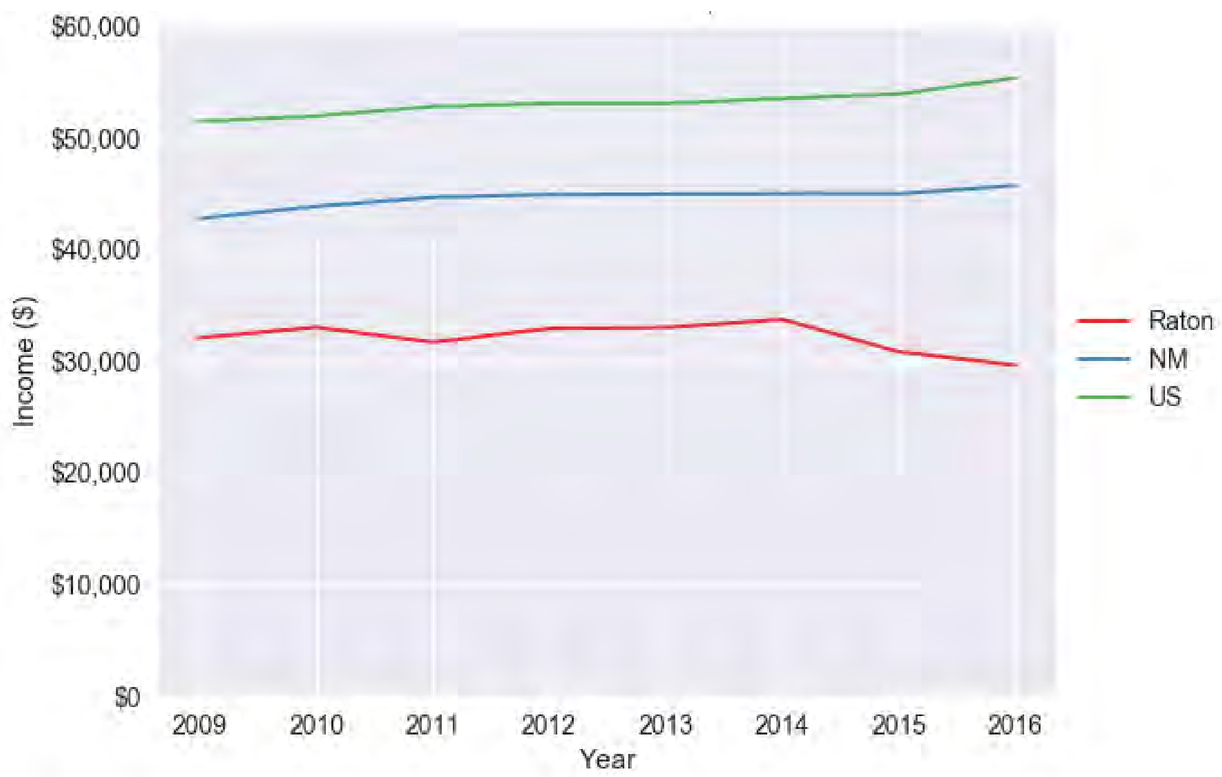

Figure 1. Median Household Income for Raton, New Mexico, 2009–2015 (Calculated by ECONorthwest with data from U.S. Census Bureau, Center for Economic Studies)

The community median annual household income was approximately $29,600 in 2016, which is substantially lower than the statewide median annual household income of approximately $45,700. The data depicted in Figure 1 show that from 2009 to 2016 Raton's MHI has shown stagnant or declining conditions while state and national levels have increased slightly. The substantial economic impacts from upgrades to Raton's WWTP technology would have a higher likelihood of being widespread because Raton's MHI is consistently substantially lower than national and state averages. In addition, wages for jobs in Raton are generally lower than wages in the state as whole.

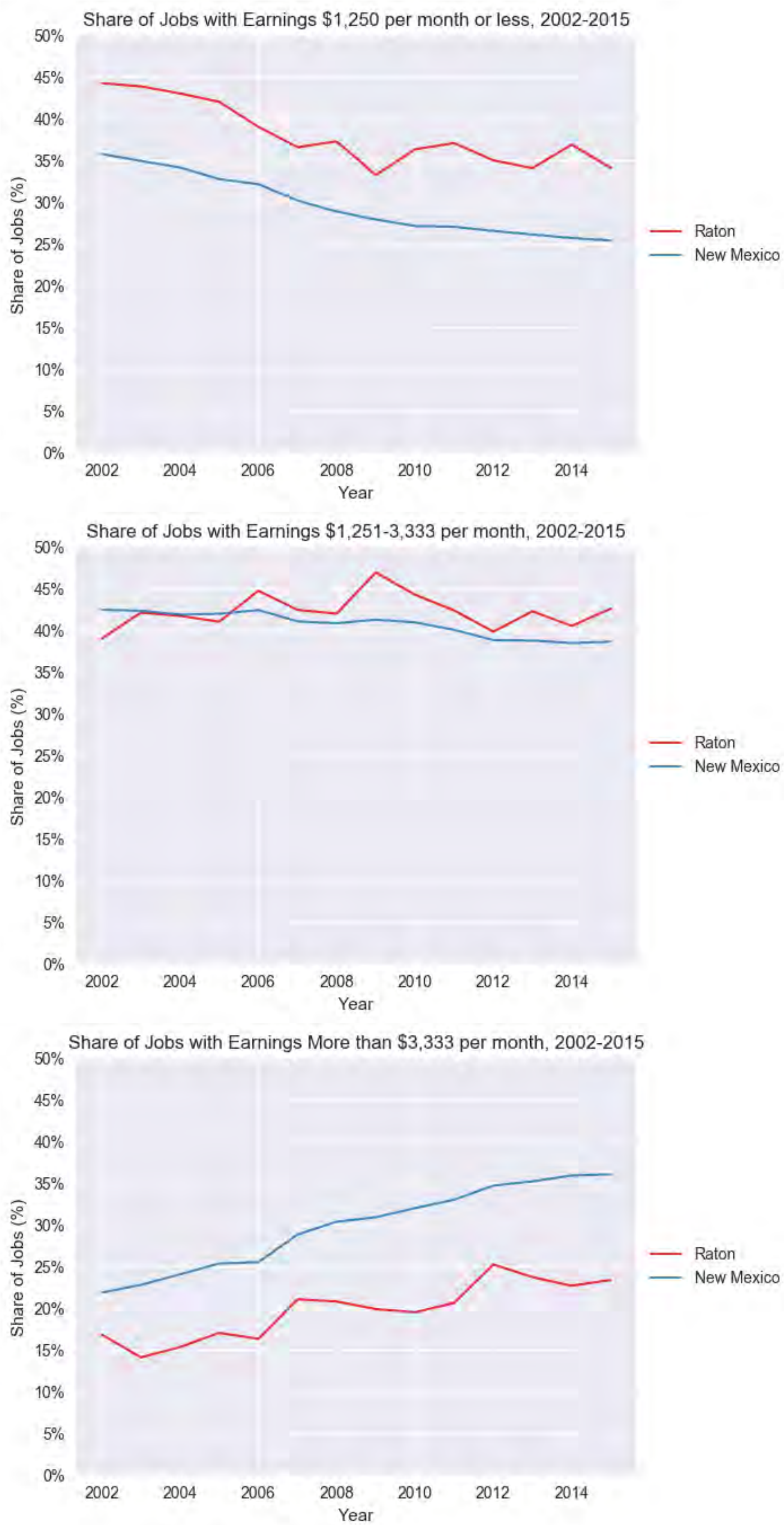

Figure 2. Jobs by Earnings by Monthly Wage, 2002–2015 (Calculated by ECONorthwest with data from U.S. Census Bureau, Center for Economic Studies)

Figure 2 shows that the share of higher paying jobs in Raton is not increasing over time as rapidly as for the state as a whole. Together these changes in MHI levels at the community scale suggest that substantial economic impacts to the Raton community are likely to be widespread.

Another factor suggesting that the substantial economic impacts associated with installing RO demonstrated in Section 5.3 would be widespread is that the impacts would occur across the entire community. Almost all households and businesses in the community pay for wastewater treatment. The increase in wastewater treatment rates necessary to install RO would apply to all rate payers and thus to almost the entire community. A substantial community-wide increase in wastewater treatment rates would likely have broad negative effects on community financial health. Such broad negative effects on community financial health would likely alter the ways in which people live, work, play, relate to one another, and organize their activities.

5.5 Summary and Conclusion

Based on the analysis presented in this report, Tetra Tech concludes that achieving WQBELs derived from the underlying WQS through treatment would necessitate the installation and operation of RO at the Raton WWTF and would lead to substantial and widespread economic and social impacts to the community. As such, the information analyzed by Tetra Tech supports the conclusion that Raton WWTF is able to demonstrate the need for a temporary standard in accordance with 20.6.4.10.F.1.a NMAC and 40 CFR 131.14(b)(2)(i)(A). As noted previously, Raton's petition for a temporary standard should include an assessment of the feasibility of other potential options for achieving WQBELs derived from underlying WQS not examined in this report, such as moving the point of discharge or land application.

6 Highest Attainable Condition Analysis

Where a petitioner can demonstrate that meeting WQBELs based on the underlying standard would cause substantial and widespread economic and social impact to the community, the petitioner must then determine the interim requirements that will apply during the term of the temporary standard. The requirements must reflect the HAC that can be achieved related to the pollutant for which the temporary standard is sought. EPA considers the HAC to mean the condition that is both feasible to attain and is closest to the protection afforded by the designated use and criteria. New Mexico defines the HAC as the highest degree of protection feasible in the short term, and the condition that will be the basis for effluent limits during the term of the temporary standard. For temporary standards applicable to a single discharger—as is the case with Raton—the HAC can be expressed as the highest attainable interim criterion for the receiving water; the interim effluent condition that reflects the greatest pollutant reduction achievable; or, if no additional feasible pollutant control technology can be identified, the interim criterion or interim effluent condition that reflects the greatest pollutant reduction achievable with the pollutant control technologies installed at the time the state adopts the WQS variance, and the adoption and implementation of a PMP. The HAC options described below are presented in the form of interim effluent condition reflecting the greatest pollutant reduction achievable.

After determining that meeting WQBELs derived from the underlying WQS would lead to substantial and widespread economic and social impact, Tetra Tech evaluated potential options to help determine the HAC for the Raton WWTF. As stated in Section 1, the analysis considered only options for optimizing existing wastewater treatment processes or modifying treatment processes to achieve greater pollutant reductions. It did not consider other options such as pollutant minimization, discharge relocation, or elimination of the discharge to surface waters. While these options were not considered as part of this analysis, they should be considered by Raton WWTF in the petition it submits to the Commission to demonstrate eligibility for a temporary standard.

6.1 Summary of Options Evaluated

Treatment options evaluated as candidates for establishing the HAC include optimization of Raton's existing treatment system and technologies (other than RO) that would provide additional reductions in the effluent concentrations of TN and TP. Options for TN and TP were evaluated separately. These options are summarized in Table 11 below.

Table 11. Potential Treatment Technology Options for Establishing the HAC—Raton WWTF

Treatment Technology Options for TN	TEC
Optimization of existing SBR (ICEAS) process to promote nitrification/denitrification	7.0 mg/L TN
Upgrade SCADA system, install new mixers and blowers	5.0 mg/L TN
Biological nitrogen removal: -nitrification/denitrification via anoxic/oxic zone or cycle retrofits AND/OR -addition of a denitrification filter, or -optimization if approaching limit of technology	3.0 mg/L TN
Treatment Technology Options for TP	TEC
Chemical precipitation OR Enhanced biological phosphorus removal—anaerobic selector technology with tertiary filtration	0.5 mg/L TP
Chemical precipitation with tertiary filtration	0.1 mg/L TP

6.2 Evaluation of Impacts of Highest Attainable Condition Options

Tetra Tech calculated the cost per household for six potential combinations of treatment options for TN and TP shown in Table 11. Table 12 shows the incremental annual cost per household of each treatment combination option, total annual pollution control costs per household (including existing annual costs of $230.16 per household), the resulting percentage of MHI for pollution control, and the corresponding increase in annual sewer bills for households in Raton.

These options are intended to capture scenarios where there continues to be a discharge to the stream. In the event that Raton identifies a different affordable option that might lead to the facility no longer having reasonable potential (e.g., if the facility identified an option to switch to land application resulting in zero discharge), then a temporary standard would not be necessary.

Table 12. Annual Pollution Control Cost Per Household (January 2017$) of TN and TP Treatment Combination Options for Raton

Cost Element	Option A Additional Optimization (TEC = 5.0 mg/L TN) and Chemical Precipitation (TEC = 0.5 mg/L TP)	Option B Denitrification Filters (TEC = 3.0 mg/L TN) and No additional TP treatment (TEC = 2.2 mg/L TP)	Option C Denitrification Filters (TEC = 3.0 mg/L TN) and Chemical Precipitation (TEC = 0.5 mg/L TP)	Option D Optimize Cycle Times (TEC = 7.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)	Option E Additional Optimization (TEC = 5.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)	Option F Denitrification Filters (TEC = 3.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)
Capital Cost	$681,360	$1,336,200	$1,557,540	$2,252,160	$2,712,180	$3,588,360
Annual O&M Cost	$150,439	$249,115	$330,001	$472,784	$542,337	$721,899
Total Annualized Cost	$205,113	$356,335	$454,982	$653,503	$759,969	$1,009,838
Incremental Annual Cost Per Household[1]	$70.97	$123.30	$157.43	$226.13	$262.97	$349.42
Existing Annual Pollution Control Costs Per Household	$230.16	$230.16	$230.16	$230.16	$230.16	$230.16
Total Annual Pollution Control Costs Per Household[2]	**$301.13**	**$353.46**	**$387.59**	**$456.29**	**$493.13**	**$579.59**
% of MHI for Pollution Control[3]	**1.01**	**1.19**	**1.30**	**1.53**	**1.66**	**1.95**
% Increase in Annual Sewer Bill	**31**	**54**	**68**	**98**	**114**	**152**

[1]2,890 households
[2]Annualized at 5% over 20 years.
[3]Based on adjusted (January 2017$) MHI of $29,773.

NMED EXHIBIT 24

There are several factors to consider when evaluating the range of options in Table 12 to determine the HAC for Raton, including those factors described in EPA's Interim Economic Guidance and further elaborated in EPA's 2014 memorandum "Financial Capability Assessment Framework for Municipal Clean Water Act Requirements" for looking at unique circumstances (USEPA 2014). In evaluating Raton's financial capability and what is feasible for the facility to attain, Raton and NMED should consider these and other relevant financial or demographic information that illustrates circumstances faced by the permittee. Raton has indicated in discussions that it has other ongoing and upcoming significant debt obligations related to necessary drinking water and sewer infrastructure upgrades. Additional detail on these obligations would be informative. Raton's MHI of approximately $29,600 per year in 2016 was below both state ($45,700/year) and national ($55,300/year) medians for the same year and has been declining since 2014. In addition, the city's population and thus the WWTF's revenue base is declining, so that remaining residents will shoulder a higher proportion of the cost burden for WWTF operation every year (i.e., total annual cost per household will increase as population decreases). If the population continues to decline as projected, the percentage of MHI that a given upgrade represents in 2018 will increase over time. The remaining life of the plant's equipment is estimated to be 20 years, and significant cost efficiencies may be gained by incorporating nutrient removal technology as equipment is upgraded as opposed to improving old equipment and processes that will be replaced within a few years.

As stated in EPA's Interim Economic Guidance, the first step of an economic analysis is to evaluate and verify project costs, because the strength of the analysis is dependent upon the accuracy of the estimates. Where possible, Raton should obtain additional information to minimize uncertainty. Refining the cost estimates, for example by obtaining bids from local firms, would minimize uncertainty about which options may or may not lead to substantial and widespread economic impacts. To the extent that Raton may need to raise wastewater service fees gradually to obtain funds to pay for treatment upgrades, installation of specific treatment may need to be staged over time. Thus, the HAC associated with certain treatment may be a function of time. If this is a consideration, then HAC options that are less costly may carry a shorter term of the temporary standard than HAC options with more costly treatment. Time to develop a long-term plan for wastewater treatment given the city's declining population and demand for water reuse may also factor into both selection of HAC and term of the variance.

Prior to submitting its petition to the Commission, Raton should evaluate other options (e.g., no discharge, seasonal discharge, and source control), that are not included in this desk study and that could inform determination of the HAC.

7 Conclusions and Next Steps

This analysis demonstrates that RO is the only technology that would allow Raton WWTF to achieve effluent concentrations approaching or achieving the underlying WQS. Installing RO would trigger substantial and widespread economic and social impact according to 40 CFR 131.10(g)(6). This analysis is only a portion of the information that the Raton WWTF would need to include in a temporary standard petition. The cost estimates are based on a desk study and, as stated in Section 4.1.1, they have an accuracy within the range of -30 percent to +50 percent or, for RO, -50 to +100 percent. Furthermore, both the analysis providing justification for a temporary standard and the analysis of options for determining the HAC consider only treatment options. Raton WWTF should evaluate pollutant minimization, discharge relocation, elimination of the discharge to surface waters, and any other feasible options to determine whether one or more of these options may allow Raton to meet the underlying WQS or lead to the HAC. If these other options achieved compliance with the WQBELs and underlying WQS, then a temporary standard may not be appropriate. In order to determine eligibility for a temporary standard, the petition should include this additional analysis.

Once Raton has refined the temporary standard demonstration and HAC analysis by (1) evaluating other alternatives for reducing nutrient loading to achieve the HAC, such as land application, and (2) refining the cost estimates provided in this report (e.g., through test bids) if it decides to pursue one or more of the HAC options described, Raton WWTF should work with NMED to finalize its petition for a temporary standard to ensure compliance with all state requirements. NMED would review the temporary standard application to ensure that all federal and state requirements are met prior to requesting adoption into the state's WQS and submitting the temporary standard to EPA for final review and approval.

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Appendix A

WQBEL Calculation

The WQBEL was calculated using the equation below.

Ce = Cs [(FQa + Qe)/Qe)] - Ca (FQa/Qe)

where:

Ce = Allowable effluent concentration

Cs = Applicable water quality criterion determined by interpreting the narrative nutrient criterion using the applicable nutrient threshold value; the applicable nutrient threshold value was determined in consultation with NMED based on Raton's site class for TN and TP

Ca = Ambient stream concentration upstream of discharge

Qe = Wastewater treatment facility design flow in MGD

Qa = Critical low flow of the receiving waters at discharge point in MGD

F = fraction of stream allowed for mixing (as applicable)

= zero (0) for water bodies identified as impaired on the most recent "State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List" with at least one cause(s) of impairment listed as "Nutrient/Eutrophication"

The receiving water is an effluent-dominated stream that is impaired, therefore there is no allowance for mixing and the equation reduces to:

Ce = Cs

In other words, the allowable effluent concentration (Ce) is equal to the applicable nutrient threshold value (Cs).

Based on the above equations, the WQBELs derived from the underlying WQS are as follows:

Parameter	Average Monthly Limitation (AML) mg/L
TN	0.65
TP	0.061

Appendix B

Variance Worksheet for Reverse Osmosis

The tables in this appendix are from the worksheets used to determine whether compliance with the WQBELs needed to meet WQS would result in substantial impacts to the community.

- Table B-1 summarizes the proposed pollution control project (reverse osmosis).
- Table B-2 provides the information used to calculate the MPS.
- Table B-3 shows the MPS calculation.
- Table B-4 provides the data used to calculate the Secondary Test Score.
- Table B-5 shows the Secondary Test Score calculation.
- Table B-6 presents the conclusion of the Substantial Impacts Analysis.

Although similar calculations were completed for all of the treatment options consider, this appendix includes only the results for RO because it is the additional treatment that would be needed to meet the WQBELs based on the applicable New Mexico numeric nutrient thresholds.

Pollution Control Project Summary Information (Worksheet A in the Guidance)
Description: This worksheet identifies and documents the pollution control project(s) needed to meet water quality standards. See the Guidance documentation below for more information. **Instructions**: Enter information in the **cells marked with an asterisk (*)** about the most cost-effective approach to meet water quality standards. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates may be derived from a comparable project in the State or from the judgment of experienced water pollution control engineers. Discharge management options to consider include: • Pollution prevention • End-of-pipe treatment • Upgrades or additions to existing treatment. Types of pollution prevention activities to consider are: • Public education • Change in raw materials • Substitution of process chemicals • Change in process • Water recycling and reuse • Pretreatment requirements. Whatever the approach, the information should demonstrate that the proposed project is the most appropriate means of meeting water quality standards and fully document project cost estimates. If at least one of the options that meets water quality standards will not have a substantial financial impact, then do not proceed with the analysis.

Current Capacity of the Pollution Control System (MGD)	0.62	*
Design Capacity of the Pollution Control System (MGD)	0.90	*
Current Excess Capacity (%)	31.1%	
Expected Excess Capacity after Completion of Project (%)	N/A	*
Projected Groundbreaking Date (MM/DD/YYYY)	N/A	*
Projected Date of Completion (MM/DD/YYYY)	N/A	*

Describe the proposed pollution control project.

There are seven possible pollution control projects included in this model.
• Optimize cycle times and upgrade instrumentation and aeration to meet 5.0 mg/L for TN; Chemical Precipitation to meet 0.5 mg/L for TP
• Retrofit with denitrification filter to meet 3.0 mg/L for TN, No TP Treatment
• Retrofit with denitrification filter to meet 3.0 mg/L for TN; Chemical Precipitation to meet 0.5 mg/L for TP
• Optimize cycle times to meet 7.0 mg/L for TN; Chemical Precipitation and Filtration to meet 0.1 mg/L for TP
• Optimize cycle times and upgrade instrumentation and aeration to meet 5.0 mg/L for TN; Chemical Precipitation and Filtration to meet 0.1 mg/L for TP
• Retrofit with denitrification filter to meet 3.0 mg/L for TN; Chemical Precipitation and Filtration to meet 0.1 mg/L for TP
• Reverse Osmosis to meet WQBELs based derived from the underlying WQS
*

Describe the other pollution control options considered, explaining why each option was rejected.

Pollution control options that were considered, but for which no cost estimates were developed include:
• Addition of membrane bioreactor after optimizing the current ICEAS SBR--denitrification filters assumed to be more cost-effective and provide scaleable flexibility for the treatment system based on projected population estimates and wastewater volume estimates
• Enhanced biological phosphorus removal (EBPR) with tertiary filtration--the Raton WWTF is testing a chemical (alum) precipitation system; chemical precipitation is less complicated than EBPR, provides greater removal efficiencies, and assumed to be more cost-effective
• Alternatives to the existing surface water discharge (e.g., land application, discharge relocation)--assessment requires additional site-specific information and is beyond the scope of this analysis
*

Guidance Documentation		
Component	***Section***	***Page***
Verify Project Costs	2.1.a	2-3
Documentation of Other Options Considered	2.1.a	2-3
Annual Cost of Pollution Control (overview)	2.1.b	2-4

Table B-2

Data Needed to Calculate the MPS (Worksheets B and C in the Guidance)
Description: This worksheet contains the information needed to calculate the municipal preliminary screener (MPS). The MPS is the average annualized pollution control cost per household in the affected community. The MPS helps to determine whether or not the community can clearly pay for the project without incurring any substantial impacts. See the Guidance documentation below for additional information.
Instructions: Enter the requested information into the **cells marked with an asterisk (*).** The affected community is the governmental jurisdiction or jurisdictions responsible for paying compliance costs. Current costs of pollution controls can also be considered in addition to the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from municipal records. If project costs are estimated for a prior year, these costs should be adjusted to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period available from the Bureau of Labor Statistics.

Capital Cost			
Upgrade Type		Reverse Osmosis	*
Capital Cost of Project ($)		$10,750,800	*
Other One-Time Costs of Project (list below, if any):			
Description of Cost Element		*Cost ($)*	
0	*	$0	*
0	*	$0	*
0	*	$0	*

Capital Costs to be Paid by Grants ($)	$0	*
Type of Financing (e.g., G.O. bond, revenue bond, bank loan)	0	*
Interest Rate for Financing (%)	5.00%	*
Time Period of Financing (years)	20	*

Annual costs of operation and maintenance (including but not limited to: monitoring, inspection, permitting fees, waste disposal charges, repair, administration and replacement; list below.)			
Description of Cost Element		*Cost ($)*	
All O&M Costs	*	$847,916	*
0	*	$0	*
0	*	$0	*
0	*	$0	*
0	*	$0	*

Total Annual Cost of Existing Pollution Control ($)	$665,162		*
Amount of Existing Costs Paid by Households ($)	$665,162	Back-calculated from sewer rates	*
Number of Households (do not use number of hook-ups)	2,890		*

Will households provide revenues for the new pollution control project in the same proportion that they support existing pollution control? (Check a, b or c, below.)				
◉ a) Yes			Assumes households pay 100% of existing and future costs	*
○ b) No, they will pay a different percentage. Enter to right.		0.00%		*
○ c) No, they will pay based on flow. Answer three questions to right. (Corresponds to **Worksheet C, Option A**.)	1. Total Usage of Project (e.g., MGD for wastewater treatment)	0		*
	2. Usage Due to Household Use (MGD of household wastewater)	0		*
	3. Industrial Surcharges, if any ($ total per year)	0		*

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Median Household Income (from Census)	$29,600	*
Current CPI	242.839	*
CPI for the year of the Census	241.432	*
Adjustment Factor [current CPI / CPI for the year of the Census]	1.006	
Adjusted Median Household Income [Median Household Income x Adjustment Factor]	$29,773	

Guidance Documentation		
Component	***Section***	***Page***
Evaluating Substantial Impacts (overview)	2	2-1
Capital Cost	2.1a	2-2
Annual Cost of Existing Pollution Controls	2.1b	2-3
Financing	2.1b	2-4
Annual Cost of Operations and Maintenance	2.1b	2-4
Median Household Income	2.3	2-7
Adjusting Median Household Income	2.3	2-7

Table B-3

Municipal Preliminary Screener (Worksheet D in the Guidance)
Description: This worksheet calculates and displays the Municipal Preliminary Screener (MPS), which is the total annual pollution control costs per household (existing annual cost per household plus the incremental cost related to the proposed project) as a percentage of median household income.
Total Annual Pollution Control Cost per Household / Adjusted Median Household Income × 100
The MPS indicates if a public entity would clearly not incur substantial economic impacts as a result of the proposed pollution control project.
Instructions: Evaluate the MPS by noting which cell is highlighted in **orange** and **marked with an asterisk (*).** If the MPS is less than 1.0 percent of median household income, the EPA does not expect the pollution control project to impose a substantial economic impact on the community; do not continue to the secondary affordability test. If the MPS is greater than 2.0 percent of median household income, then the pollution control project may result in a substantial economic impact to the community; continue to the secondary affordability test. If the MPS is between 1.0 and 2.0 percent of median household income, the community may incur a mid-range economic impact; continuing to the secondary affordability test is optional. See the Guidance documentation below for more information.

A. Calculation of the MPS		
Total Annual Pollution Control Cost per Household [**Worksheet C**, (11) or **Worksheet C: Option A**, (10)]	$822.06	(1)
Adjusted Median Household Income	$29,773	(2)
MPS [[(1) / (2)] × 100]	2.8%	(3)

B. Evaluation of the MPS

Note column of cell highlighted in **orange** and **marked with an asterisk (*)** below:

Little Impact	Mid-Range Impact	Large Impact
Less than 1.0%	1.0% - 2.0%	Greater than 2.0% *
Indication of no substantial economic impacts	--> Proceed to Secondary Test	

Guidance Documentation		
Component	***Section***	***Page***
MPS	2.3	2-6
Annual Pollution Control Cost per Household	2.2	2-5
Median Household Income	2.3	2-7
Census	2.3	2-7
Interpreting MPS	2.3	2-7
Determining Need for Secondary Test	2.3	2-7

NMED EXHIBIT 24

Data Needed to Calculate the Secondary Test Score (Worksheet E in the Guidance)

Description: This worksheet contains the numerical data necessary to calculate the secondary test score. The secondary test score characterizes the community's current financial and socioeconomic condition. See the Guidance documentation below for additional information.

Instructions: If the MPS indicates substantial impacts may occur (i.e. it exceeds 1.0%), proceed with the secondary test by entering socioeconomic data for the affected community in the **cells marked with an asterisk (*)**. Additional information on potential sources of data are provided in the tab named: "Potential Data Sources," and example data sources are provided in the tab named: "Example Data Sources." If one or more of the six indicators is not developed, provide an explanation as to why the indicator is not appropriate or not available.

A. Socioeconomic Data

Data	Potential Source	Value		
Direct Net Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$5,073,348	*	(1)
Overlapping Debt ($)	Community Financial Statements Town, County or State Assessor's Office	$0	*	(2)
Market Value of Taxable Property ($)	Community Financial Statements Town, County or State Assessor's Office	$364,990,766	*	(3)
Bond Rating (for uninsured bonds)	Standard and Poor's or Moody's	$0	*	(4)
Community Unemployment Rate (%)	Census of Population Regional Data Centers	6%	*	(5)
National Unemployment Rate (%)	Bureau of Labor Statistics	5%	*	(6)
Community Median Household Income (not adjusted for inflation)	Census of Population	$29,600		(7)
State Median Household Income (for same time period as Community MHI) ($)	Census of Population	$45,674	*	(8)
Property Tax Collection Rate (%)	Community Financial Statements Town, County or State Assessor's Office	99.00	*	(9)
Property Tax Revenues ($)	Community Financial Statements Town, County or State Assessor's Office	$637,160	*	(10)

If any cell above is left blank, explain why the indicator is not appropriate or not available:

The City of Raton does not have a bond rating according to searches on the Moody's and S&P websites. We were unable to calculate overlapping debt based on available data. We were also unable to accurately calculate the property tax collection rate based on available data.

*

Some states have statutory limits on property tax collections and/or rates, or data on full-market value of taxable property are not available. If this is the case, select "yes" below and provide the number of people residing in the affected community.

Are there statutory limits on property tax collections and/or rates in the state, or are data on the full-market value of taxable property not available?

- (●) a) No *
- ( ) b) Yes (enter the number of residents in the affected community below) *

Population (#)	Census of Population	6,493	*	(Pop.)

Table B-4 (continued)

B. Calculated Indicators (for informational purposes only)		
1. Overall Net Debt as a Percent of Full Market Value of Taxable Property		
Overall Net Debt [(1) + (2)]	$5,073,348	(11)
Overall Net Debt as a Percent of Full Market Value of Taxable Property [[(11)/(3)] × 100]	1.39%	(12)
1a. Overall Net Debt Per Capita (Alternative Indicator)		
Overall Net Debt Per Capita [[(11) / (Pop.)] × 100]	$781	(12 Alt.)
2. Property Tax Revenues as a Percent of Full Market Value of Taxable Property		
Property Tax Revenues as a Percent of Full Market Value of Taxable Property [[(10)/(3)] × 100]	0.17%	(13)

Guidance Documentation		
Component	***Section***	***Page***
Secondary Test (overview)	2.4	2-7
Net and Overlapping Debt	2.4	2-9
Bond Rating	2.4	2-8
Unemployment Rate	2.4	2-9
Median Household Income	2.4	2-10
Property Tax	2.4	2-10
Alternative Indicators	2.4	2-11
Use of Secondary Test	2.4	2-11

Table B-5

Calculation of the Secondary Test Score (Worksheet F in the Guidance)
Description: This worksheet calculates the secondary test score, which characterizes the affected community's current financial and socioeconomic condition. The secondary test score is used in combination with the MPS to evaluate whether or not substantial economic impacts are likely to occur. See the Guidance documentation below for additional information.
Instructions: Verify that the appropriate cell is selected in each row and in the "Score" column to be summed below (highlighted in **orange** and **marked with an asterisk (*)**).

Indicator	Secondary Indicators			Score
	Weak [a]	Mid-Range [b]	Strong [c]	
Bond Rating **Worksheet T**, (4)	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) Above Baa (Moody's)	N/A
Overall Net Debt as Percent of Full Market Value of Taxable Property **Worksheet T**, (12)	Above 5%	2% - 5%	Below 2% *	3 *
Overall Net Debt Per Capita[1] **Worksheet T**, (12 Alt.)	Greater than $3,000	$1,000 - $3,000	Less than $1,000	N/A
Unemployment[2] **Worksheet T**, (5) & (6)	Above National Average *	National Average	Below National Average	1 *
Median Household Income[3] **Worksheet T**, (7) & (8)	Below State Median *	State Median	Above State Median	1 *
Property Tax Revenues as a Percent of Full Market Value of Taxable Property[4] **Worksheet T**, (13)	Above 4%	2% - 4%	Below 2% *	3 *
Property Tax Collection Rate[4] **Worksheet T**, (9)	< 94%	94% - 98%	> 98% *	3
Average of Financial Management Indicators[4] **Worksheet T**, (13) and (9)				3 *
	a. Weak is a score of 1 point b. Mid-Range is a score of 2 points c. Strong is a score of 3 points		**SUM**	**8**
			AVERAGE	**2.0**

Notes:

[1] If the state has statutory limits on property tax collections and/or rates or data on full-market value of taxable property are not available, "Overall Net Debt as Percent of Full Market Value of Taxable Property" is replaced with "Overall Net Debt Per Capita" and "Property Tax Revenues as a Percent of Full-Market Value of Taxable Property" is dropped.

[2] If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

[3] If the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

[4] If one of the debt or socioeconomic indicators is not available, the two financial management indicators are averaged and this averaged value is used as a single indicator with the remaining indicators.

Guidance Documentation		
Component	***Section***	***Page***
Calculating Secondary Test Score	2.4	2-11
Interpreting Secondary Test Score	2.4	2-11
Missing Indicators	2.4	2-12
Determining Need for Widespread Analysis	2.5; Figure 2-1	2-12; 2-14

Table B-6

Conclusion for Community
Description: This matrix evaluates the likelihood of substantial economic impacts due to implementation of the pollution control costs. See the Guidance documentation below for additional information.
Instructions: Evaluate the combined results of the MPS and the secondary test by noting which cell in the Substantial Impacts Matrix below is highlighted in **orange** and **marked with an asterisk (*)**. If the matrix indicates the pollution control project is not likely to impose a substantial economic impact on the community, do not continue to the widespread analysis. If the matrix indicates the pollution control project is likely to impose a substantial economic impact on the community, continue to the widespread analysis. If the matrix indicates the pollution control project may or may not impose a substantial economic impact on the community, continuing to the widespread analysis is optional.

Assessment of Substantial Impacts Matrix (Table 5-2 from the Guidance)

MPS: 2.8%
Secondary Test Score: 2.0

Secondary Test Score	MPS		
	Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X *
Greater than 2.5	✓	✓	?

Key:
✓ : Impact is not likely to be substantial
X : Impact is likely to be substantial
? : Impact is unclear

Guidance Documentation

Component	***Section***	***Page***
Using Substantial Impacts Matrix	2.5	2-12
Determining Need for Widespread Analysis	2.5; Figure 2-1	2-12; 2-14

APPENDIX B

City of Raton and FEI Engineering Technical Memorandum:

City of Raton Wastewater Treatment Facility –
NPDES Permit No. NM0020273
Preliminary Evaluation of Proposed Temporary Standards

PART OF ALAN PLUMMER ASSOCIATES

TECHNICAL MEMORANDUM – DRAFT FINAL FOR NMED REVIEW

TO:	Dan Campbell – General Manager, City of Raton Shelly Lemon – Bureau Chief, Surface Water Quality Bureau, NMED
FROM:	Kee Venkatapathi, CWP Mark Dahm, PE
REVIEWED BY:	Patrick O'Brien, PE
DATE:	February 2, 2019
SUBJECT:	City of Raton Wastewater Treatment Facility (NPDES Permit No. NM0020273) Preliminary Evaluation of Proposed Temporary Standards Under Development
JOB NO.	EAINC-0293

1. INTRODUCTION

The purpose of this Technical Memorandum is to present the results of a conceptual-level evaluation of the City of Raton's (City) Wastewater Treatment Plant (WWTP) focused on the technical feasibility and the associated estimated cost impacts to attain reduced nutrient limits for Total Nitrogen (TN) and Total Phosphorus (TP). The City requested that FEI Engineers (FEI), under subcontract to Engineering Analytics, Inc., assist the City.

Pursuant to the new water quality standards regulations and framework for adopting temporary standards approved by the New Mexico Water Quality Control Commission (WQCC) under 20.6.4 NMAC, the New Mexico Environment Department (NMED) (in collaboration with USEPA) is developing an approach to applying the adopted rule to developing Temporary Standards for nutrient limits.

This memorandum presents the following items:

- Existing WWTP process overview and summary of discharge concentration data
- NMED Highest Attainable Condition (HAC) Analysis Report – Overview and Application to the Existing City of Raton WWTP
- Conceptual level opinion of probable costs - HAC Option A, C, and proposed additional option A1
- Conceptual evaluation of alternate discharge Option
- Schedule addressing the Table 2 of the July 23, 2018 NMED letter

NMED EXHIBIT 24

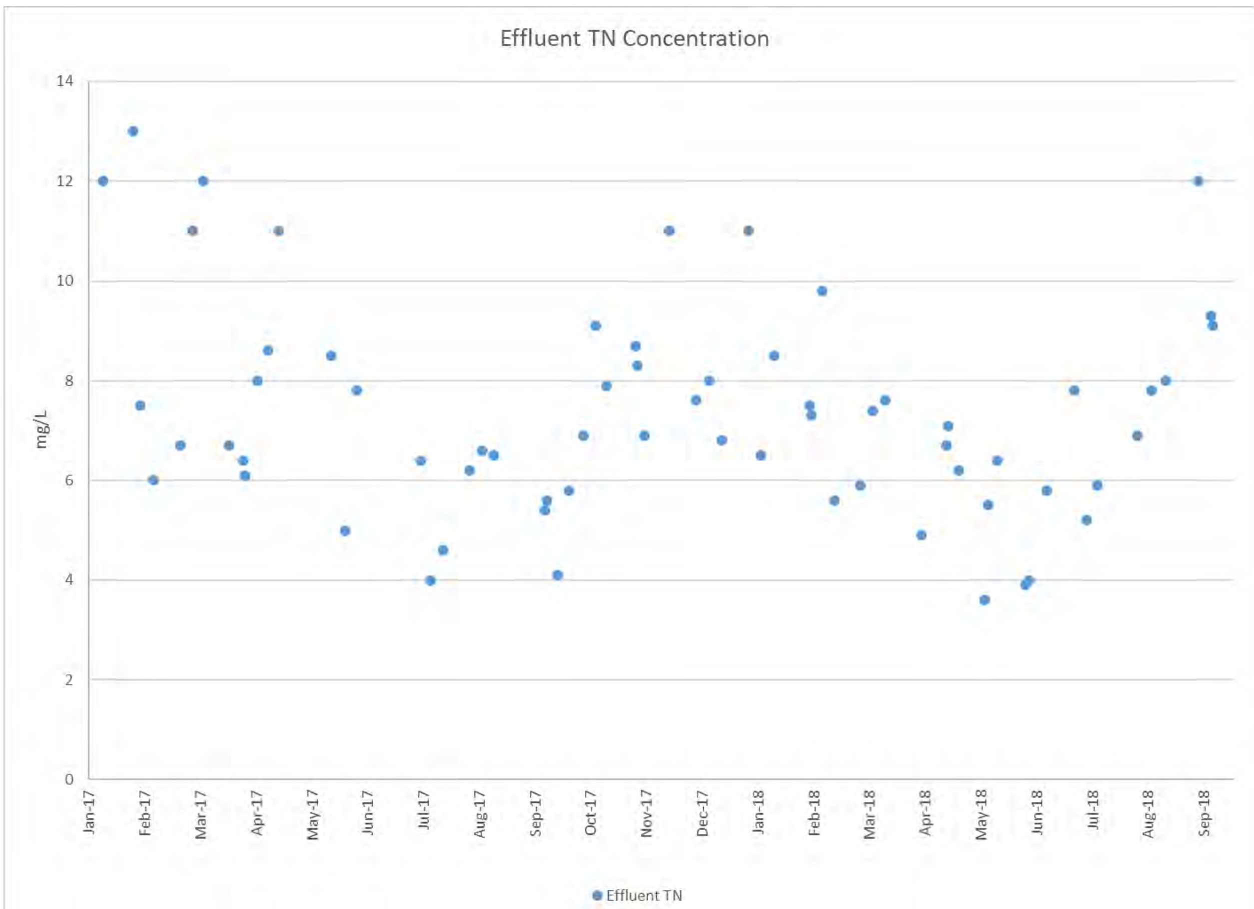
2. EXISTING WWTP PROCESS OVERVIEW AND SUMMARY OF DISCHARGE CONCENTRATION DATA

The existing WWTP was designed for a hydraulic capacity of 0.9 MGD and an organic capacity of 1,989 lbs BOD_5 /day, assuming an estimated influent concentrations of 265 mg/L BOD_5 and 60 mg/L TKN.

The WWTP headworks consists of mechanical screen, grit chamber, and flow measuring flume. Following the grit chamber, the influent flows through the splitter box before reaching the sequencing batch reactor (SBR) secondary treatment process. The SBR process utilized at the Raton WWTP is a Xylem-Sanitaire (Xylem) Intermittent Cycle Extended Air System (ICEAS). The secondary effluent from the SBR process is decanted to an effluent equalization basin. The effluent from the equalization basin flows by gravity to either the reuse facility or to UV Disinfection. The effluent going through the UV Disinfection is discharged to Doggett Creek.

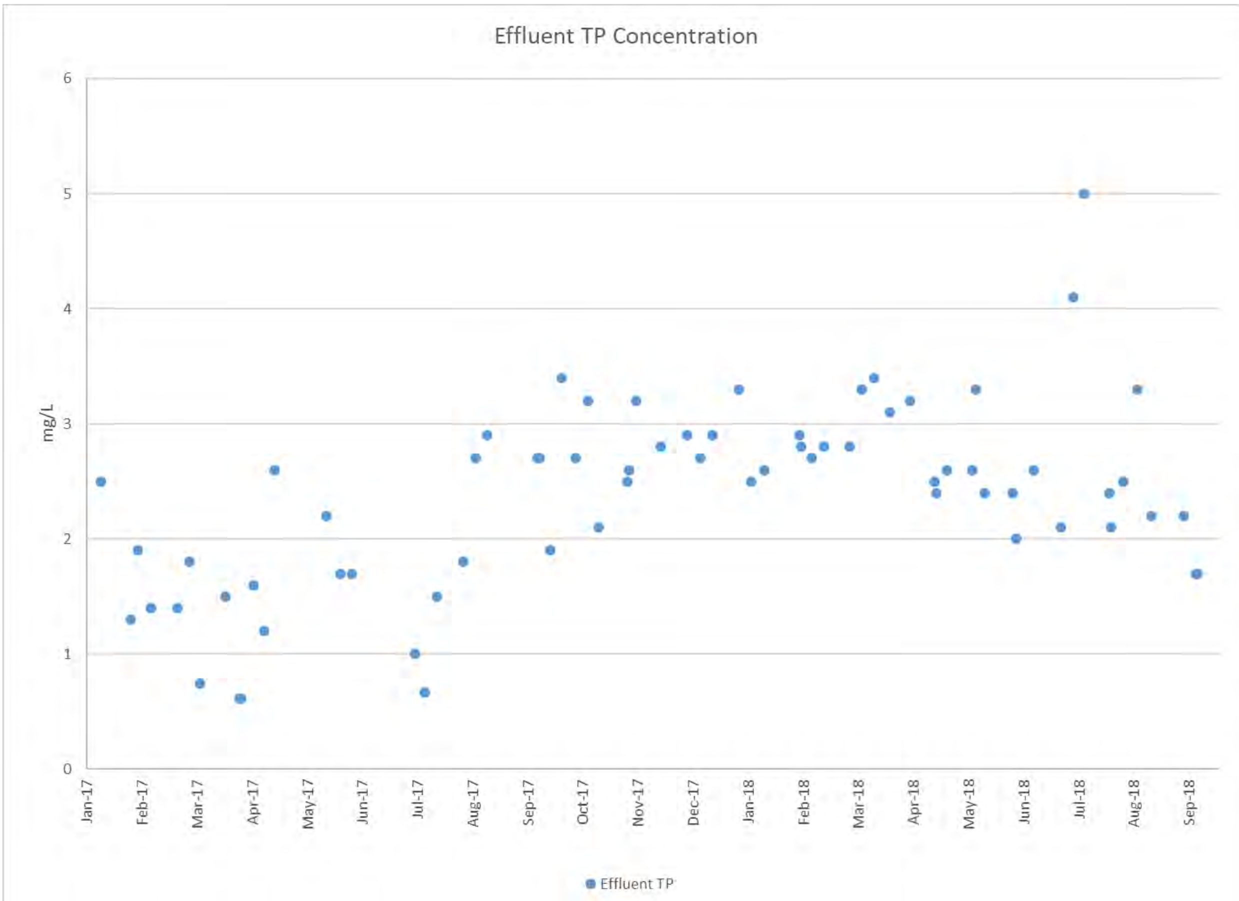
Results of an analysis of the effluent nutrient discharge concentration and reclaim flow TN and TP data from January 2017 through September 2018 are shown in Figures 1 and 2, respectively. The average effluent TN concentration for the analyzed time-period was 7.3 mg/L and effluent TP concentration was 2.37 mg/L.

Figure 1. Effluent TN Concentrations



NMED EXHIBIT 24

Figure 2. Effluent TP Concentrations



3. NMED HIGHEST ATTAINABLE CONDITION (HAC) ANALYSIS REPORT - OVERVIEW AND APPLICATION

As part of the NMED nutrient Temporary Standards development, several WWTP facilities were selected by NMED as "demonstration facilities". The City was presented with the opportunity to participate as one of five facilities selected and to work with NMED to develop a nutrient Temporary Standard that would eventually become incorporated in a permit. The following section presents a summary of the NMED Temporary Standards development approach.

3.1. NMED FRAMEWORK FOR TEMPORARY STANDARDS DEVELOPMENT – OVERVIEW

NMED has worked with two Contractors to evaluate several sets of proposed TN and TP treatment standards, screen treatment technologies, evaluate the community cost impact of WWTP modifications and increased rates, and to develop a report summarizing a set of proposed Highest Attainable Condition (HAC) treatment limits. The City was provided a copy of the Substantial and Widespread Economic and Social Impact and Highest Attainable Condition (HAC) Analysis Report for the City of Raton, NM by NMED (HAC Analysis Report).

Reverse Osmosis (RO) was found to be the only available technology that would approach attaining the < 1 mg/L TN and < 0.1 mg/L TP nutrient water quality standards; however, implementation of RO was found likely to cause substantial and widespread economic and social impacts to the community. Because of this finding the HAC Analysis Report developed HAC Option that reflect a range of proposed effluent standards and plant improvements treatment technologies. Table 12 of the report (included as Attachment

NMED EXHIBIT 24

1) provides several proposed TN and TP HAC Options that identify specific treatment options tied to a specific set of proposed treatment limits (termed Target Effluent Conditions).

The framework for temporary standards development anticipates that the City will review the underlying assumptions for the developed HAC options and that a temporary standards petition would be jointly constructed by the City and NMED for presentation before the WQCC. Subsequent to review and approval by the WQCC and approval by Region 6 USEPA, the temporary standard would be incorporated into the discharge permit.

3.2. DESCRIPTION OF HIGHEST AVAILABLE CONDITION (HAC) OPTIONS

A July 23, 2018 NMED letter to the City (included as Attachment 2) proposed using Options A and C from Table 12 in the HAC Analysis Report as the starting point for options to be evaluated by the City. The selected HAC Option would then be included in a petition for a Temporary Standard to be implemented over a set time period (term) and for subsequent inclusion in the City's WWTP discharge permit. An additional proposed HAC Option with somewhat less stringent nutrient limits than those provided by HAC Options A or C has also been included for evaluation in this Technical Memorandum. For purposes of continuing the nomenclature used in the NMED HAC Analysis Report, this third option will be referred to as Option A1, while HAC Options A and C will remain as defined in the referenced report.

3.2.1. HAC OPTIONS A AND C

As presented in the HAC Analysis Report, both the projected process performance and construction costs for HAC Options A and C are based on a de-rated flow of 0.62 MGD.

Table 1. HAC Options A and C (Shown in Attachment 1 of the HAC Analysis Report)

HAC Option	Description of Treatment Technologies	Target Effluent Concentrations at the De-rated 0.62 MGD Flow	Estimated Cost (As a Percentage of MHI)
Option A	Additional Optimization; Chemical Precipitation	5.0 mg/L TN 0.5 mg/L TP	1.01
Option C	Denitrification Filters; Chemical Precipitation	3.0 mg/L TN 0.5 mg/L TP	1.30

3.2.2. PROPOSED ADDITIONAL HAC OPTION - A1

Table 2. HAC Option A1

HAC Option	Description of Treatment Technologies	Target Effluent Concentrations at the De-rated 0.62 MGD Flow	Estimated Cost (As a Percentage of MHI)
Option A1	Additional Optimization; Chemical Precipitation	7.0 mg/L TN 1.0 mg/L TP	Not Applicable

A conceptual-level evaluation of HAC Options is summarized in the following subsections. Required WWTP modifications applicable to Options A, C, and A1 are discussed and where relevant, technology limitations are identified.

3.3. CONCEPTUAL-LEVEL EVALUATION OF HAC OPTION A

Option A identified in Table 12 of the HAC Analysis Report includes a target TN concentration of 5 mg/L

NMED EXHIBIT 24

and a TP concentration of 0.5 mg/L. HAC Option A includes modifications to the existing WWTP SBR secondary treatment process to meet the Option A target effluent TN and TP limits.

The existing Xylem ICEAS SBR process was designed for an effluent TN concentration of 10 mg/L and there was no consideration of a design TP effluent limit. FEI has worked with Xylem to identify the level process modifications required to meet Option A nutrient limits.

Observations concerning the existing process and plant performance with relevance to HAC Option A are summarized below:

- Historical effluent TN data in combination with limited influent nitrogen data indicate that complete nitrification may not be occurring due to either insufficient aeration time cycles, insufficient alkalinity, or a combination (reference Attachment 3).
- Historical effluent pH data indicate that sufficient alkalinity for complete nitrification may not be available during certain intervals (reference Attachment 3).
- Based on limited influent nitrogen data, the BOD to TKN ratio is less than the optimum 5:1 ratio for near-complete denitrification.
- The current aeration blowers are each 150 HP without VFD controls. The DO probes in the SBR process basins are not tied to blower operation via control logic.

3.3.1. EQUIPMENT MODIFICATIONS REQUIRED TO MEET TARGET EFFLUENT LIMITS

3.3.1.1. XYLEM RECOMMENDED PROCESS MODIFICATIONS

Xylem has provided the following suggested process and equipment modifications to optimize TN removal to meet HAC Option A limits:

- Replace the existing ICEAS system PLC control logic and upgrade to Xylem's proposed current Biologic Nutrient Removal (BNR) PLC control logic, NURO Controller (reference Attachment 4).
- Install ammonia, nitrate, temperature, and DO sensors and transmitters to provide the necessary data and allow the new NURO control logic to optimize the existing process for nitrification and denitrification, while preventing excess blower run times during low loads.
- Reduce the number of "Air Off-Cycles" in the SBR process to enhance the nitrification process. The justification behind reducing the total amount of off-cycle time is that the denitrification process is faster as compared to nitrification process and the decant cycle time will also contribute to the available denitrification time.
- Installation of a combination ammonium/nitrate probe located approximately two thirds of the distance down the length of the SBR basin (towards the decanter end).
- Installation of an online phosphate probe to allow continuous online monitoring of phosphate in the SBR basins.
- External alkalinity addition will likely be required. (Reference Attachment 5)
- External carbon addition will likely be required to provide the necessary carbon required during the denitrification process. The supplemental carbon should be introduced at the beginning of the last Air OFF period for a given total cycle. (Reference Attachment 7)

The current total cycle is designed for 4.8 hours (5 cycles/24 hours) that includes 4 Air ON cycles (24 minutes each for a total of 96 minutes), 3 Air OFF cycles (24 minutes each for a total of 96 minutes), 1 settle period (60 minutes) and 1 decant period (60 minutes).

The new cycle timing proposed by Xylem for process optimization is 2.4 hours (10 cycles/24 hours) that includes 48 minutes of Air ON, 24 minutes of Air OFF, 36 minutes each for settle and decant. The proposed optimization will reduce the total Air OFF in a 24 hours period from 6 hours to 4 hours. The decreased Air OFF period and increased Air ON period will provide the excess time needed for near complete nitrification (assuming sufficient alkalinity is present).

Xylem is proposing an upgrade to the existing control logic. The proposed controller (NURO Controller) will use a combination of ammonia, nitrate, temperature, and DO sensors to optimize the existing process for nitrification and denitrification while preventing excess blower run times during low loads.

3.3.1.2. ADDITIONAL SUGGESTED PROCESS MODIFICATIONS

- Update the controller logic to operate the aeration blowers based on the dissolved oxygen (DO) input from the SBR basins. Changes to the aeration cycles in response to demand, might require improvements to/retrofits to the existing aeration blowers.
- The addition of VFDs to the aeration blowers will enable the NURO controller to maintain DO setpoints in the SBR basins. The Xylem BioWin modeling indicates that oxygen carryover from aeration the ON periods to the aeration OFF periods will occur inhibiting denitrification.
- If the aeration blower motors are not suitable for VFDs, either the motor or the entire blower will require replacement.
- Installation of a coagulation feed system for chemical removal of TP. (Reference Attachment 6)

3.4. CONCEPTUAL-LEVEL EVALUATION OF HAC OPTION C

HAC Option C identified in Table 12 of the HAC Analysis Report includes a target TN concentration of 3 mg/L and a TP concentration of 0.5 mg/L. Option C includes modifications to the existing WWTP SBR secondary treatment process to meet the Option C target effluent TN and TP limits.

The existing Xylem ICEAS SBR process was designed for an effluent TN concentration of 10 mg/L and there was no consideration of a design TP effluent limit. FEI has worked with Xylem to identify process modifications required to meet HAC Option C nutrient limits.

Observations concerning the existing process and plant performance with relevance to HAC Option C are summarized below:

- Historical annual average effluent TN concentrations are approximately 7 mg/L. The annual average effluent nitrate concentrations are approximately 4 mg/L.
- The proposed target effluent TN concentration for Option C requires a reduction of more than 50 percent below the existing average effluent TN concentrations.
- Historical effluent TN data in combination with limited influent nitrogen data indicate that complete nitrification may not be occurring due to either insufficient aeration time cycles, insufficient alkalinity, or a combination (reference Attachment 3).
- Historical effluent pH data indicate that sufficient alkalinity for complete nitrification may not be available during certain intervals (reference Attachment 3).
- Based on limited influent nitrogen data, the BOD to TKN ratio is less than the optimum 5:1 ratio for denitrification.

3.4.1. EQUIPMENT MODIFICATIONS REQUIRED TO MEET HAC OPTION C TARGET EFFLUENT LIMITS

3.4.1.1. ADDITIONAL RECOMMENDED PROCESS MODIFICATIONS

In addition to the Xylem-provided ICEAS system equipment modification recommendations for the HAC Option A discussed above in Section 3.2 (and repeated below), the following additional process equipment modifications to optimize TN and TP reduction are suggested:

- Installation of tertiary denitrification filters and provision of supplemental carbon addition for nitrate removal.
- Installation of a coagulation feed system and tertiary filtration system for chemical removal of TP. Note: there are treatment equipment options that provide tertiary treatment for both TN and TP in a single tertiary treatment filter equipment system. (Reference Attachment 6)

3.4.1.2. XYLEM RECOMMENDED PROCESS MODIFICATIONS

Similar to the equipment and process modification recommendations listed for HAC Option A, Xylem has provided the following suggested process and equipment modifications to optimize TN removal to meet HAC Option C limits:

- Replace the existing ICEAS system PLC control logic and upgrade to Xylem's proposed current BNR PLC control logic (NURO Controller).
- Install ammonia, nitrate, temperature, and DO sensors and transmitters to allow the new control logic to optimize the existing process for nitrification and denitrification while preventing excess blower run times during low loads.
- Installation of a combination ammonium/nitrate probe located approximately two thirds of the distance down the length of the SBR basin (towards the decanter end).
- Installation of an online phosphate probe to allow continuous online monitoring of phosphate in the SBR basins.
- Reduce the number of "Air Off-Cycles" in the SBR process to enhance the nitrification process. The justification behind reducing the total amount of off-cycle time is that the denitrification process is faster as compared to nitrification process and the decant cycle time will also contribute to the denitrification available time.
- Update the controller logic to operate the aeration blowers based on the DO input from the SBR basins. Changes to the aeration cycles in response to DO demand, might require improvements to/retrofits to the existing aeration blowers.
- External carbon addition will likely be required to provide the necessary carbon required during the denitrification process. The supplemental carbon should be introduced at the beginning of the last Air OFF period for a given total cycle. (Reference Attachment 7)

3.5. CONCEPTUAL-LEVEL EVALUATION OF PROPOSED HAC OPTION A1

Proposed HAC Option A1 includes modifications to the existing WWTP SBR secondary treatment process to meet the Option A1 target effluent limits of TN of 7 mg/L and TP of 1 mg/L. The existing Xylem ICEAS SBR process was designed for an effluent TN concentration of 10 mg/L and there was no consideration of a design TP effluent limit.

FEI has worked with Xylem to identify ICEAS treatment system process modifications required to meet the proposed Option A1 nutrient limits. The following observations concerning the existing process and plant performance are summarized below:

- Historical effluent TN data in combination with limited influent nitrogen data indicate that complete nitrification may not be occurring due to either insufficient aeration time cycles, insufficient alkalinity, or a combination (reference Attachment 3).
- Historical effluent pH data indicate that sufficient alkalinity for complete nitrification may not be

NMED EXHIBIT 24

available during certain intervals (reference Attachment 3).

- Based on limited influent nitrogen data, the BOD to TKN ratio is less than the optimum 5:1 ratio for denitrification.

The estimated alum dosage required to achieve 1 mg/L in the effluent is provided in Table 3 below.

Table 3. Coagulant Addition- Option A

Parameter	Current Average Flow	Design Flow
Coagulant Addition Chemical	Alum (Aluminum Sulfate Solution)	
Solution strength	50% by weight	
Daily solution dosing rate at Max. Month flow	23 gal/day (0.95 gal/hr)	37 gal/day (1.5 gal/hr)
Dosing pump operating range	0.5 to 5 gal/hr	

Assumed TP of 3.3 mg/L after biological assimilation to be reduced to 1 mg/L.
Daily dosing rate includes 25 percent safety factor to account for field conditions

3.5.1. WWTP IMPROVEMENTS AND OPTIMIZATION STEPS FOR ATTAINMENT OF PROPOSED OPTION A1 DISCHARGE LIMITS

FEI worked with Xylem to identify process modifications required to meet HAC Option A1 nutrient limits. Both Option A and proposed Option A1 nutrient limits are less stringent than Option C limits. Modifications proposed by Xylem for Option A1 are applicable to Option A and proposed Option A1. The current average effluent TN concentration is fairly close to the proposed effluent TN limit. The following process optimization items are recommended for inclusion in Option A1.

- Upgrades to the existing control logic. The proposed controller upgrade (NURO Controller) will use a combination of ammonia, nitrate, temperature, and DO sensors to optimize the existing process for nitrification and denitrification while preventing excess blower run times during low loads.
- Updates to controller logic to run aeration blowers based on the DO input from the SBR basins. This will add on-line instrumentation for tighter aeration and nutrient control. Changes to the aeration cycles in response to demand, might require improvements to/retrofits to the existing aeration blowers.
- The Xylem BioWin modeling indicates that oxygen carryover from aeration the ON periods to the aeration OFF periods will occur inhibiting denitrification. Adding VFDs to the aeration blowers will enable the NURO controller to maintain a DO setpoint in the SBR basins.
- If the aeration blower motors are not suitable for VFDs, either the motor or the entire blower will require replacement.
- External carbon addition will likely be required to provide the necessary carbon required during the denitrification process. The supplemental carbon should be introduced at the beginning of the last Air OFF period for a given total cycle.

The existing ICEAS treatment system was not designed for enhanced biological phosphorus removal. At present, the difference between the current influent and effluent TP concentrations is due to uptake of orthophosphate for normal cell growth. The remaining effluent TP is a combination of soluble phosphorus, soluble non-reactive phosphorus, and particulate phosphorus.

Option A1 includes chemical phosphorus removal for attainment of the proposed effluent TP concentration of 1 mg/L.

4. CONCEPTUAL LEVEL OPINION OF PROBABLE COSTS - HAC OPTIONS A, C, AND PROPOSED OPTION A1

Section 3 above, presents HAC Options A and C with all components of the options as-presented in the HAC Analysis Report. Section 4 presents the rationale for changing the TP Target Effluent Concentration to 1.0 mg/L as Proposed Option A1; discusses limitations of the technologies included in Options A, C, and Proposed Option A1 for TN and TP reduction; and presents a summary of preliminary estimates of probable cost.

Table 4. HAC Options A, C, and Proposed Option A1 As Modified for this Technical Memorandum (Basis: Chemical Feed Using Totes)

HAC Option	Description of Treatment Technologies	Target Effluent Concentrations At the Current Design Flow of 0.9 MGD	Preliminary Opinion of Probable Cost (As a Percentage of MHI)
Option A, NURO Controller, Instrumentation, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Caustic 50%, Alum, Micro C	Additional Optimization; Chemical Precipitation	5.0 mg/L TN 1.0 mg/L TP	1.13
Option C, NURO Controller, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Below Grade Tertiary Filters, Caustic 50%, Ferric Chloride and Micro C	Denitrification Filters; Chemical Precipitation	3.0 mg/L TN 0.5 mg/L TP	1.49
Option A1, NURO Controller, Instrumentation, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Caustic 50%, Alum	Additional Optimization; Chemical Precipitation	7.0 mg/L TN 1.0 mg/L TP	1.08

NMED EXHIBIT 24

Table 5. HAC Options A, C, and Proposed Option A1 As Modified for this Technical Memorandum (Basis: Chemical Feed Using Bulk Tank Storage)

HAC Option	Description of Treatment Technologies	Target Effluent Concentrations At the Current Design Flow of 0.9 MGD	Preliminary Opinion of Probable Cost (As a Percentage of MHI)
Option A, NURO Controller, Instrumentation, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Caustic 50%, Alum, Micro C	Additional Optimization; Chemical Precipitation	5.0 mg/L TN 1.0 mg/L TP	0.92
Option C, NURO Controller, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Below Grade Tertiary Filters, Caustic 50%, Ferric Chloride and Micro C	Denitrification Filters; Chemical Precipitation	3.0 mg/L TN 0.5 mg/L TP	1.20
Option A1, NURO Controller, Instrumentation, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Caustic 50%, Alum	Additional Optimization; Chemical Precipitation	7.0 mg/L TN 1.0 mg/L TP	0.90

4.1.1. TREATMENT SYSTEM IMPROVEMENT DESCRIPTIONS

4.1.1.1. XYLEM ICEAS CONTROLLER OPTION

Replacement of the existing PLC controller with a new Xylem NURO Controller would provide a significant expansion in process control of the nitrification/denitrification processes. The NURO controller utilizes a combination of ammonia, nitrate, temperature and DO sensors to optimize the existing process for nitrification and denitrification while preventing excess blower run times during low loads. The controller upgrades package includes YSI IQ SensorNet, DO sensors, ammonia/nitrate sensors, and replacement of the existing PLC with a new PLC with the NURO control algorithm. The NURO controller is designed to utilize the data from the ammonia/nitrate/DO sensors to regulate blower operation and optimize the treatment processes.

4.1.1.2. ALKALINITY ADDITION

At present the WWTP does not add supplemental alkalinity. Analysis of plant data including effluent TN concentration and pH indicate a potential intermittent lack of sufficient alkalinity. To achieve the TN target effluent limits, it is necessary to achieve close to complete nitrification. Nitrification (reduction in alkalinity) and denitrification (gaining alkalinity) netted out consumes 3.64 lb of alkalinity/lb of nitrogen to be nitrified/denitrified. Reduced availability of alkalinity inhibits the nitrification process and

NMED EXHIBIT 24

subsequently the denitrification process (due to reduced nitrate to denitrify). The proposed modifications described in this section consider 50 percent sodium hydroxide (NaOH) for the alkalinity addition.

4.1.1.3. SUPPLEMENTAL CARBON ADDITION

Nitrification uses oxygen to convert ammonia to nitrite and to nitrate. During the denitrification process, microorganisms use organic carbon to convert nitrate to nitrogen gas. The organic carbon in the influent is used by microorganisms during aeration resulting in reduced carbon available for denitrification. Micro-C has been included in this preliminary assessment as the external carbon addition source. Preliminary stoichiometric calculations were performed to estimate the Micro-C required for denitrification.

4.1.1.4. COAGULANT ADDITION

The existing secondary process was not designed for biological phosphorus removal; however, influent Phosphorus is partially consumed for biological growth of microorganisms. Currently, the calculated 90th percentile effluent TP is 3.3 mg/L. To be conservative, the current 90th percentile effluent TP was used to calculate the coagulant dosage requirement.

The soluble phosphorus in the process can be removed through coagulation, settling solids, and removal through sludge wasting. Particulate phosphorus cannot be removed through coagulation, it comprises a portion of the effluent TSS and contributes to the effluent TP. Alum was utilized in this preliminary evaluation as the coagulant for soluble phosphorus removal.

4.1.2. RATIONALE FOR CHANGING THE HAC OPTION A TARGET EFFLUENT CONCENTRATION FOR TP TO 1.0 MG/L

In a typical municipal WWTP the coagulant is added before the secondary clarifier or alternately, a two-step chemical addition is possible as mentioned in the HAC Analysis Report. For the Sanitaire process in Raton's WWTP, the chemicals would be added before the start of the last Air-On cycle to the mixed liquor before entering the settle phase. Typically, the effluent particulate phosphorus percent in the TSS varies from 1 to 3 percent. This percentage is shifted towards the high end for a WWTP without enhanced phosphorus removal. The Raton WWTP on average has an effluent TSS concentration of 5 mg/L, while the 90th percentile concentration is 10 mg/L.

Since the ICEAS process does not have a clarifier and the solids separation is limited to the efficiency of the settle/decant phases of the SBR cycle, the above estimate of TSS and TP carryover, may not be typically attained. Additional data collection is necessary to determine the TSS and TP effluent concentration relationship.

At an assumed 90th percentile of TSS concentration of 10 mg/L, and using an assumed three (3) percent the particulate phosphorus would comprise approximately 0.3 mg/L of the effluent Total Phosphorus. The current discharge permit has a 30 day average TSS concentration of 30 mg/L. Applying the above assumptions, the particulate phosphorus would contribute 0.9 mg/l of the total phosphorus concentration. This would mean that under a scenario where the effluent TSS concentration might intermittently approach 20 - 30 mg/L, the City would be in jeopardy of not meeting the effluent TP limit of 0.5 mg/L.

4.1.3. PRELIMINARY ESTIMATES OF PROBABLE COST

The following estimates of probable cost include instrumentation upgrades necessary to provide information for the controlling the process; PLC and control programming upgrades; blower system

NMED EXHIBIT 24

improvements; chemical feed system panels/pumps; and operations costs utilizing either tote storage or bulk storage. The tables below also include operations and cost scenarios tied to both chemical storage scenarios (chemical tote storage and bulk storage) at both the current flowrate, 0.62 MGD, and the design flowrate 0.90 MGD.

4.1.3.1. HAC OPTION A

Option A: TN 5, TP 1. NURO Controller, Instrumentation, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Caustic 50%, Alum, Micro C			
	0.62 MGD Chemical Totes	0.62 MGD Bulk Chemical Storage	0.90 MGD Bulk Chemical Storage
Total Construction Opinion of Probable Cost	$ 349,000	$ 424,000	$ 424,000
Total O&M Cost	$ 328,600	$ 113,300	$ 164,400
New % of MHI as Sewer Cost	1.19%	0.94%	1.00%

Refer to Attachment 11 - Opinion of Probable Cost table.

4.1.3.2. HAC OPTION C

Option C: TN 3, TP 0.5. NURO Controller, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Below Grade Tertiary Filters, Caustic 50%, Ferric Chloride and Micro C				
	0.90 MGD Bulk Chemical Storage	0.90 MGD Chemical Totes	0.62 MGD Bulk Chemical Storage	0.62 MGD Chemical Totes
Total Construction Opinion of Probable Cost	$ 2,778,000	$ 2,704,000	$ 2,778,000	$2,704,000.00
Total O&M Cost	$ 182,000	$ 516,500	$ 127,600	$ 358,200.00
New % of MHI as Sewer Cost	1.19%	1.58%	1.13%	1.39%

Refer to Attachment 12 - Opinion of Probable Cost table.

NMED EXHIBIT 24

4.1.3.3. HAC OPTION A1

Option A1: TN 7, TP 1. NURO Controller, Blower VFD, Heat Trace, 3 Chemical Feed Panels, Caustic 50%, Alum			
	0.62 MGD Chemical Totes	0.62 MGD Bulk Chemical Storage	0.90 MGD Bulk Chemical Storage
Total Construction Opinion of Probable Cost	$ 349,000	$ 413,000	$ 413,000
Total O&M Cost	$ 286,600	$ 91,300	$ 132,600
New % of MHI as Sewer Cost	1.14%	0.91%	0.96%

Refer to Attachment 13 - Opinion of Probable Cost table.

5. DEVELOPMENT OF PROPOSED AVERAGE MONTHLY TARGET EFFLUENT LIMITS – TN AND TP LIMITS FOR PROPOSED OPTION A1

This section presents proposed Average Monthly Target Effluent Limits developed consistent with the HAC Options A and C Estimated Average Monthly Limits (CV = 0.6, sample frequency 4x/month) presented in the October 31, 2018, TS Factor 6 Raton Presentation developed by NMED. The calculations utilized to develop the proposed set of average monthly effluent limits use the methodology and equations presented in the USEPA Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001), March 1991.

The intent behind developing this set of proposed average monthly effluent limits is to identify effluent target limits for a monthly set of effluent samples collected at a frequency of 4 times per month, starting with the proposed Target Effluent Concentrations, TN = 7.0 mg/L and TP = 1.0 mg/L, shown above in Section 4, Table 4. It is believed that a monthly average target effluent limit would better fit plant operations and the pattern of challenging operations periods that the plant experiences, while both attaining the desired Long Term Average and minimizing plant exceedances.

5.1. METHODOLOGY FOR DEVELOPING AVERAGE MONTHLY LIMITS

The calculation procedure assumed a lognormal probability distribution for the effluent limit data set with a relative variation of the data set, or coefficient of variation CV, of 0.6. The calculation uses an upperbound concentration (such as the Waste Load Allocation, WLA) and the CV to calculate the Long Term Average (LTA). Applying this methodology to the Proposed Option A1 limits of TN = 7 mg/L and TP = 1 mg/L, the Maximum Daily Limit (MDL) was calculated to be 13.27 mg/L for TN and 1.90 mg/L for TP. The Average Monthly Limit (AML) was calculated for a sample frequency of 1x, 2x, and 4x per month.

NMED EXHIBIT 24

Table 6. Summary of Calculated Maximum Daily Limits, and Average Monthly Limits

HAC Option	TN Proposed Option A1	TP Proposed Option A1
Long Term Average (LTA), mg/L	7.0	1.0
Max. Daily Limit (MDL), mg/L	13.27	1.90
Average Monthly Limit (AML) (1x / month), mg/L	14.94	2.13
Average Monthly Limit (AML) (2x / month), mg/L	12.58	1.80
Average Monthly Limit (AML) (4x / month), mg/L	10.87	1.55

6. CONCEPTUAL EVALUATION OF ALTERNATE DISCHARGE OPTION

The City currently reuses a portion of effluent for non-potable reuse at a golf course during summer and fall months. The reuse varies on average between 40 to 50 percent of the influent flow. The City is collecting data to explore the option of a zero discharge/seasonal discharge permit.

Monthly average of the influent and reclaim flow data for the periods extending from March - November 2017 and from March – September 2018 were analyzed. In 2017, 41 percent of influent flow was directed to reclaim use. In 2018 up to September 55 percent of the influent was direct to reclaim use.

6.1. SEASONAL DISCHARGE PERMIT / ZERO DISCHARGE PERMIT OPTION

The current WWTP process flow diagram is provided in Attachment 8. The secondary effluent from the SBR process flows by gravity to the effluent equalization basin. The effluent from the EQ basin flows by gravity to either UV Disinfection or to effluent polishing filter. There are currently three filters (two duty and one standby). The filtered effluent flows to a wetwell where vertical turbine pumps pump the filtered effluent to the reuse.

The City is evaluating using all of the WWTP flow during the summer/fall months followed by a seasonal effluent nutrient limit for the winter months. This approach would provide the City time required to gradually raise the user rates and secure funding for the WWTP improvements. One approach that is being evaluated for implementing the zero discharge/seasonal permit approach would be to break the work into two phases.

- Phase 1: Upgrade/add a polishing filter, increase the capacity of the reuse pumps, increase the size of pipes to minimize pipe losses for 100 percent effluent reuse. During non-irrigation months, WWTP discharges effluent to Doggett Creek under an interim (10-15 years) less-stringent or current permit
- Phase 2: Based on the final effluent nutrient limit, either Option A or Option C standard of the HAC, WWTP processes will be modified.

At end of Phase 2, the WWTP would continue to use 100 percent of the flows during the summer/fall months and will discharge to the receiving stream during the winter months. This phased approach would reduce financial burden on the City. The cost associated with the Options A, C, and A1 interim nutrient standard upgrades are provided in Section 4.1.4.

Alternatively, the City could send their WWTP entire effluent flows in winter months to a processing facility that has the capacity to use the effluent. This would eliminate the need for a NPDES permit for the WWTP.

NMED EXHIBIT 24

7. PROPOSED HAC IMPLEMENTATION SCHEDULE

The City's proposed schedule for implementing the selected HAC Option A1 projects completion of the proposed treatment equipment, installation/construction, startup/commissioning of the WWTP with the upgraded ICEAS controls system by the end of 2030.

It is anticipated that the City will continue to work towards the HAC Option A Target Effluent Limits and would tentatively project implementation of the HAC Option A treatment system equipment upgrades by the end of 2045.

Description of Step	Approximate Time to Complete
1. Implementation of advanced operational strategies to reduce nutrients using existing infrastructure. Evaluate effects of operational changes and fine tune as necessary. Preliminarily assess the feasibility of reuse, etc.	Est. 3 years
2. Hire an engineer to prepare a preliminary engineering report (PER) that evaluates Option for chemical precipitation (and denitrification filters) that lead to further nutrient reductions and build upon developed operational strategies. Begin discussion with funding agencies.	Est. 1 year
3. Go through funding agency timelines and requirements for planning, if necessary. This may involve legislative approval, depending upon the funding sought. Implement minor facility improvements, if appropriate, and fine tune operations for further TN and TP reductions.	Est. 3 years
4. Design capital improvements. Go through the Department (NMED) and/or other funding agency review and approval processes for the design/bidding phase. Bid major capital project.	Est. 2 years
5. Construct project, including reuse, if appropriate. Begin operating new infrastructure and fine tune operations. Continue with advanced operational training with new infrastructure. Evaluate nutrient reductions achieved.	Est. 3 years

8. OBSERVATIONS

Based on the work performed by Xylem/Sanitaire and cost estimating information compiled to evaluate and contrast Options A, C, and Proposed Option A1 the following observations can be made. The primary observation is that required treatment plant improvements necessary to attain TN concentrations of 7 mg/L or less and TP concentrations of 1 mg/L or less require capital equipment expenditures and ongoing operating expenditures. Due to certain process limitations associated with the SBR equipment, it is apparent that the operations expenditures end up comprising the majority of the annual amortized costs, and hence, contributing more to the calculated percentage of MHI increases.

A secondary observation is tied to the relative cost contribution attributable to chemical feed system cost tied to chemical feed/storage costs using chemical totes versus the cost of chemical feed/storage using bulk storage tanks. As can be seen from the cost tables presented in Section 4, as the chemical demand increases, the bulk storage option becomes the most cost effective approach. Note: for this Draft, costs that may be necessary for a chemical storage building to house bulk storage tankage and chemical feed systems have not been included pending an evaluation of available space for bulk storage from the City.

A comparison of MHI impacts outlined in the Section 4 cost tables shows that Option C cost impacts are

NMED EXHIBIT 24

over 5 times more costly than either Option A or Option A1, resulting in MHI percentage impacts ranging from 1.13 to 1.58 percent, indicating a likely significant impact to the community.

Based on the need to maintain a situation where improvements can be made and impacts to the community can be maintained at a realistic, manageable level it is recommended that Options A and A1 be considered further and Option C not be pursued.

9. ATTACHMENTS

Attachment 1 – Table 12, HAC Analysis Report
Attachment 2 - Tertiary Filter Vendor
Attachment 3 - Effluent TN Concentration and pH
Attachment 4 - NURO Controller
Attachment 5 - Alkalinity Dosage
Attachment 6 - Coagulant Dosage
Attachment 7 - External Carbon Dosage
Attachment 8 - Current PFD
Attachment 9 - Current Sanitaire Design
Attachment 10 - Tertiary Filter Vendor Proposal
Attachment 11 - Option A Opinion of Probable Cost
Attachment 12 - Option C Opinion of Probable Cost
Attachment 13 - Option A1 Opinion of Probable Cost
Attachment 14 - New Drum Filter

Table 12 - Annual Pollution Control Cost Per Household

NMED EXHIBIT 24

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Table 12. Annual Pollution Control Cost Per Household (January 2017$) of TN and TP Treatment Combination Options for Raton

Cost Element	Option A Additional Optimization (TEC = 5.0 mg/L TN) and Chemical Precipitation (TEC = 0.5 mg/L TP)	Option B Denitrification Filters (TEC = 3.0 mg/L TN) and No additional TP treatment (TEC = 2.2 mg/L TP)	Option C Denitrification Filters (TEC = 3.0 mg/L TN) and Chemical Precipitation (TEC = 0.5 mg/L TP)	Option D Optimize Cycle Times (TEC = 7.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)	Option E Additional Optimization (TEC = 5.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)	Option F Denitrification Filters (TEC = 3.0 mg/L TN) and Chemical Precipitation Plus Filtration (0.1 mg/L TP)
Capital Cost	$681,360	$1,336,200	$1,557,540	$2,252,160	$2,712,180	$3,588,360
Annual O&M Cost	$150,439	$249,115	$330,001	$472,784	$542,337	$721,899
Total Annualized Cost	$205,113	$356,335	$454,982	$653,503	$759,969	$1,009,838
Incremental Annual Cost Per Household[1]	$70.97	$123.30	$157.43	$226.13	$262.97	$349.42
Existing Annual Pollution Control Costs Per Household	$230.16	$230.16	$230.16	$230.16	$230.16	$230.16
Total Annual Pollution Control Costs Per Household[2]	**$301.13**	**$353.46**	**$387.59**	**$456.29**	**$493.13**	**$579.59**
% of MHI for Pollution Control[3]	**1.01**	**1.19**	**1.30**	**1.53**	**1.66**	**1.95**
% Increase in Annual Sewer Bill	**31**	**54**	**68**	**98**	**114**	**152**

[1]2,890 households
[2]Annualized at 5% over 20 years.
[3]Based on adjusted (January 2017$) MHI of $29,773.

NMED EXHIBIT 24

ATTACHMENT 2

Tertiary Filter Vendor

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NEW MEXICO
ENVIRONMENT DEPARTMENT

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BUTCH TONGATE
Cabinet Secretary

J. C. BORREGO
Deputy Secretary

July 23, 2018

The Honorable Neil Segotta Jr.
Mayor of Raton
224 Savage Ave., P.O. Box 910
Raton, NM 87740

Subject: Substantial and Widespread Economic and Social Impact and Highest Attainable Condition (HAC) Analysis Report for Raton, New Mexico

Dear Mayor Segotta:

Nutrients are one of the leading causes of water quality impairment in New Mexico surface waters; however, nutrient concentrations necessary to protect aquatic life are very low (<1 mg/L total nitrogen [TN] and <0.1 mg/L total phosphorus [TP]). Most wastewater treatment facilities discharging to surface waters would need water quality based effluent limits ("WQBELs") for nutrients. Moreover, because of the limited available dilution in many receiving waters, many facilities would have WQBELs (whether based on total maximum daily loads or not) that require protective concentrations to be met "end-of-pipe." These required WQBELs might not be economically or technologically achievable for many permittees. A temporary standard for nutrients may help create a clear path to compliance that is achievable and affordable in the short-term and encourages incremental improvements in the medium and longer-terms.

In 2017, the New Mexico Water Quality Control Commission ("Commission") approved a new water quality standards regulation under 20.6.4 NMAC that created a framework for adopting temporary [water quality] standards. A temporary standard is a regulatory tool that allows progress toward standards attainment that is not currently achievable. In short, a temporary standard is a time-limited designated use and criterion for a specific pollutant(s); may be applied to individual permittees; reflects the highest degree of protection that is feasible; and, will not cause the further impairment or loss of an existing use. A temporary standard does not exempt dischargers from complying with all other applicable standards or control technologies, but rather allows time for the permittee to work towards attaining the underlying water quality standard over a defined period of time with established and reasonably achievable water quality goals.

Following the adoption of this rule, the New Mexico Environment Department's ("NMED") Surface Water Quality Bureau ("SWQB") began a collaborative effort with the U.S. Environmental Protection Agency ("EPA") to apply the framework established in the New Mexico temporary standards regulation for potential water quality standards changes related to nutrients, specifically to help demonstrate that the nutrient standard is not currently attainable because, "controls more stringent than those required by sections 301(b) and 306 of the [Clean Water] Act would result in substantial and widespread economic and social impact." [40 CFR 131.10(g)(6)]. A handful of facilities were selected to be "demonstration facilities" based on their economic and wastewater infrastructure characteristics, and receiving water impairment status, including the City of Raton Wastewater Treatment/Reclamation Facility (National Pollutant Discharge Elimination System ("NPDES") Permit No. NM0020273). The five demonstration facilities represent a wide array of communities and treatment technologies with the intent to establish a framework to effectively implement temporary standards for nutrient management and pollutant reductions in New Mexico under a variety of social, economic, and environmental conditions. NMED has been in communication with Raton and the New Mexico Municipal League regarding this project, and would welcome working closely with the City of Raton to pursue a nutrient temporary standard.

Enclosed for your review is the *Substantial and Widespread Economic and Social Impact and Highest Attainable Condition ("HAC") Analysis Report for Raton, New Mexico*. This report was prepared by Tetra Tech, Inc. and ECONorthwest for the EPA and NMED. This report provides (1) a brief characterization of Raton's wastewater treatment facility's current performance and evaluation of the controls that would be required to meet nutrient WQBELs, (2) cost estimates for attaining nutrient WQBELs for total nitrogen and total phosphorus and an analysis of the affordability for the community based on publicly available information, and (3) evaluation of various levels of incremental nutrient reductions that Raton could achieve through upgrades including the estimated costs of these upgrades and analysis of their affordability for the community, again, based on publicly available information.

The **overall outcome** of the analysis was that reverse osmosis ("RO") was the only available technology that would approach the concentrations necessary to meet the nutrient water quality standard (<1 mg/L TN and <0.1 mg/L TP); however, **installation and operation of an RO treatment system would likely cause substantial and widespread economic and social impacts to the community**. *So, the question is, what technology is available for nutrient removal that would not cause substantial and widespread impacts?*

The report details several treatment options for a temporary standard petition, shown below in **Table 1**. As stated previously, a temporary standard creates a path to compliance by encouraging incremental improvements over time. NMED recognizes that the nutrient standard is currently not achievable, but also believes that Raton can make tangible progress towards achieving the standard. NMED views Option A and Option C, highlighted below, as potential goals (i.e., highest attainable condition, "HAC") for the Raton wastewater treatment facility, depending on the term of the temporary standard. For example, a temporary standard with a HAC of 5.0 mg/L TN and 0.5 mg/L TP might be justified for 8 years, whereas a temporary standard with a HAC of 3.0 mg/L TN and 0.5 mg/L TP might be justified for 14 years (**Table 2**). Other options evaluated in the report either do not require additional TP treatment (Option B) or are approaching mid-range to substantial impacts to the community (Options D-F).

The report, as provided, addresses only the substantial and widespread economic and social impact analyses for reverse osmosis ("RO") and several other options for optimizing or modifying existing wastewater treatment processes to achieve greater nutrient reductions.

The report does not consider other options such as pollutant minimization[1], reuse, or land application. If Raton pursues a nutrient temporary standard, the temporary standard petition should consider a full array of options including various treatment options to evaluate which option or combination of options would result in the highest attainable condition or would achieve the underlying standard.

Table 1. Evaluation of Options for Highest Attainable Condition – "HAC"

Option	Description of Technology	Performance	Cost of Option (% MHI)	NMED Interpretation
Option A	Additional Optimization + Chemical Precipitation	5.0 mg/L TN 0.5 mg/L TP	0.9	Likely not substantial impact
Option B	Denitrification Filters + No additional TP treatment	3.0 mg/L TN 2.2 mg/L TP	1.1	Low impact/ impact unclear
Option C	Denitrification Filters + Chemical Precipitation	3.0 mg/L TN 0.5 mg/L TP	1.2	Low impact/ impact unclear
Option D	Optimize Cycle Times + Chemical Precipitation and Filtration	7.0 mg/L TN 0.1 mg/L TP	1.4	Mid-range impact
Option E	Additional Optimization + Chemical Precipitation and Filtration	5.0 mg/L TN 0.1 mg/L TP	1.5	Mid-range impact
Option F	Denitrification Filters + Chemical Precipitation and Filtration	3.0 mg/L TN 0.1 mg/L TP	1.8	Approaching substantial impact

% MHI = percent of median household income spent on sewage bill; current sewage bill is 0.74% MHI.

Table 2. Steps and approximate times for permittee to achieve the treatment requirements.

Description of Step	Approximate Time to Complete
1. Implementation of advanced operational strategies to reduce nutrients using existing infrastructure. Evaluate effects of operational changes and fine tune as necessary. Preliminarily assess the feasibility of reuse, etc.	**2-3 years**
2. Hire an engineer to prepare a preliminary engineering report (PER) that evaluates options for chemical precipitation (and denitrification filters) that lead to further nutrient reductions and build upon developed operational strategies. Begin discussion with funding agencies.	**1-2 years**
3. Go through funding agency timelines and requirements for planning, if necessary. This may involve legislative approval, depending upon the funding sought. Implement minor facility improvements, if appropriate, and fine tune operations for further TN and TP reductions.	**2-3 years**
4. Design capital improvements. Go through the Department (NMED) and/or other funding agency review and approval processes for the design/bidding phase. Bid major capital project.	**1-2 years**
5. Construct project, including reuse, if appropriate. Begin operating new infrastructure and fine tune operations. Continue with advanced operational training with new infrastructure. Evaluate nutrient reductions achieved.	**1-4 years**

1 A pollutant minimization program (PMP) is a structured set of activities to improve processes and pollutant controls that will prevent and reduce pollutant loadings. A permittee shall submit a PMP to NMED once the permittee achieves the identified HAC treatment requirements. Following review and approval, the PMP will be incorporated into the permittee's next NPDES permit. If a permittee achieves the HAC treatment requirement for only one nutrient parameter (i.e., either TN or TP), but not both, then the permittee shall develop and implement a PMP for the achieved nutrient parameter while continuing to work toward the HAC treatment requirement for the other nutrient parameter.

The next step in this process would be to review and refine cost estimates, as necessary, to support a HAC determination and duration for the temporary standard. If desired, NMED will work with the City of Raton to submit a formal nutrient temporary standard petition to the New Mexico Water Quality Control Commission ("Commission") for review and approval. If the Commission adopts the temporary standard, then NMED would submit documentation to EPA for final review and approval. At that point, if EPA approves the temporary standard proposal, then the temporary standard would become effective for Clean Water Act purposes under Section 303(c) of the Act and subsequently would be incorporated into Raton's NPDES permit No. NM0020273.

We appreciate the opportunity to present this report and would like to extend an invitation to follow-up with you and your staff in person or by teleconference at your convenience to discuss any questions or next steps the City may be considering as an outcome of this report. I am available by phone at (505) 827-2819 or by email at shelly.lemon@state.nm.us.

Sincerely,

Shelly Lemon

Shelly Lemon, Bureau Chief
Surface Water Quality Bureau
New Mexico Environment Department

Enclosures

Cc: Scott Berry, Raton City Manager, 224 Savage Ave., P.O. Box 910, Raton, NM 87740
Dan Campbell, Raton Water Works Manager, 224 Savage Ave., P.O. Box 910, Raton, NM 87740
Jennifer Brundage, EPA (via email Brundage.Jennifer@epa.gov)
Philip Crocker, EPA (via email Crocker.Philip@epa.gov)
Denise Hamilton EPA (via email Hamilton.Denise@epa.gov)
Brent Larsen, EPA (via email Larsen.Brent@epa.gov)
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Danielle Anderson, EPA (via email Anderson.Danielle@epa.gov)
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Heidi Henderson, SWQB (via email heidi.henderson@state.nm.us)
Kris Barrios, SWQB (via email kristopher.barrios@state.nm.us)

ATTACHMENT 3

Effluent TN Conc. and pH

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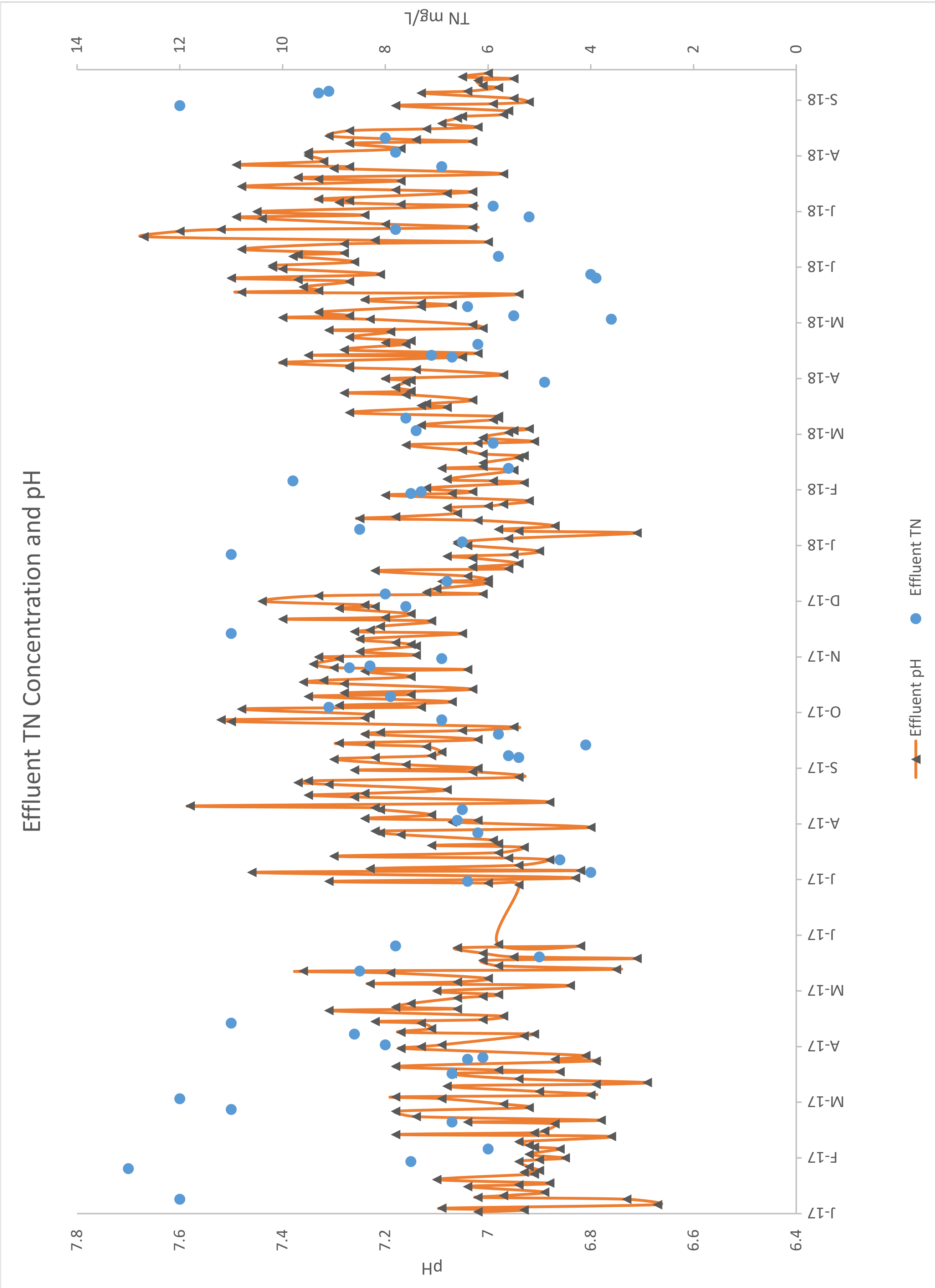
Effluent TN Concentration and pH
TN mg/L
14
12
10
8
6
4
2
0
pH
7.8
7.6
7.4
7.2
7
6.8
6.6
6.4
J-17
F-17
M-17
A-17
M-17
J-17
J-17
A-17
S-17
O-17
N-17
D-17
J-18
F-18
M-18
A-18
M-18
J-18
J-18
A-18
S-18
Effluent pH
Effluent TN

ATTACHMENT 4

NURO Controller

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OSCAR Knows ICEAS Nutrient Control

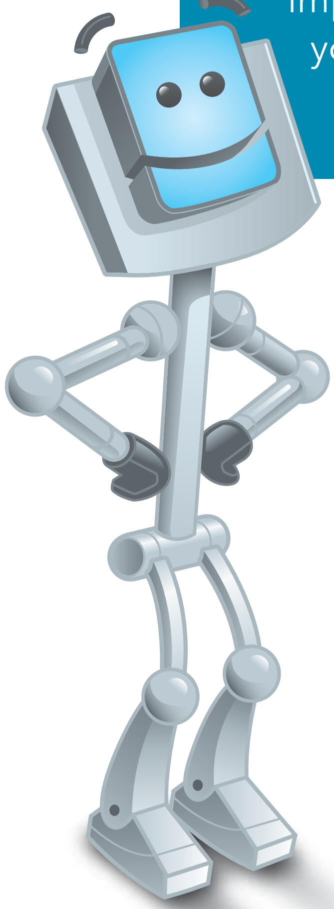
REAL-TIME MONITORING | REAL-TIME CONTROL | REAL-TIME SAVINGS

OSCAR process performance optimizer with NURO controller is a tailor-made control system for the Sanitaire ICEAS advanced SBR. It combines the operational flexibility provided by the ICEAS system with advanced process control to improve the treatment capacity while reducing operational cost.

If you can't measure it, you can't control it. Robust WTW/YSI sensors are used to measure dissolved oxygen, temperature and ammonia. The OSCAR system uses more data from the sensors than just the process variables, because smart sensors should mean smart control.

Keeping plant operations staff in mind. Operator friendly screens enable simple adjustment of setpoints and flexibility to freely adjust cycle operation to a plant's needs.

Is saving energy while ensuring you meet your permit important to you?



SANITAIRE

a xylem brand

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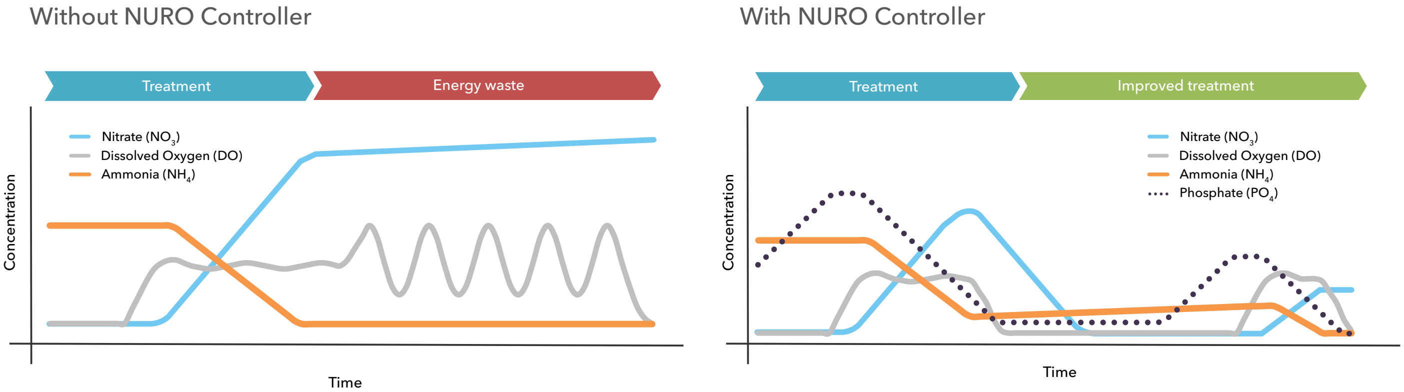
Biological Nutrient Removal Optimized

Most SBR treatment systems use pre-defined aeration and mixing periods. As the load and conditions vary with day, week and season, this pre-defined cycle is seldom optimal for the current conditions. As a result, plants are not only wasting energy but are not using their plants full capacity.



Without nutrient control, low loaded treatment cycles are only partially used for treatment. Once the organic and ammonia load is treated, the remaining aeration time results in unstable aeration control and wasted energy. With the NURO controller, aeration is automatically adjusted to the current cycle need, shifting the previous energy waste to improved treatment.

- **NURO controller stabilizes treatment:** The NURO controller uses online measurements of ammonia and temperature to ensure the effluent ammonia is always in compliance.
- **NURO optimizes nitrogen removal:** Excessive aeration and high oxygen concentrations inhibit denitrification. As influent load varies over the day and season, the NURO controller automatically shuts the blower off when not needed, allowing for anoxic conditions.
- **NURO enables biological phosphorus removal:** The NURO controller automatically optimizes conditions for biological phosphorus removal. With the continuous carbon source of the Sanitaire ICEAS system, the NURO controller uses the full treatment cycle to maximize biological phosphorus release and uptake as the current conditions allow.
- **NURO reduces energy:** Excessive aeration is not only hurting the process but also cost money. With the OSCAR system controlling the ICEAS process, energy savings of 20% can be realized.
- **NURO reduces the need for chemicals:** By optimizing the conditions for removing phosphorus biologically, the OSCAR system can reduce or even eliminate the need to add chemicals.
- **NURO protects equipment:** Excess aeration during underloaded conditions results in unstable oxygen control, often requiring unnecessary starts and stops of the blowers. The NURO controller reduces the blower wear by reducing the starts and stops on the blower by up to 50%.

Backed by Sanitaire biological process expertise and supported by Xylem's suite of premium products, the OSCAR ensures process optimization. Optimal treatment starts with optimized nutrient control. Let one of our process experts show you how the OSCAR system takes the guesswork out of nutrient control.

SB035-2549 • Sanitaire OSCAR NURO Control Sell Sheet • 11/2017 • NACT

Kee Venkatapathi

From: Marc Hatfield <mhatfield@isiwest.com>
Sent: Friday, October 26, 2018 2:48 PM
To: Kee Venkatapathi; Mark Dahm
Subject: Raton NM - Price for Sanitaire NURO control

Kee and Mark:

I understand you have requested a budget price for Sanitaire's NURO control system.

*Budget price for NURO controller is **$37,200** – which would include:*

- *One (1) YSI IQ SensorNet (IQSN) 2020XT modular water quality system with terminal controller and analyzer capable of controlling up to 20 sensors with communication back to the ICEAS® control panel. Necessary mounting hardware included.*
- *Two (2) YSI FDO 700 IQ dissolved oxygen (DO) sensors, including mounting hardware, to connect to the IQSN system.*
- *Two (2) YSI VARiON 700 IQ ammonia/nitrate sensors, including mounting hardware, to connect to the IQSN system.*
- *NURO control algorithm programmed into the PLC to operate with the blowers and sensors.*

Best,

Marc Hatfield | isiWEST Environmental Equipment
cell: 970.231.3699 | office: 970.535.0571
4175 Mulligan Drive | Longmont, CO 80504
www.isiwest.com

NMED EXHIBIT 24

ATTACHMENT 5

Alkalinity Dosage

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Alkalinity Addition- Option A

Parameter	Current Average Flow	Design Flow
Alkalinity addition rate	157 mg/L @ 0.62 MGD	157 mg/L @ 0.9 MGD
Alkalinity adjustment chemical	Sodium Hydroxide (Caustic Soda)	
Solution strength	50% by weight	
Daily solution dosing rate at Max. Month flow	83 gal/day (3.5 gal/hr)	121 gal/day (5 gal/hr)
Dosing pump operating range	1 to 8 gal/hr	

1) Based on influent TKN conc. of 55 mg/L, Effluent NO_3 concentration of 3 mg/L and effluent ammonia concentration of 1 mg/L
2) Assumed Influent Alkalinity- 125 mg/L, Effluent Alkalinity-75 mg/L

Alkalinity Addition- Option A1

Parameter	Current Average Flow	Design Flow
Alkalinity addition rate	164 mg/L @ 0.62 MGD	164 mg/L @ 0.9 MGD
Alkalinity adjustment chemical	Sodium Hydroxide (Caustic Soda)	
Solution strength	50% by weight	
Daily solution dosing rate at Max. Month flow	87 gal/day (4 gal/hr)	126 gal/day (5 gal/hr)
Dosing pump operating range	1 to 8 gal/hr	

1) Based on influent TKN conc. of 55 mg/L, Effluent NO_3 concentration of 5 mg/L and effluent ammonia concentration of 1 mg/L
2) Assumed Influent Alkalinity- 125 mg/L, Effluent Alkalinity-75 mg/L

Alkalinity Addition- Option C

Parameter	Current Average Flow	Design Flow
Alkalinity addition rate	171 mg/L @ 0.62 MGD	171 mg/L @ 0.9 MGD
Alkalinity adjustment chemical	Sodium Hydroxide (Caustic Soda)	
Solution strength	50% by weight	
Daily solution dosing rate at Max. Month flow	91 gal/day (3.8 gal/hr)	132 gal/day (5.5 gal/hr)
Dosing pump operating range	1 to 8 gal/hr	

1) Based on influent TKN conc. of 55 mg/L, Effluent NO_3 to tertiary treatment concentration of 7 mg/L and effluent ammonia concentration of 1 mg/L
2) Assumed Influent Alkalinity- 125 mg/L, Effluent Alkalinity-75 mg/L

ATTACHMENT 6

Coagulant Dosage

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Coagulant Addition- Option A and Option A1

Parameter	Current Average Flow	Design Flow
Coagulant Addition Chemical	Alum (Aluminum Sulfate Solution)	
Solution strength	50% by weight	
Daily solution dosing rate	23 gal/day (0.9 gal/hr)	37 gal/day (1.5 gal/hr)
Dosing pump operating range	0.5 to 5 gal/hr	

1) Assumed TP of 3.3 mg/L after biological assimilation to be reduced to 1 mg/L.
2) Daily dosing rate includes 25% safety factor to account for field conditions

Coagulant Addition- Option C

Parameter	Current Average Flow	Design Flow
Coagulant Addition Chemical	Alum (Aluminum Sulfate Solution)	
Solution strength	50% by weight	
Daily solution dosing rate	28 gal/day (1.1 gal/hr)	45 gal/day (1.8 gal/hr)
Dosing pump operating range	0.5 to 5 gal/hr	

3) Assumed TP of 3.3 mg/L after biological assimilation to be reduced to 0.5 mg/L.

4) Daily dosing rate includes 25% safety factor to account for field conditions

ATTACHMENT 7

External Carbon Dosage

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External Carbon Addition- Option A

Parameter	Current Average Flow	Design Flow
External Carbon Chemical	Micro-C 2000	
Current Design Effluent Nitrate	9 mg/L	
Option A Effluent Nitrate	3 mg/L	
Daily solution dosing rate	20 gal/day (0.8 gal/hr)	31.5 gal/day (1.3 gal/hr)
Dosing pump operating range	0.1 to 5 gal/hr	

External Carbon Addition- Option A1

Parameter	Current Average Flow	Design Flow
External Carbon Chemical	Micro-C 2000	
Current Design Effluent Nitrate	9 mg/L	
Option A1 Effluent Nitrate	5 mg/L	
Daily solution dosing rate	13 gal/day (0.5 gal/hr)	21 gal/day (0.8 gal/hr)
Dosing pump operating range	0.1 to 5 gal/hr	

External Carbon Addition- Option C

Parameter	Current Average Flow	Design Flow
External Carbon Chemical	Micro-C 2000	
Current Design Effluent Nitrate	9 mg/L	
Option C Effluent Nitrate	1 mg/L	
Daily solution dosing rate	26 gal/day (1 gal/hr)	42 gal/day (1.7 gal/hr)
Dosing pump operating range	0.2 to 5 gal/hr	

Micro-C dosage calculated based on theoretical nitrate to Micro-C ratio. Tertiary filter Micro-C consumption might vary.

ATTACHMENT 8

Current PFD

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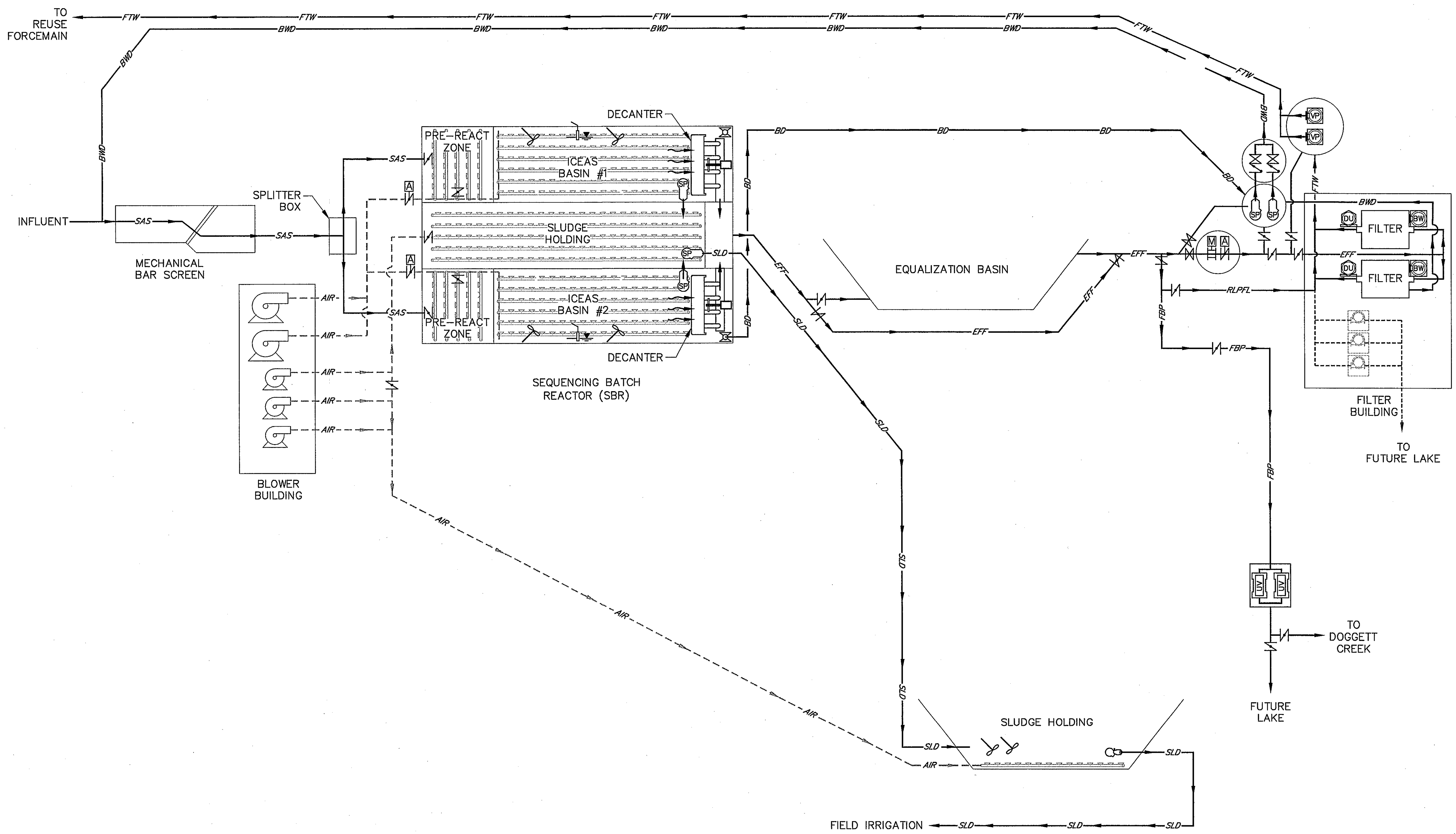

LEGEND

- BACKWASH PUMP, GRUNDFOS, 480v,
- BLOWER (LARGE) 150 HP
- BLOWER (SMALL) 50 HP
- BUBBLE DIFFUSERS
- BUTTERFLY VALVE
- BUTTERFLY VALVE WITH ACTUATOR
- DECANTER ACTUATOR
- D.O. PROBES
- DRIVE UNIT FOR FILTER, EURODRIVE
- GATE VALVE
- MAG METER
- MUD VALVE
- SUBMERSIBLE MIXER
- SUBMERSIBLE PUMP
- VERTICAL TRUBINE PUMP, 350 GAL/MIN.
- ULTRAVIOLET CYLINDERS
- BWD — BACKWASH DRAIN LINE
- BD — BASIN DRAIN
- AIR — BLOWER AIR LINE
- EFF — EFFLUENT LINE
- EBP — EQUALIZATION BASIN BY PASS LINE
- FBP — FILTER BUILDING BY PASS
- INF — INFLUENT LINE
- RLPFL — REUSE LAKE PUMP FEED LINE
- SAS — SANITARY SEWER LINE
- SDL — SLUDGE LINE
- FUTURE VERTICAL TURBINE PUMPS

PROCESS FLOW DIAGRAM

NOT TO SCALE

NO.	DESCRIPTION	DATE	BY

REVISIONS

WILSON & COMPANY
4900 LANG AVE. N.E.
ALBUQUERQUE, NM 87109

	INITIALS	DATE
DESIGNED BY	BJA	3/05
DRAWN BY	DAH/ZAS	3/05
CHECKED BY	BJA	3/17
REVIEWED BY	RJP	3/17

CITY OF RATON, NM
WASTEWATER TREATMENT FACILITY IMPROVEMENTS

PROCESS FLOW DIAGRAM

PROJECT NO. X0-210-047

DATE 12/15/04

DRAWING NO. P1

SHEET NO.

X:\Public\PROJECTS\X0047\wwtp\SHEETS\Process\flow_diagram_1.dwg 12/6/2004 10:00:21 AM MST

NMED EXHIBIT 24

APPENDIX C

City of Raton/Raton Water Works Nutrient Removal Schedule

Raton Water Works

Water Department

P.O. Box 99 / Raton, New Mexico 87740 / (575) 445-3861

April 25, 2019

Shelly Lemon
NMED
Surface Water Quality Bureau
PO Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

Re: Temporary Standard Schedule

Ms. Lemon,

The Raton Water Board met on April 16, 2019 and approved the attached 20 year implementation schedule for a temporary standard goal of achieving a 30 day average nutrient concentration of 8 mg/l total nitrogen and 1.6 mg/l total phosphorus. This schedule proposes both optimization and modification of our existing treatment facility. The goal will require both, capital and operational expense from the utility budget. The impact upon the utility budget will be difficult to fund due to the poor economic condition of the City. The schedule proposes to evaluate the progress every five years during the NPDES application process.

Raton Water Works will keep NMED updated as the design and funding portions of each project phase progress. Please move the temporary standard process forward and keep us informed of how we can assist. If further information is required or additional changes are needed please contact me.

Sincerely,

Dan Campbell
General Manager

Enclosed – Temporary Standard Implementation Schedule

City of Raton/Raton Water Works (NPDES Permit #NM0020273)
Nutrient Removal Schedule

Goal 2020 – 2040
1.6 MG/L TP
8.0 MG/L TN
30 day average

IMPLEMENTATION SCHEDULE

Task	Target Completion Period
WWTP – Nutrient Removal - NPDES Permit Application/Renewal - Continued Optimization Efforts of Existing system - PER for SBR Upgrades to Achieve Nutrient Removal Goal - Pilot Testing of Coagulation - Design for Phase 1 (Coagulation) - Funding Applications	Jan. 2020 – Jan. 2025
NPDES Permit Application - Evaluate Temporary Standard Progress - Final Design Completion - Bidding & Contract Award - Construction of Phase 1 - Construction Completion & Start Up	Jan. 2025 – Jan. 2029
- Optimization of Facility - Evaluation of Process Changes - Review & Evaluate PER Goals/Objectives and Plans	Jan. 2029 – Jan. 2030
NPDES Permit Application - NPDES Permit Application/Renewal - Evaluate Nutrient Removal Temporary Standard - Design Phase 2 (Aeration Control Upgrade for TN Removal)	Jan. 2030 – Jan. 2031
- Pursue Funding - Complete Final Design	Jan. 2031 – Jan. 2032
- Bidding & Contract Award - Construction - Construction Completion & Start Up	Jan. 2032 – Jan. 2035
NPDES Permit Application - Optimization of New Processes - Evaluation of Temporary Standard Progress	Jan. 2035 – Jan. 2037
- Continued Optimization - Evaluation of Progress	Jan. 2037 – Jan. 2040

Factors Determining Scheduling Compliance:
- Time needed to complete and approve final design of each phase;
- Time needed to successfully obtain financing;
- Successful bidding and construction processes within budget;
- Staff training for complete facility optimization;
- Evaluation of targeted steps to the goals of the temporary standard.

Temporary Standard Timeframe
The temporary standard is subject to review at each WQCC triennial review. At each NPDES permit application the progress will be reviewed and schedule modified if necessary.

APPENDIX D

Phased TMDLs & Nutrient Implementation Plan

The full TMDL document can be found online at:
https://www.env.nm.gov/wp-content/uploads/2019/09/Canadian-TMDL_EPA-approved_091819.pdf

EPA-Approved

TOTAL MAXIMUM DAILY LOAD (TMDL)

FOR THE

CANADIAN RIVER WATERSHED

SEPTEMBER 18, 2019

NMED EXHIBIT 24

Prepared by

New Mexico Environment Department, Surface Water Quality Bureau

Monitoring, Assessments, and Standards Section

Public Draft Released: June 5, 2019

Water Quality Control Commission Approval Date: August 13, 2019

U.S. EPA Approval Date: September 18, 2019

Effective Date: September 18, 2019

Revision Date(s): ______________________________

____

For Additional Information please visit:

https://www.env.nm.gov/surface-water-quality/

~or~

1190 St. Francis Drive

Santa Fe, New Mexico 87505

Cover photo: Rito de Gascon, August 20, 2016

NMED EXHIBIT 24

Table of Contents

The full TMDL document can be found online at:
https://www.env.nm.gov/wp-content/uploads/2019/09/Canadian-TMDL_EPA-approved_091819.pdf

List of Abbreviations

4Q3	4-Day, 3-year low-flow frequency
6T3	Temperature not to be exceeded for 6 or more consecutive hours on more than 3 consecutive days
AU	Assessment Unit
BMP	Best management practices
CFR	Code of Federal Regulations
cfs	Cubic feet per second
cfu	Colony forming units
CGP	Construction general storm water permit
CoolWAL	Cool Water Aquatic Life
CWA	Clean Water Act
CWAL	Cold Water Aquatic Life
ºC	Degrees Celsius
DMR	Discharge Monitoring Report
ºF	Degrees Fahrenheit
HUC	Hydrologic unit code
$j/m^2/s$	Joules per square meter per second
km^2	Square kilometers
LA	Load allocation
lbs/day	Pounds per day
mgd	Million gallons per day
mg/L	Milligrams per Liter
mi^2	Square miles
mL	Milliliters
MCWAL	Marginal Coldwater Aquatic Life
MOS	Margin of safety
MOU	Memorandum of Understanding
MS4	Municipal separate storm sewer system
MSGP	Multi-sector general storm water permit
NM	New Mexico
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint source
QAPP	Quality Assurance Project Plan
RFP	Request for proposal
SEE	Standard Error of the Estimate
SLO	State Land Office
SSTEMP	Stream Segment Temperature Model
SWPPP	Storm water pollution prevention plan
SWQB	Surface Water Quality Bureau
TMDL	Total Maximum Daily Load
UAA	Use Attainability Analysis
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WBP	Watershed-based plan
WLA	Waste load allocation
WQCC	Water Quality Control Commission
WQS	Water quality standards (20.6.4 NMAC as amended through 2/28/18)

EXECUTIVE SUMMARY

Section 303(d) of the Federal Clean Water Act, 33 U.S.C. § 1313(CWA), requires states to develop Total Maximum Daily Load (TMDL) management plans for water bodies determined to be water quality limited. A TMDL is defined as "*a written plan and analysis established to ensure that a water body will attain and maintain water quality standards including consideration of existing pollutant loads and reasonably foreseeable increases in pollutant loads*" (USEPA, 1999). A TMDL defines the amount of a pollutant a water body can assimilate without violating a state's water quality standards. It also allocates that load capacity to known point sources and nonpoint sources at a given flow. It further identifies potential methods, actions, or limitations that could be implemented to achieve water quality standards. TMDLs are defined in 40 Code of Federal Regulations Part 130 (40 C.F.R. § 130.2(i)) as the sum of individual Waste Load Allocations (WLAs) for point sources, and Load Allocations (LAs) for nonpoint source and background conditions, and a Margin of Safety (MOS) in acknowledgement of various sources of uncertainty in the analysis.

The New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB) conducted a water quality survey of the Dry Cimarron and Upper and Lower Canadian basins in 2015-2016. Water quality monitoring stations were located so as to evaluate the impact of tributary streams and ambient water quality conditions. Assessment of data generated during the 2015 and 2016 monitoring efforts was conducted according to the 2016-2018 SWQB Assessment Protocols (NMED/SWQB, 2015). This TMDL document addresses the documented impairments as summarized in Table ES-1, below. Additional information regarding these impairments can be reviewed in the current Clean Water Act §303(d)/§305(b) Integrated Report and List (IR) (NMED/SWQB, 2018a). Previous TMDL documents were completed for the same geographic area in 2007, 2009, 2011 and 2015 (details can be seen at https://www.env.nm.gov/surface-water-quality/tmdl/). No new TMDLs were addressed in this document for the Cimarron HUC (11080002) as SWQB plans to develop an alternate TMDL planning document for the Cimarron HUC.

The next scheduled water quality monitoring date for the Dry Cimarron and Upper and Lower Canadian basins is 2023-2024, at which time TMDL targets will be re-examined and potentially revised, as this document is considered to be an evolving management plan. In the event that new data indicate that the targets used in this analysis are not appropriate and/or if new standards are adopted, the load capacity will be adjusted accordingly. When water quality standards have been achieved, the reaches will be moved to the appropriate category in the IR.

Table ES-5. TMDL for Doggett Creek (Raton Creek to headwaters)	
New Mexico Standards Segment	20.6.4.99
Assessment Unit Identifier	NM-2305.A_255
NPDES Permit(s)	NM0020273
Segment Length	3 miles
Parameters of Concern	*E. coli,* plant nutrients
Designated Uses Affected	Primary Contact, Warmwater Aquatic Life
USGS Hydrologic Unit Code	11080001 - Canadian Headwaters
Scope/size of Watershed	2.9 square miles
Land Type	26l - Upper Canadian Plateau
Land Use/Cover	49% grassland, 31% evergreen forest, 15% shrub/scrub and 2% deciduous forest
Probable Sources	Bridges/culverts/RR crossings; Channelization; Gravel or dirt roads; Municipal point source discharge; On-site treatment systems; Paved roads; Pavement/impervious surface; Residences/buildings; Site clearance (land development); Urban runoff/storm sewers; Wildlife other than waterfowl
Land Management	93% private, 6% State, and less than 1% USFS, USFWS, BLM, and BOR
IR Category	5
Priority Ranking	High
WLA + LA + MOS = TMDL	
E. coli	See Raton Creek NM-2305.A_253
Plant nutrients	See Raton Creek NM-2305.A_253

Table ES-13. TMDL for Raton Creek (Chicorica Creek to headwaters)	
New Mexico Standards Segment	20.6.4.305
Assessment Unit Identifier	NM-2305.A_253
NPDES Permit(s)	NM0029891 and NM0020273
Segment Length	17.6 miles
Parameters of Concern	Plant nutrients, *E. coli*
Designated Uses Affected	Marginal warmwater aquatic life use
USGS Hydrologic Unit Code	11080001 - Canadian Headwaters
Scope/size of Watershed	45 square miles
Land Type	21f - Sedimentary Mid-Elevation Forests, 21d - Foothill Shrublands, 26l - Upper Canadian Plateau
Land Use/Cover	49% grassland, 31% evergreen forest, 15% shrub/scrub and 2% deciduous forest
Probable Sources	Bridges/culverts/RR crossings; Gravel or dirt roads; Mass wasting; Rangeland grazing; Stream channel incision
Land Management	93% private, 6% State, and less than 1% USFS, USFWS, BLM, and BOR
IR Category	5
Priority Ranking	High
WLA + LA + MOS = TMDL	
Plant nutrients Total phosphorus Total nitrogen	 0.46 + 0.07 + 0.06 = 0.59 lbs/day 4.88 + 0.78 + 0.63 = 6.29 lbs/day
E. coli	$4.30 \times 10^9 + 6.86 \times 10^8 + 5.54 \times 10^8 = 5.54 \times 10^9$

NMED EXHIBIT 24

4.0 PLANT NUTRIENTS

Nutrient assessments were conducted on data collected during the 2015-2016 Canadian River water quality survey. Detailed assessment of various water quality parameters indicated plant nutrient impairment in nine assessment units. The nutrient impairments are addressed through the four watershed TMDLs listed in **Table 4.1**. The Cimarron River in Oklahoma is downstream of the Dry Cimarron River in New Mexico. The Oklahoma portion is impaired for dissolved oxygen, but the State of Oklahoma does not have nutrient criteria for this waterbody and is therefore not listed as impaired for plant nutrients.

A previous TMDL for plant nutrients was developed for Pajarito Creek (Canadian River to headwaters) that included a WLA for the Tucumcari WWTP (NM0020711). A revision of that TMDL is planned before the end of the current permit term (September 30, 2020). The Maxwell WWTP (NM0029149) discharges to Canadian River (Cimarron River to Chicorica Creek), however, no nutrient WLA is assigned as the facility has reported no discharge since 2006 and may not renew their NPDES permit (June 30, 2019 expiration).

Table 4.1 Nutrient impaired watersheds and assessment units

AU_ID	Assessment Unit	WQS Segment	HUC
Conchas River (Conchas Reservoir to Salitre Creek)			
NM-2305.A_010	Conchas River (Conchas Reservoir to Salitre Creek)	20.6.4.305	11080005
Coyote Creek (Mora River to headwaters)			
NM-2306.A_020	Coyote Creek (Mora River to Amola Ridge)	20.6.4.309	11080004
NM-2306.A_023	Coyote Creek (Amola Ridge to Williams Canyon) *	20.6.4.309	11080004
NM-2306.A_022	Coyote Creek (Williams Canyon to Black Lake)	20.6.4.309	11080004
NM-2306.A_021	Coyote Creek (Black Lake to headwaters) *	20.6.4.309	11080004
Dry Cimarron River (Perennial reaches OK boundary to headwaters)			
NM-2701_00	Dry Cimarron River (Perennial reaches OK bnd to Long Cyn)	20.6.4.702	11040001
NM-2701_01	Dry Cimarron River (Oak Creek to headwaters)	20.6.4.701	11040001
NM-2701_02	Dry Cimarron River (Long Canyon to Oak Creek)	20.6.4.702	11040001
NM-2701_20	Long Canyon (Perennial reaches abv Dry Cimarron)	20.6.4.702	11040001
Raton Creek (Chicorica Creek to headwaters)			
NM-2305.A_255	Doggett Creek (Raton Creek to headwaters)	20.6.4.99	11080001
NM-2305.A_253	Raton Creek (Chicorica Creek to headwaters)	20.6.4.305	11080001

**unimpaired assessment unit*

4.1 Target Loading Capacity

There are two potential causes of nutrient enrichment in a given stream: excessive phosphorus and/or nitrogen. Phosphorous is found in water primarily as orthophosphate. In contrast nitrogen may be found as several dissolved species, all of which must be considered in nutrient loading. Total nitrogen is defined as the sum of nitrate+nitrite (N+N), and Total Kjeldahl Nitrogen (TKN). At the present time, there is no USEPA-approved method to test for total nitrogen, however adding the results of USEPA methods 351.2 (TKN) and 353.2 (N+N) is appropriate for estimating total nitrogen (APHA 1989). While not an EPA-approved method, Method SM4500-N for Total Nitrogen using a persulfate digest, is an approved method in the SWQB QAPP (NMED/SWQB 2019) and is used in cases where a lower detection limit is needed.

The intent of nutrient criteria, whether numeric or narrative, is to limit nutrient inputs in order to control the excessive growth of attached algae and higher aquatic plants. Controlling algae and plant growth preserves aesthetic and ecologic characteristics along the waterway. While conceptually there may be a number of possible combinations of total nitrogen (TN) and total phosphorus (TP) concentrations that are protective of water quality, the application of simple chemical limitation concepts to a complex biologic system to determine these combinations is challenging. One of the primary reasons for this is that different species of algae and higher aquatic plants will have different nutritional needs. Some species will thrive in nitrogen limited environments while others will thrive in phosphorous limited environments. Because of the diversity of nutritional needs amongst organisms, numeric thresholds for both TN and TP are required to preserve the aesthetic and ecologic characteristics along a waterway. Focusing on one nutrient or trading a decrease in one for an increase in the other may simply favor a particular species without achieving water quality standards (USEPA 2012).

New Mexico has a narrative criterion for plant nutrients set forth in Subsection E of 20.6.4.13 NMAC:

> ***Plant Nutrients:*** *Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in the dominance of nuisance species in surface waters of the state.*

This narrative criterion can be challenging to assess because the relationships between nutrient levels and impairment of designated uses are not defined, and distinguishing nutrients from "other than natural causes" is difficult. Numeric thresholds are necessary to establish targets for TMDLs, to develop water quality-based permit limits and source control plans, and to support designated uses within the watershed. Therefore, SWQB, with the assistance from EPA and the USGS, developed nutrient-related thresholds, or *narrative translators*, to address both cause (TN and TP) and response variables (dissolved oxygen [DO], pH, and periphyton chlorophyll *a*). Water quality assessments for nutrients are based on quantitative measurements of these causal and response indicators. If these measurements exceed the numeric nutrient threshold values, indicate excessive primary production, and/or demonstrate an unhealthy biological community, the reach is considered impaired (NMED/SWQB 2018a).

The applicable threshold values for cause and response variables for three of the four watershed TMDLs are in the Flat TN site class (0.65 mg/L) and the Flat-moderate TP site class (0.061 mg/L), whereas Coyote Creek is in the Moderate TN site class (0.37 mg/L) and the Flat-moderate TP site class (0.061 mg/L). These threshold values were used for water quality assessments and as a starting point for TMDL development.

4.2 Flow

40 CFR 130.7(c)(1) requires states to calculate a TMDL using the critical conditions for stream flow. The presence of plant nutrients in a stream can vary as a function of flow, however, higher nutrient concentrations typically occur during low-flow conditions because there is reduced stream capacity to assimilate nutrients. In other words, as flow decreases, the stream cannot dilute its constituents causing the concentration of plant nutrients to increase. Higher flows typically do not represent impairment as high flows can quickly move the TN and TP through the assessment unit not allowing for the growth of nuisance algae.

A climatic year starting April 1 of the prior year and ending March 31 is often used when examining critical low flow conditions in the United States. This choice reduces the likelihood of splitting low flow periods - typically found in the summer or fall - across different years and thereby affecting the results of Log Pearson Type III analysis of series of annual low flows. A different climatic year or shorter season may be used if low flow periods occur at other times of the year or overlap the boundaries of the climatic year.

When available, USGS gages are used to estimate flow. The 4Q3 flow for Coyote Creek (07218000) was estimated using gage data and DFLOW software, Version 3.1b (USEPA 2006). DFLOW 3.1b is a Windows-based tool developed to estimate user selected design stream flows for low flow analysis by utilizing algorithms based on Log Pearson Type III distribution.

It is often necessary to estimate a critical flow for a portion of a watershed where there is no active USGS flow gage. 4Q3 derivations for ungauged streams were based on analysis methods described by Waltemeyer (2002). In Waltemeyer's analysis, two regression equations for estimating 4Q3 were developed based on physiographic regions of NM (i.e., statewide and mountainous regions above 7,500 feet in elevation). The following statewide regression equation (**Equation 4.1**) is based on data from 50 streamflow-gaging stations that had non-zero 4Q3 low-flow frequency (Waltemeyer, 2002). Parameters used in the calculation were determined using StreamStats, an online GIS application developed by the US Geological Survey. The critical flow was converted from cfs to million gallons per day (MGD) using a conversion factor of 0.646. Flows used for TMDL development are listed in **Table 4.2.**

Equation 4.1

$$4Q3 = 1.2856 \times 10^{-4} DA^{0.42} {P_w}^{3.16}$$

Where:

4Q3 = Four-day, three-year low-flow frequency (cfs)
DA = Drainage area (mi^2)
P_w = Average basin mean winter precipitation (inches)

Table 4.2 Flow summaries for nutrient-impaired watersheds

Watershed	Flow Method	Average Elevation (ft)	DA (mi^2)	P_w (in)	4Q3
Conchas River (Conchas Reservoir to Salitre Creek)	Waltemeyer-statewide	5590	514	4.4	0.19 cfs 0.12 mgd
Coyote Creek (Mora River to headwaters)	DFLOW 07218000 [a]	n/a	n/a	n/a	0.46 cfs 0.30 mgd
Dry Cimarron River (Perennial reaches OK boundary to headwaters)	Waltemeyer - statewide	5840	905	4.87	0.33 cfs 0.21 mgd
Raton Creek (Chicorica Creek to headwaters)	Waltemeyer-statewide	7150	45	6.85	0.28 cfs 0.18 mgd

(a) period of record 1929-2018

It is important to remember that in this case, the TMDL itself is a value calculated at a defined critical flow condition and is calculated as part of the planning process designed to achieve water quality standards. Since flows vary throughout the year in these systems, the actual load at any given time will also vary.

4.3 TMDL Calculation

This subsection describes the relationship between the numeric nutrient targets and the allowable pollutant-level by determining the total assimilative capacity of the waterbody, or loading capacity, for the pollutant. The loading capacity is the maximum amount of pollutant loading that a waterbody can receive while meeting its water quality objectives.

As a river flows downstream it has a specific carrying capacity for nutrients. This carrying capacity, or TMDL, is defined as the mass of pollutant that can be carried under critical flow conditions without violating the target concentration for that constituent. These TMDLs were developed based on simple dilution calculations using critical flows, the numeric target, and a conversion factor. The specific carrying capacity of a receiving water for a given pollutant, was estimated using **Equation 4.2**. The calculated daily carrying capacities (i.e. TMDLs) for TP and TN are summarized in **Table 4.3**.

Critical flow (4Q3) x WQS x Conversion Factor = TMDL **(Eq. 4.2)**

Table 4.3 Daily target loads for TP & TN

TMDL Watershed	Parameter	Critical Flow (mgd)[(a)]	In-Stream Target (mg/L)	Conversion Factor	TMDL (lbs/day)
Conchas River (Conchas Reservoir to Salitre Creek)	Total Phosphorus Total Nitrogen	0.12	0.061 0.65	8.34	0.06 0.65
Coyote Creek (Mora River to headwaters)	Total Phosphorus Total Nitrogen	0.30	0.061 0.37	8.34	0.15 0.93
Dry Cimarron River (Perennial reaches OK boundary to headwaters)	Total Phosphorus Total Nitrogen	0.33	0.061 0.65	8.34	0.17 1.79
Raton Creek (Chicorica Creek to headwaters)	Total Phosphorus Total Nitrogen	1.16 [(b)]	0.061 0.65	8.34	0.59 6.29

Notes: *(a)* See Section 4.2 for details about critical flow calculations.
(b) The design flows of NM0020273 (0.9 mgd) and NM0029891 (0.08 mgd) were added to the calculated 4Q3.

This total TMDL for the Raton Creek watershed is then allocated as follows: first the MOS is subtracted as described in Section 4.4, then the Waste Load Allocation is subtracted as described in Section 4.5.1, and the remainder is the Load Allocation as described in Section 4.5.2 and Equation 4.3.

Table 4.4 Plant Nutrient TMDLs

Assessment Unit	Parameter	MOS (lbs/day)	LA (lbs/day)	WLA (lbs/day)	TMDL (lbs/day)
Conchas River (Conchas Reservoir to Salitre Creek)	Total Phosphorus Total Nitrogen	0.01 0.07	0.05 0.59	0 0	0.06 0.65
Coyote Creek (Mora River to headwaters)	Total Phosphorus Total Nitrogen	0.02 0.09	0.14 0.83	0 0	0.15 0.93
Dry Cimarron River (Perennial reaches OK boundary to headwaters)	Total Phosphorus Total Nitrogen	0.01 0.11	0.1 1.02	0 0	0.11 1.14
Raton Creek (Chicorica Creek to headwaters)	Total Phosphorus Total Nitrogen	0.06 0.63	0.07 0.78	0.46 [a] 4.88 [a]	0.59 6.29

Notes: *(a)* WLA for NM0020273. See Secton 4.5.1.

4.4 Margin of Safety

TMDLs should reflect a MOS based on the uncertainty or variability in the data, the point and nonpoint source load estimates, and the modeling analysis. The MOS can be expressed either implicitly or explicitly. An implicit MOS is incorporated by making conservative assumptions in the TMDL analysis, such as allocating a conservative load to background sources. An explicit MOS is applied by reserving a portion of the TMDL and not allocating it to any other sources.

For these nutrient TMDLs, the margin of safety was developed using a combination of conservative assumptions and explicit recognition of potential errors. Therefore, this margin of safety is the sum of the following two elements:

- *Conservative Assumptions*
  - Treating phosphorus and nitrogen as pollutants that do not readily degrade in the environment.
- *Explicit Recognition of Potential Errors*
  - Uncertainty exists in sampling nonpoint sources of pollution. A conservative MOS for this element is therefore **5 %**.
  - There is inherent error in all flow values, both measured and calculated; a conservative MOS for this element in gaged streams is **5 %**.

4.5 Waste Load Allocations and Load Allocations

4.5.1 Waste Load Allocation

There are no National Pollutant Discharge Elimination System (NPDES) individual permits that discharge to the Conchas River, Coyote Creek, or Dry Cimarron River watersheds. However, the City of Raton WWTP (NM0020273) discharges into Doggett Creek thence to Raton Creek and the City of Raton WTP (NM0029891) discharges to Raton Creek. Phased WLAs for NM0020273 are listed in **Table 4.5**; no WLA was assigned for NM0029891. The EPA Technical Support Document for Water Quality Based Toxics Control (EPA 1991) strongly recommends that the WLA is not directly implemented in the permit as it is an overly conservative estimate, but the document provides a methodology for translation of the WLA into appropriate permit limitations. See Chapter 7.4.3 in the 1991 TSD for an example calculation. Per Chapter 5.3.1 of the TSD:

> *"Direct use of a WLA as a permit limit creates a significant risk that the WLA will be enforced incorrectly, since effluent variability and the probability basis for the limit are not considered specifically. For example, the use of a steady state WLA typically establishes a level of effluent quality with the assumption that it is a value never to be exceeded. The same value used directly as a permit limit could allow the WLA to be exceeded without observing permit violations if compliance monitoring was infrequent. Confusion can also result in translating a longer duration WLA requirement (e.g. for chronic protection) into maximum daily and average monthly permit limits. The permit writer must ensure that permit limits are derived to implement a WLA requirement correctly."*

Further discussion of these permits as well as nutrient TMDL implementation are discussed in **Section 7.1**.

Table 4.5 Wasteload Allocation for NM0020273

Phase	Parameter	Target limit (mg/L)	WLA (lbs/day)
0 (Current permit)	Total Phosphorus	3.0 (a)	14 (a)
	Total Nitrogen	10.0 (a)	46.7 (a)
1^{st}	Total Phosphorus	3.0 (b)	13.3 (b)
	Total Nitrogen	9.4 (b)	41.5 (b)
2^{nd}	Total Phosphorus Total Nitrogen	TBD (c)	TBD (c)
n^{th}	Total Phosphorus	0.061 (d)	0.46 (e)
	Total Nitrogen	0.65 (d)	4.88 (e)

TBD = to be determined.

(a) The 2015 permit effluent limits were based on the 85th percentile of 2009-2014 concentration data. The loading limit was based on the maximum 30-day average flow (0.56 mgd) from the previous two years of data. See fact sheet for NPDES permit issued in 2015.

[b] Targets and WLA based on 85th percentile of DMR chemistry data and maximum 30-day flow (0.53 mgd) for the July 2015-March 2019 time period.

[c] To be evaluated next permit cycle and TMDL revised if necessary. See Section 7.1.

[d] Targets based on in-stream nutrient targets discussed in Section 4.1.

[e] TMDL calculated using Equation 4.2 and 0.9 mgd design flow.

There are no Municipal Separate Storm Sewer System (MS4) permits in these AUs. However, excess nutrient loading may be a component of some storm water discharges covered under general NPDES permits. There may be storm water discharges from construction activities covered under the NPDES Construction General Permit (CGP). Permitted sites require preparation of a SWPPP that includes identification and control of all pollutants associated with the construction activities to minimize impacts to water quality. The current CGP also includes state-specific requirements to implement site-specific interim and permanent stabilization, managerial, and structural solids, erosion, and sediment control Best Management Practices (BMPs) and/or other controls. BMPs are designed to prevent to the maximum extent practicable an increase in sediment load to the water body or an increase in a sediment-related parameter, such as total suspended solids, turbidity, siltation, stream bottom deposits, etc. BMPs also include measures to reduce flow velocity during and after construction compared to pre-construction conditions to assure that WLAs or applicable water quality standards, including the antidegradation policy, are met. Compliance with a SWPPP that meets the requirements of the CGP is generally assumed to be consistent with this TMDL.

Storm water discharges from active industrial facilities are generally covered under the current NPDES Multi-Sector General Permit (MSGP). This permit also requires preparation of an SWPPP, which includes specific requirements to limit (or eliminate) pollutant loading associated with the industrial activities in order to minimize impacts to water quality. Compliance with a SWPPP that meets the requirements of the MSGP is generally assumed to be consistent with this TMDL.

It is not possible to calculate individual WLAs for facilities covered by these General Permits at this time using available tools. Loads that are in compliance with the General Permits are therefore currently included as part of the LA.

4.5.2 Load Allocation

The load allocation (LA) accounts for the non-point sources (NPS) of pollution in the respective watersheds. Nonpoint sources include all other categories not classified as point sources (i.e., WLAs). In order to calculate the LA, the WLAs and MOS were subtracted from the TMDL using **Equation 4.3**:

$$TMDL = \Sigma\, WLA + \Sigma\, LA + MOS \qquad \textbf{(Eq. 4.3)}$$

therefore,

$$\Sigma\, LA = TMDL - MOS - \Sigma\, WLA$$

4.5.3 Load Reductions

The load reductions necessary to meet the target loads were calculated as the difference between the calculated daily target load (**Table 4.5**) and the measured load as shown in **Table 4.6**.

Table 4.6 Calculation of load reduction for TP and TN

TMDL Watershed	Parameter	Target Load[(a)] (lbs/day)	Measured Load[(b)] (lbs/day)	Load Reduction (lbs/day)	Percent Reduction[(c)]
Conchas River (Conchas Reservoir to Salitre Creek)	Total Phosphorus	0.05	0.50	0.45	89%
	Total Nitrogen	0.59	5.20	4.61	89%
Coyote Creek (Mora River to headwaters)	Total Phosphorus	0.14	32.89	32.75	100%
	Total Nitrogen	0.83	348.28	347.45	100%
Dry Cimarron River (Perennial reaches OK boundary to headwaters)	Total Phosphorus	0.10	0.73	0.63	87%
	Total Nitrogen	1.02	6.91	5.89	85%
Raton Creek (Chicorica Creek to headwaters)	Total Phosphorus	0.53	5.70	5.18	91%
	Total Nitrogen	5.66	11.73	6.07	52%

Notes: *(a)* Target Load = TMDL – MOS. The MOS is not included in the load reduction calculations because it is a set aside value, which accounts for any uncertainty or variability in TMDL calculations and therefore should not be subtracted from the measured load.

(b) The measured load is the magnitude of point and nonpoint sources. It is calculated using mean measured exceedance values (Appendix A) and the mean measured flow at exceedances.

(c) Percent reduction is the percent the existing measured load must be reduced to achieve the target load and is calculated as follows: (Measured Load – Target Load) / Measured Load x 100.

4.5 Identification and Description of Pollutant Sources

SWQB fieldwork includes an assessment of the probable sources of impairment (Appendix B). The approach for identifying "Probable Sources of Impairment" was modified by SWQB to include additional input from a variety of stakeholders including landowners, watershed groups, and local, state, tribal and federal agencies. Probable Source Sheets are filled out by SWQB staff during watershed surveys and watershed restoration activities. The draft probable source list (**Table 4.7**) will be reviewed and modified, as necessary, with watershed group/ stakeholder input during the TMDL public meeting and comment period.

Table 4.7 Pollutant source summary for plant nutrients

TMDL Watershed	NPDES permits	Probable Sources
Conchas River (Conchas Reservoir to Salitre Creek)	None	Bridges/culverts/RR crossings, gravel or dirt roads, low water crossing, on-site treatment systems (septic), rangeland grazing, residences/buildings, stream channel incision, waterfowl, wildlife other than waterfowl
Coyote Creek (Mora River to headwaters)	None	Angling pressure, campgrounds, channelization, crop production, dams/diversions, fish stocking, flow alterations, gravel or dirt roads, highways/road/bridge runoff, hiking trails, irrigated crop production, legacy logging, on-site treatment systems (septic), rangeland grazing, residences/buildings, site clearance (land development), stream channel incision, waterfowl, wildlife other than waterfowl
Dry Cimarron River (Perennial reaches OK boundary to headwaters)	None	Bridges/culverts/RR crossings, channelization, crop production, dams/diversions, dumping/garbage/trash/litter, flow alterations, gravel/dirt roads, irrigated crop production, legacy logging, low water crossing, mass wasting, on-site treatment systems (septic), paved roads, rangeland grazing, recent bankfull/overbank flows, residences/buildings, stream channel incision, storm runoff due to construction, waterfowl, wildlife other than waterfowl.
Raton Creek (Chicorica Creek to headwaters)	NM0020273 NM0029891	Bridges/culverts/RR crossings, channelization, crop production, dams/diversions, dumping/garbage/trash/litter, flow alterations, gravel/dirt roads, highway/road/bridge runoff, hiking trails, inappropriate waste disposal, irrigated crop production, legacy logging, low water crossing, mass wasting, municipal point source discharge, on-site treatment systems (septic), paved roads, pavement/impervious surfaces, rangeland grazing, recent bankfull/overbank flows, residences/buildings, site clearance, stream channel incision, urban runoff/storm sewers, waste from pets, waterfowl, watershed runoff following forest fire, wildlife other than waterfowl.

The Probable Source Identification Sheets in Appendix B provide an approach for a visual analysis of a pollutant source along an impaired reach. Although this procedure is qualitative, SWQB feels that it provides the best available information for the identification of probable sources of impairment in a watershed. The list of “Probable Sources” is not intended to single out any particular land owner or single land management activity and has therefore been labeled “Probable” and generally includes several sources for each impairment. Probable sources of impairment along each reach as determined by field reconnaissance and assessment are listed in **Table 4.8**. Probable sources of nutrients will be evaluated, refined, and changed as necessary through the Watershed-Based Plan (WBP).

4.6 Linkage between Water Quality and Pollutant Sources

The source assessment phase of TMDL development identifies sources of nutrients that may contribute to both elevated nutrient concentrations and the stimulation of algal growth in a waterbody (**Figure 4.3**). Where data gaps exist or the level of uncertainty in the characterization of sources is large, the recommended approach to TMDL assignments requires the development of allocations based on estimates utilizing the best available information.

Figure 4.3: Canadian River at NM 120, October 13, 2016

Phosphorus and nitrogen generally drive the productivity of algae and macrophytes in aquatic ecosystems, therefore they are regarded as the primary limiting nutrients in freshwaters. The main reservoirs of natural phosphorus are rocks and natural phosphate deposits. Weathering, leaching, and erosion are all processes that breakdown rock and mineral deposits allowing phosphorus to be transported to aquatic systems via water or wind. The breakdown of mineral phosphorus produces inorganic phosphate ions ($H_2PO_4^-$, HPO_4^{2-}, and PO_4^{3-}) that can be absorbed by plants from soil or water (USEPA 1999). Phosphorus primarily moves through the food web as organic phosphorus (after it has been incorporated into plant or algal tissue) where it may be released as phosphate in urine or other waste by heterotrophic consumers and reabsorbed by plants or algae to start another cycle (Nebel and Wright 2000).

The largest reservoir of nitrogen is the atmosphere. About 80% of the atmosphere by volume consists of nitrogen gas (N_2). Although nitrogen is plentiful in the environment, it is not readily available for biological uptake. Nitrogen gas must be converted to other forms, such as ammonia (NH_3 and NH_4^+), nitrate (NO_3^-), or nitrite (NO_2^-) before plants and animals can use it. Conversion of gaseous nitrogen into usable mineral forms occurs through three biologically mediated processes of the nitrogen cycle: nitrogen fixation, nitrification, and ammonification (USEPA 1999). Mineral forms of nitrogen can be taken up by plants and algae and incorporated into their tissue. Nitrogen follows the same pattern of food web incorporation as phosphorus and is released in waste primarily as ammonium compounds. The ammonium compounds are usually converted to nitrates by nitrifying bacteria, making it available again for uptake, starting the cycle anew (Nebel and Wright 2000).

Rain, overland runoff, groundwater, drainage networks, and industrial and residential waste effluents transport nutrients to receiving waterbodies. Once nutrients have been transported into a waterbody they can be taken up by algae, macrophytes, and microorganisms either in the water column or in the benthos; they can sorb to organic or inorganic particles in the water column and/or sediment; they can accumulate or be recycled in the sediment; or they can be transformed and released as a gas from the waterbody (**Figure 4.4**).

As noted above, phosphorus and nitrogen are essential for proper functioning of ecosystems. However, excess nutrients cause conditions unfavorable for the proper functioning of aquatic ecosystems. Nuisance levels of algae and other aquatic vegetation (macrophytes) can develop rapidly in response to nutrient enrichment when other factors (e.g., light, temperature, substrate) are not limiting (**Figure 4.4**). The relationship between nuisance algal growth and nutrient enrichment in stream systems has been well documented in the literature (Welch 1992; Van Nieuwenhuyse and Jones 1996; Dodds *et al.* 1997; Chetelat *et al.* 1999). Unfortunately, the magnitude of nutrient concentration that constitutes an "excess" is difficult to determine and varies by ecoregion. The recommended level of total phosphorus to avoid algal blooms in nitrogen-limited ecosystems is 0.01 to 0.1 mg/L and 0.1 mg/L to 1 mg/L of total nitrogen. The upper end of these ranges also support less biological diversity (NOAA/USEPA 1988).

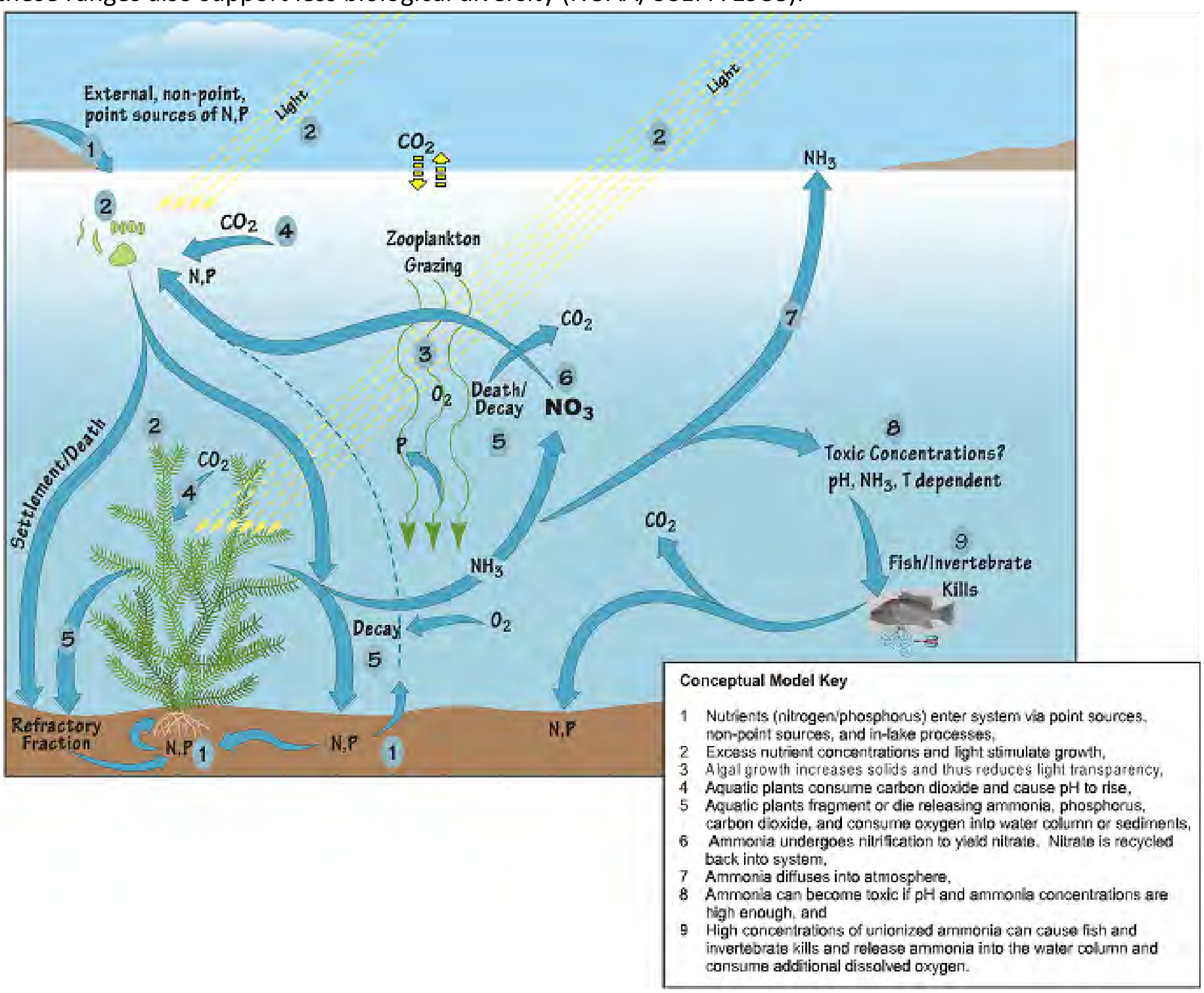

Figure 4.4 Nutrient conceptual model (USEPA 1999)

As described in Section 4.2, the presence of plant nutrients in a stream can vary as a function of flow. As flow decreases through water diversions and/or drought-related stressors, the stream cannot effectively dilute its constituents, which causes the concentration of plant nutrients to increase. Nutrients generally reach a waterbody from land uses that are in close proximity to the stream because the hydrological pathways are shorter and have fewer obstacles than land uses located away from the riparian corridor. During the growing season (i.e. in agricultural return flow) and in storm water runoff, distant land uses can become hydrologically connected to the stream, thus transporting nutrients from the hillslopes to the stream during these time periods.

In addition to agriculture, there are several other human-related activities that influence nutrient concentrations in rivers and streams. Residential areas contribute nutrients from septic tanks, landscape maintenance, as well as backyard livestock (e.g., cattle, horses) and pet wastes. Urban development contributes nutrients by disturbing the land and consequently increasing soil erosion, by increasing the impervious area within the watershed, and by directly applying nutrients to the landscape. Recreational activities such as hiking and biking can also contribute nutrients to the stream by reducing plant cover and increasing soil erosion (e.g., trail network, streambank destabilization), direct application of human waste, campfires and/or wildfires, and dumping trash near the riparian corridor.

Undeveloped, or natural, landscapes also can deliver nutrients to a waterbody through decaying plant material, soil erosion, and wild animal waste. Another geographically occurring nutrient source is atmospheric deposition, which adds nutrients directly to the waterbody through dryfall and rainfall. Atmospheric phosphorus and nitrogen can be found in both organic and inorganic particles, such as pollen and dust as well as anthropogenic sources such as combustion and agriculture. The contributions from these natural sources are generally considered to represent background levels.

Water pollution caused by on-site septic systems is a widespread problem in New Mexico (McQuillan 2004). Septic system effluents have contaminated more water supply wells, and more acre-feet of ground water, than all other sources in the state combined. Groundwater contaminated by septic system effluent can discharge into streams gaining from groundwater inflow. Nutrients such as phosphorous and nitrogen released into gaining streams from aquifers contaminated by septic systems can contribute to eutrophic conditions.

4.7 Consideration of Seasonal Variability

Section 303(d)(1) of the CWA requires TMDLs to be "established at a level necessary to implement the applicable WQS with seasonal variation." Data used in the calculation of this TMDL were collected during the spring, summer, and fall to ensure coverage of any potential seasonal variation in the system. Exceedences were observed during all seasons, which captured flow alterations related to snowmelt, the growing season, and summer monsoonal rains. The critical condition used for calculating the TMDL is considered to be conservative and protective of the water quality standard under all flow conditions. Calculations made at the critical flow, in addition to using other conservative assumptions as described in the previous section on MOS, should be protective of the water quality standards designed to preserve aquatic life in the stream. It was assumed that if critical conditions were met during this time, coverage of any potential seasonal variation would also be met. Flow considerations are discussed in Section 4.2.

4.8 Future Growth

Growth estimates by county and Water Planning Region (WPR) are available from the New Mexico Bureau of Business and Economic Research (http://bber.unm.edu/data). These estimates project growth to the year 2060. The nutrient TMDLs fall within the Northeast New Mexico, Colfax and Mora/San Miguel/Guadalupe WPRs, as detailed on **Table 4.9**. BBER projects continuing slow growth for the Colfax and Mora/SanMiguel/Guadalupe WPRs, and "relatively very slow" growth in the Northeast New Mexico WPR, with slight negative growth in the 2050-2060 decade.

Table 4.8 TMDL Study Area Water Planning Region Population Estimates

WPR	2015*	2030	2040	2050	2060	% Increase (2015-2060)
Northeast New Mexico	84,987	88,338	89,654	89,772	89,216	5.0
Colfax	15,323	16,480	16,976	17,484	18,129	18.3
Mora/San Miguel/Guadalupe	44,545	48,488	50,894	52,855	54,681	22.8

**most recent estimate available*

Estimates of future growth are not anticipated to lead to a significant increase in nutrients that cannot be controlled with BMPs. However, it is imperative that BMPs continue to be utilized to improve road conditions and grazing allotments and adhere to SWPPP requirements related to construction and industrial activities covered under the general permit. Any future growth would be considered part of the existing load allocation, assuming persistence of the hydrologic conditions used to develop these TMDLs.

7.0 IMPLEMENTATION OF TMDLs

When approving TMDL documents, USEPA takes action on the TMDL, LA, WLA, and other components of the TMDL as needed (e.g., MOS and future growth). USEPA does not take action on the implementation section of the TMDL, and USEPA is not bound to implement any recommendations found in this section, in particular if they are found to be inconsistent with CWA and NPDES regulations, guidance, or policy.

7.1 Point Sources – NPDES permitting

There are four individual NPDES permits that discharge to the assessment units addressed in this document.

Table 7.1 Individual NPDES permits

NPDES permit/ expiration date	Assessment Unit	Impairment	WLA	Current permit limit
NM0024996 - Mora Mutual Domestic Water & Sewerage (September 30, 2022)	Mora River (USGS gage east of Shoemaker to Hwy 434)	*E.coli*	2.48×10^8 cfu/day	126 MPN/100mL 30-day average and 410 MPN/100 mL daily maximum
NM0029891 - City of Raton Water Filtration Facility (August 31, 2021)	Raton Creek (Chicorica Creek to headwaters)	Plant nutrients	Zero	None
NM0020273 – City of Raton WWTP (June 30, 2020)	Raton Creek (Chicorica Creek to headwaters)	Plant nutrients *E.coli*	Phased TMDL. See Table 4.5 4.30×10^9 cfu/day	TN 10mg/L and 46.7 lbs/day (30-day avg) TP 3mg/L and 14 lbs/day (30-day avg) 126 MPN/100mL 30-day average and 410 MPN/100 mL daily maximum
NM0020711 – City of Tucumcari WWTP (September 30, 2020)	Pajarito Creek (Perennial portions Canadian River to Vigil Canyon)	Temperature	Zero	None

7.1.2 Plant nutrients

A previous TMDL for plant nutrients was developed for Pajarito Creek (Canadian River to headwaters) that included a WLA for the Tucumcari WWTP (NM0020711). A revision of that TMDL is planned before the end of the current permit term (September 30, 2020). The Maxwell WWTP (NM0029149) discharges to Canadian River (Cimarron River to Chicorica Creek), however, no nutrient WLA is assigned as the facility has reported no discharge since 2006 and may not renew their NPDES permit (June 30, 2019 expiration).

The Raton Water Filtration Facility (NM0029891) discharges into the Raton Creek (Chicorica Creek to headwaters) assessment unit and has no permit limit for either total nitrogen or total phosphorus. No plant nutrient data from either DMR documents or MASS staff are available for this facility. The reasonable potential analysis conducted during the 2015 permit renewal process indicated that the facility discharge has no reasonable potential to exceed the applicable WQS for nitrite+nitrate. The facility has reported "no discharge" since at least January 2010. The Raton WTP is not expected to cause or contribute to the plant nutrient impairment, therefore no WLA is assigned. The permit expires in August 2021.

The Raton WWTP (NM0020273) discharges into the Doggett Creek (Raton Creek to headwaters) assessment unit and then into Raton Creek. The Raton WWTP has both total nitrogen and total phosphorus permit limits: total nitrogen 10mg/L and 46.7 lbs/day (30-day average) and total phosphorus 3mg/L and 14 lbs/day (30-day average). Thirty-six monthly DMR samples were collected for the July 2015-June 2018 period and during that time, two total nitrogen samples exceeded the 10 mg/L permit limit and two total phosphorus samples exceeded the 3 mg/L permit limit. No samples exceeded either 30-day average loading permit limit. The permit expires in June 2020.

If the TS (temporary standard) Proposal is not approved by the time of the next permit renewal, it is the policy of the Water Quality Control Commission and EPA to allow schedules of compliance in NPDES permits in order for the facility modifications necessary to meet new water quality-based requirements. The target threshold values for the WWTP discharging to Raton Creek of 0.65 mg/L TN and 0.061 mg/L TP are not achievable with current technology. NMED-SWQB proposes a multiphase approach that will provide incremental progress towards the highest attainable condition (see Table 4.5). Phase 0 is the current permit limits. Phase 1 is a reduction from the current permit limits and is based on the 85th percentile of what the facility is currently achieving. Phase 2 through the final phase (n), will be re-evaluated as additional data about the receiving waters and the facility's capabilities is collected and technology improves. In any case, the WLAs should be translated into discrete permrit limits using the approach in EPA's Technical Support Document. The TSD specifically states that implementing a WLA directly as limitations in a permit is overly conservative. The compliance schedule for the next Permit renewal should be set for the facility to meet Phase 1 (a reduction from 10 mg/L TN to 9.4 mg/L and 3 mg/L TP to 3.0 mg/L) at the end of that permit cycle with the current phase 0 limits retained for the balance of the permit cycle. If the TS proposal is still not approved by the end of the permit term that will include Phase 1 limits, the TMDL may be revised to include Phase 2 limits or other appropriate measures.

9.0 PUBLIC PARTICIPATION

Public participation was solicited in development of this TMDL. The draft TMDL was first made available for a 30-day comment period beginning June 5, 2019 and ending on July 5, 2019. The draft document notice of availability was advertised via email distribution lists and webpage postings. A public meeting was held on June 13, 2019, at the Raton City Council chambers from 5:30 to 7:30 pm. A response to comments was added to the TMDL document as Appendix E. The TMDL was approved by the WQCC on August 13, 2019 and EPA on September 18, 2019.

The next step for public participation will be development of WBPs and watershed protection projects, including those that may be funded by CWA Section 319(h) grants managed by SWQB.

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APPENDIX E

Calculation of Highest Attainable Interim Effluent Conditions

Raton WWTP (NPDES Permit No. NM0020273)—Calculation of Highest Attainable Interim Effluent Conditions

Background, Assumptions, and Observations

- Calculations based on Table 5-2 (Calculation of Permit Limits) from the USEPA *Technical Support Document for Water Quality-based Toxics Control* to set an average monthly effluent limitation (AML) based on the target effluent concentration (TEC) presented.
    - TECs are performance-based levels of effluent quality representing average effluent concentrations and could potentially represent a highest attainable condition (HAC).
    - The TEC is assumed to be the long-term average (LTA) in the WQBEL calculation.
    - WQBEL calculations assume that effluent concentrations of TN and TP are lognormally distributed with a coefficient of variation (CV) of 0.6.
    - Calculations assume that the AML is set at the 95th percentile.
    - Calculations assume that the sampling frequency for TN and TP would be set at 2x/month.

Table 5-2 Calculation of Permit Limits

$$AML = LTA \times e^{[LTA\ Multiplier]}$$

Where,

AML = average monthly limit,

LTA = long-term average (TEC), and

$e^{[LTA\ Multiplier]}$ is based on a coefficient of variation of 0.6, the 95th percentile of occurrence probability, and a sampling frequency of n=2 times per month = 1.60.

Identified Highest Attainable Interim Effluent Condition		
Treatment Combination for Raton (TECs)	**Treatment Option Description**	**Estimated 30-Day Average Effluent Limits 2x/month**
5.0 mg/L TN 1.0 mg/L TP	• Optimize existing SBR (ICEAS) process to promote nitrification/denitrification • Upgrade SCADA system, install new mixers and blowers • Chemical precipitation	8.0 mg/L TN 1.6 mg/L TP

New Mexico Nutrient Thresholds for Perennial Wadeable Streams

Final Report

August 21, 2015

TETRA TECH, INC.

Prepared by Tetra Tech, Inc.
in cooperation with the
New Mexico Environment Department
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NMED EXHIBIT 25

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This work was supported by EPA's Office of Water, Office of Science and Technology, through the Nutrient Scientific Exchange and Partnership System (N-STEPS) administered by EPA's National Nutrient Criteria Program.

Executive Summary

The State of New Mexico currently has a narrative criterion for plant nutrients. This criterion is used to identify nutrient conditions that contribute to production of undesirable or nuisance aquatic life. Narrative criteria must be translated to numeric nutrient thresholds for consistent implementation in impairment determinations, NPDES permit limits, and TMDL budgets. Therefore, the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department (NMED) is refining nutrient threshold values with regional data, reference conditions, links between cause and response variables, and verified classification systems.

The United States Environmental Protection Agency (USEPA) nutrient criteria guidance recommends that criteria be derived for primary causal variables total nitrogen (TN) and total phosphorus (TP). The analysis presented in this report uses concurrently measured causal and response variables, including diatom and benthic macroinvertebrate assemblages, dissolved oxygen (DO) and chlorophyll *a* (chl-a) concentrations. The approach uses reference conditions and stressor-response relationships to derive numeric nutrient thresholds for application of the narrative criterion. This document describes the nutrient threshold development process and existing nutrient conditions in New Mexico streams across the landscape, in relation to the stressor gradient and aquatic life uses.

The pathways by which nutrients affect aquatic life conditions are the basis for the stressor-response analyses. The focus was on TN and TP effects on diatoms and benthic macroinvertebrates through direct and indirect pathways including chl-a and DO. Chl-a is a proxy for algal biomass, which in turn is a proxy for algal productivity. Algal productivity is the link between the nutrient stressors and the impacts to designated uses (e.g., DO consumption, nuisance to humans, displacement of other desirable algae, etc.). The linkages and relationships defined in the conceptual model and analyzed in this study include:

1. Increases in nutrients result in increases in chl-a
2. Increases in chl-a result in changes in DO dynamics
3. Increases in nutrients result in changes in diatom metrics
4. Changes in DO dynamics result in changes in macroinvertebrate metrics

The analytical methods consisted of two major categories: reference condition distributions and stressor-response relationships. The reference condition approach included identification of minimally disturbed sites, classification of the sites, and description of reference condition based on characteristics in minimally disturbed sites in each site class. Candidate thresholds were derived from distributions of nutrient concentrations in reference streams. In this study, reference streams represent least disturbed conditions with ecological integrity expected for a region. As such, the nutrient conditions in reference streams are the best estimate concentrations due to "*natural causes*" as they are referred to in the narrative criteria. Thresholds for a particular stressor of interest (e.g., TN or TP) were derived by selecting a

NMED EXHIBIT 25

representative value from the distribution found among reference sites. Values greater than those observed in the reference conditions are likely to be outside of the reference range, indicating the presence of *"nutrients from other than natural causes"* and possible threats to aquatic life designated uses. The threshold value defines expectations for all streams in a site class.

Stressor-response approaches refer to analytical techniques that derive candidate thresholds by defining the relationships between response variables and nutrient concentrations. Response variables included chl-a and DO, as well as biological metrics that are known to respond to nutrient stressors. Benthic macroinvertebrate and diatom metrics represent the relative integrity of the community at a site. Maintaining metric conditions that are similar to conditions observed in reference sites is a reliable indicator that designated aquatic life uses are being protected.

The statistical techniques for relating stressors and responses included correlation analysis, regression interpolation, and change-point analysis. Each of these techniques has strengths and limitations that inform the use of resulting candidate thresholds. The reference condition approach was emphasized and evidence from the stressor-response relationships further supported threshold selection.

Data were collected through NMED and national monitoring programs within New Mexico and in the immediate surrounding areas, including the National Rivers and Streams Assessment (NRSA) and the Wadeable Streams Assessment and Environmental Monitoring and Assessment program (WSA & EMAP, respectively). A GIS analysis of sites and their catchments was conducted to characterize environmental conditions. All data were compiled in a relational database following a Quality Assurance Project Plan (QAPP) (Tetra Tech 2011a, 2012). Screening sites for data integrity and completeness resulted in 663 sites with nutrient data in one or more samples collected between 1990 and 2012. Other types of data (diel DO, chl-a, macroinvertebrates, and diatoms) were available for subsets of those sites. All data were screened for outlier values and nutrient values were standardized to common detection limits.

The reference site analysis and disturbance gradient designations of 542 sites resulted in 20% of sites identified as least disturbed reference sites. Another 11% were designated as near-reference. The reference and near-reference sites were used to determine site classes based on nutrient conditions. For nitrogen, concentrations were associated with land slope, and three nutrient classes were identified as TN Flat, TN Moderate, and TN Steep sites. For phosphorus, soil TP and volcanic geology were important in addition to land slope, resulting in three different nutrient classes: TP High-Volcanic, TP Flat-Moderate, and TP Steep. In general, nutrient concentrations are higher in flatter landscapes. Frequency distributions of nutrient conditions in reference and near-reference sites were used to derive candidate thresholds. Median nutrient values within sites and the 90th quantile of median values across sites within site classes were the basis for the candidate thresholds.

NMED EXHIBIT 25

Correlation and other multivariate techniques supported the major linkages between nutrients, chl-a, DO, diatoms, and macroinvertebrates. Chl-a relationships supported causal linkages between chl-a, nutrients, and DO but were too weak and variable to derive candidate thresholds. The indirect correlations between nutrients and macroinvertebrates were as strong as more direct correlations between nutrients and DO, or DO and macroinvertebrates. Although chl-a and DO were assumed to be intermediate in the pathway of nutrient-macroinvertebrate effects, indirect nutrient-macroinvertebrate relationships were also defined. The direct nutrient-diatom relationship was evident, therefore intermediate links were not analyzed. Co-varying conditions (e.g., conductivity with nitrogen) that might contribute to the relationships between nutrients and responses were also found. These were noted for further consideration, but could not be effectively factored out of the stressor-response analyses.

Regression interpolations and change-point analysis for macroinvertebrate and diatom metrics and DO in response to nutrient concentrations resulted in multiple candidate thresholds in each site class. Candidate thresholds that did not pass criteria of significance or corroboration of analytical indicators were eliminated. Candidate thresholds from stressor-response analyses defined a range of values around the reference frequency distribution thresholds.

For each nutrient and site class, candidate thresholds from all analyses were quantified, weighting the reference distribution results as primary because they were direct evidence of nutrient conditions in minimally disturbed systems. The stressor-response results typically bracketed the reference distribution results. The range of candidate thresholds are presented in cumulative distribution function (CDF) curves, including confidence intervals around the primary thresholds as well as ranges of alternative thresholds derived from stressor-response analyses. In general, the primary thresholds were comparable to the 50^{th} - 70^{th} quantile of the candidate thresholds derived from stressor-response analysis based on the CDF curves.

TN		TN Flat	TN Moderate	TN Steep
	Reference 90^{th} quantile	0.69 mg/L	0.42 mg/L	0.30 mg/L
	90% confidence interval	0.62 – 0.85	0.38 – 0.51	0.26 – 0.34
	Stressor-response median	0.52 mg/L	0.33 mg/L	0.26 mg/L
TP		TP High-Volcanic	TP Flat-Moderate	TP Steep
	Reference 90^{th} quantile	0.105 mg/L	0.061 mg/L	0.030 mg/L
	90% confidence interval	0.089 – 0.114	0.051 – 0.069	0.016 – 0.053
	Stressor-response median	0.067 mg/L	0.066 mg/L	0.029 mg/L

Table of Contents

NMED EXHIBIT 25

NMED EXHIBIT 25

List of Tables

NMED EXHIBIT 25

List of Figures

NMED EXHIBIT 25

NMED EXHIBIT 25

NMED EXHIBIT 25

NMED EXHIBIT 25

1.0 Introduction

1.1 Purpose

While a few streams have segment specific numeric criteria for total phosphorus, the State of New Mexico currently has no general numeric criteria for nutrients. The narrative criterion in the State of New Mexico Standards for Interstate and Intrastate Surface Waters found at § 20.6.4.13 NMAC provides that (NMWQCC 2011):

> *Plant nutrients from other than natural causes shall not be present in concentrations which will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.*

The narrative nutrient criterion can be difficult to implement because the relationships between nutrient levels and impairment of designated uses are not quantitatively defined, and distinguishing nutrients from "other than natural causes" is difficult (NMED/SWQB 2008). Therefore, the Surface Water Quality Bureau (SWQB) has developed nutrient assessment protocols for streams and is planning to refine the protocols and nutrient threshold values with regional data, links between cause and response variables and verified classification systems.

Towards the implementation of this narrative criterion, New Mexico has adopted an assessment method applicable to wadeable perennial streams that evaluates nutrient impairment for the purpose of Clean Water Act § 303(d) listing and TMDL development. The wadeable stream assessment utilizes a tiered weight-of-evidence approach that includes dissolved oxygen, pH, total nitrogen (TN), total phosphorus (TP), qualitative algae coverage, periphyton coverage, and anaerobic conditions observations at the screening level, and quantitative measures of both stressor and response variables using either a threshold or, in unique cases, reference-based approach. The State's use of the nutrient assessment protocol has resulted in the listing of 54 assessment units (i.e., stream reaches) and the development of 31 EPA-approved nutrient TMDLs for TN and/or TP. Although successfully implemented, the NMED assessment protocols for nutrients, is based on thresholds derived from frequency distribution curves and were never linked to undesirable responses or use impairment.

The United States Environmental Protection Agency (USEPA) nutrient criteria guidance recommends that criteria be derived for primary causal variables TN and TP and primary response variables chlorophyll-a (chl-a) and clarity. EPA's guidance supports modeling nutrient stressors with response variables as a way of deriving TN, TP, or chl-a thresholds and suggests using responses such as dissolved oxygen, trophic state indices, and biocriteria (USEPA 2000). EPA recommends three methods to establish nutrient criteria (USEPA 2000): a reference-based approach, a stressor-response approach, and literature-derived values.

The NMED proposed a stepwise threshold development approach as described in Empirical Approaches for Nutrient Criteria Derivation (USEPA 2009). This approach includes five steps, (1) Selecting and Evaluating Data; (2) Assessing the Strength of the Cause-Effect Relationship; (3)

Analyzing Data; (4) Evaluating Estimated Stressor-Response relationship; and (5) Evaluating Candidate Stressor-Response Criteria. Toward this end, New Mexico SWQB, working with Tetra Tech, completed a preliminary analysis (a Proof of Concept) that undertook Step 1 and started the analysis for Steps 2 and 3. This report describes the ongoing analyses up to Step 5. The goal at this time is to propose revised numeric thresholds for New Mexico's narrative nutrient water quality standard. The analysis described herein uses concurrently measured causal and response variables including nutrients and other related water quality parameters, as well as biological data, i.e., algal and benthic macroinvertebrate community composition and chl-a concentration. The development approach for nutrient thresholds will use reference conditions and stressor-response relationships to derive numeric thresholds (USEPA 2009).

This report describes existing nutrient conditions in New Mexico streams across the landscape, in relation to the stressor gradient and aquatic life uses. With these descriptions in mind, the purpose of this document is to describe the intent, methods, and results of nutrient threshold development for wadeable streams in New Mexico

1.2 Background

Nutrient threshold development for TN and TP values in perennial, wadeable streams in New Mexico has taken place in three steps, thus far. First, the EPA compiled nutrient data from the national nutrient dataset, divided it by waterbody type, grouped it into nutrient ecoregions, and calculated the 25th percentiles for each aggregate and Level III ecoregion (Table 1). EPA published the Clean Water Act 304(a) recommended water quality criteria for TN and TP to help states and tribes reduce problems associated with excess nutrients in waterbodies in specific areas of the country (USEPA 2000).

Table 1. Draft Level III Ecoregion Nutrient Criteria for streams (mg/L), calculated using 25th percentile by EPA procedures, draft Ecoregion Nutrient Criteria (USEPA 2000).

	21-Southern Rockies	23-AZ/NM Mountains	22-AZ/NM Plateau	24-Chihua-huan Desert	26-SW Tablelands
TN	0.04	0.12	0.085	0.543	0.26
TP	0.006	0.011	0.015	0.018	0.025

Refinement of the ecoregional nutrient thresholds for New Mexico was conducted by Evan Hornig, a USGS employee assisting states in EPA Region 6 with development of nutrient thresholds. Hornig used regional nutrient data from EPA's Storage and Retrieval System (STORET), the U.S. Geological Survey (USGS), and the Surface Water Quality Bureau (SWQB) to create a regional dataset for New Mexico. The revised threshold values were calculated based on EPA procedures and the median for each Level III ecoregion (Table 2).

Table 2. Ecoregional nutrient thresholds for streams (mg/L), calculated using regional data, the 50th percentile and EPA procedures (Evan Hornig, unpublished data 2003)

	21-Southern Rockies	23-AZ/NM Mountains	22-AZ/NM Plateau	24-Chihuahuan Desert	26-SW Tablelands
TN	0.30	0.32	0.42	0.64	0.54
TP	0.025	0.020	0.070	0.062	0.025

The third round of analysis was conducted by SWQB to produce nutrient threshold values for streams based on ecoregion and designated aquatic life use. For this analysis, TP, total Kjeldahl nitrogen (TKN), and nitrate plus nitrite (NO_3NO_2) data from the National Nutrient Dataset (1990-1997) was combined with Archival STORET data from 1998 and 1999-2006 data from the SWQB in-house database. SWQB recognized site classes based on Level 3 ecoregions and cold, warm, and transitional temperature regimes as applied for designated Aquatic Life Uses. The threshold values (Table 3) were derived from median values for all the data in each classification. The process that SWQB used for this analysis is detailed in Appendix A.

Table 3. Ecoregional nutrient and aquatic life use thresholds for streams (mg/L), using regional data and the 50th percentile (NMED/SWQB 2013).

	Southern Rockies (21)		AZ/NM Plateau** (22)		AZ/NM Mountains (23)		Chihuahuan Desert** (24)	SW Tablelands (26)		
TN	0.25		0.35		0.25		0.53	0.38		
TP	0.02		0.05		0.02		0.04	0.03		
ALU*	CW	T/WW (volcanic***)	CW	T/WW	CW	T/WW	T/WW	CW	T	WW
TN	0.25	0.25	0.28	0.48	0.25	0.29	0.53	0.25	0.38	0.45
TP	0.02	0.02 (0.05)	0.04	0.09	0.02	0.05	0.04	0.02	0.03	0.03

NOTES: * ALU = designated aquatic life use of the assessment unit
CW – streams with only coldwater uses (high quality coldwater or coldwater)
T – transitional streams with marginal coldwater, coolwater, or both cold and warmwater uses
WW – streams with only warmwater uses (warmwater or marginal warmwater)
** Because of the limited area and number of sites in the Madrean Archipelago (79) and Colorado Plateau (20) ecoregions, these data where grouped with the most similar ecoregions; the Madrean Archipelago with the Chihahuan Desert and the Colorado Plateau with the Arizona/New Mexico Plateau. The Western High Plains (25) had no stream data as the only surface waters are playas, therefore this protocol does not apply to this ecoregion.
*** The volcanic threshold is applicable to Level IV ecoregions 21g and 21h as well as 21j in the Jemez Mountains

The relationship between nuisance algal growth and nutrient enrichment in stream systems has been well documented in the literature (Van Nieuwenhuyse and Jones 1996; Dodds et al. 1997; Chetelat et al. 1999, Suplee et al. 2009, Stevenson et al. 2006). The NMED assessment protocols (2013) currently include procedures for assessing algal growth using visual assessments and measures of chl-a and at least 72 hours of continuous DO and pH monitoring. Threshold values are applied via New Mexico’s listing methodology in a tiered, weight-of-evidence approach.

Exceedance of the TN or TP thresholds and confirmation of potential impairment from at least one response indicator (algal abundance, dissolved oxygen, or presence of anoxic sediments) during the screening level assessment triggers additional data collection and a complete nutrient assessment. For the screening level, NMED assumes that high rates of primary production can cause DO super-saturation and high pH during the day. Impairment is suspected if DO saturation readings are above 120% and/or pH values are above the appropriate aquatic life criterion (i.e., pH > 8.8 for high quality cold and coldwater uses or pH > 9.0 for marginal cold, cool, warm, and marginal warmwater uses). In the complete nutrient assessment, DO and pH data are collected using multi-parameter, continuous recording devices to observe diel fluctuations, as opposed to the "snapshot" that one-time, grab data provide. Because algal biomass above nuisance levels often produces large diel fluctuations in DO and pH (Mabe 2007), DO concentration, percent local DO saturation, and pH are used as indicators of nuisance levels of algal biomass. For algal biomass, complete nutrient assessments include collection of a benthic periphyton sample, analysis of chl-a concentration and comparison of the concentration to thresholds (Table 4). When multiple nutrient concentration measures are taken within an assessment unit, more than 10% of TN and/or TP measurements must exceed the threshold, and one or more response variables must be present, before impairment is determined during the complete nutrient assessment (NMED/SWQB 2013). The assessment units are defined by NMED and represent waters with assumed homogenous water quality, such as a stream segment between major tributaries.

Table 4. Chl-a Level III Ecoregional Threshold Values in $\mu g/cm^2$. Reproduced from NMED (2011).

21-Southern Rockies	20/22-AZ/NM Plateau	23-AZ/NM Mountains	24/79-Chihuahuan Desert	25/26-SW Tablelands
3.9 – 5.5	7.4 – 7.8	5.8 – 11.0	16.5 – 17.5	8.2 – 14.0

NMED observed that the current nutrient thresholds were frequently exceeded at sites with little human activities in the watershed and therefore did not provide an effective filter for identifying impairment from "…*other than natural causes*…" (20.6.4.13(E) NMAC). Since 2002, exceedances of more than 15% of samples at each site were noted in high percentages of sites (43-100%, commonly >80%) in each ecoregion (Seva Joseph, personal communication). NMED has new data for analysis, including data from a broader region, and a new analytical approach based on reference conditions and stressor-response analysis. Therefore, NMED initiated the process for revising the thresholds starting with a data gathering and exploration phase, the Proof of Concept for nutrient threshold development (Tetra Tech 2011b). Variables were selected for analysis, data were assembled, and characteristics of these data were explored. Data regarding nutrients, water chemistry, physical habitat conditions, site characteristics, and response variables were compiled from multiple sources. Data exploration consisted of preliminary analysis using techniques intended for final analysis once the datasets are fully assembled. The preliminary analyses and data visualization tools were used to select variables to appropriately quantify the stressors (i.e., excess nutrients) and the responses. Collaborators on the several phases of nutrient threshold development have included NMED, USEPA Region 6, the Nutrient Scientific Technical Exchange Partnership and Support (N-STEPS) program run through the U.S. EPA's Office of Water Nutrient Criteria program, run through the Health and Ecological Criteria Division (HECD), and the consulting firm Tetra Tech, Inc.

1.3 Linking NM's Narrative Criterion to Nutrient Stressors

Nutrients occur in streams naturally and can be greatly increased due to human activity. In this study, the focus was on nitrogen and phosphorus because these nutrients (or other non-nutrient factors) typically limit or enhance primary production and are readily measured. Other nutrients are usually only required in trace amounts for plant growth and rarely limit production. Therefore, increases in nutrients other than nitrogen and phosphorus might be evident with increased human disturbance, but they are not suspected of causing changes in the primary producers.

Human activities can cause increases in nutrient concentrations in streams through a variety of pathways. These include, but are not limited to, fertilizer application, soil and vegetative disturbance, partial treatment of municipal or residential wastewater, and animal production. These sources are presumed to be related to general classes of land cover, including agriculture and residential/urban development and to specific human activities such as wastewater treatment.

Increases in major nutrients are often associated with increases in other pollutants and stressors. Nutrients may be associated with turbidity and Total Suspended Solids (TSS). Suspended sediments, in turn, have been associated with metrics of the benthic macroinvertebrate assemblage (Jessup et al. 2010). The interaction of multiple stressors can cause amplified or buffered effects on responding organisms. This phenomenon was explored in this analysis, though the emphasis remains on the interaction between major nutrients, secondary stressors, and biotic responses.

Forms of nitrogen and phosphorus vary depending on the conditions in their environment. Some forms, such as ammonium ions (NH_4^+), nitrate ions (NO_3^-), and orthophosphate (PO_4^{-3}), are more accessible for uptake by plants. Typical nutrient measures from stream samples include nitrate (NO_3), nitrite (NO_2), combined NO_3NO_2, ammonium (NH_4), total Kjeldahl N (TKN), total nitrogen (TN), orthophosphate, and total phosphorus (TP). The most common measures are NO_3NO_2, TKN, TN, and TP. TN can be calculated from TKN + NO_3 + NO_2. The best indication of potential nutrient availability is the sum of all forms, or TN and TP.

NMED EXHIBIT 25

Protection of aquatic life uses is required by the Clean Water Act and the key reason for establishing nutrient thresholds. The pathways by which nutrient concentrations affect aquatic life conditions are complex, as suggested in conceptual models (e.g., EPA 2010, EPA 2012) and literature supporting linkages along the pathways. The basic relationships are described here and form the basis of our rationale for using the selected response measures in the analyses.

Nutrient impaired waters can cause problems that range from annoyances to serious health concerns (Dodds and Welch 2000). In streams, gross primary production is effected by nutrient concentrations, especially phosphorus (Mulholland 2001). The primary producers include periphyton and aquatic macrophytes. Periphyton (including diatoms) is ubiquitous in streams and can be sampled consistently. They are therefore potential indicators of nutrient conditions. Periphyton species are responsive to stressors other than nutrients, especially in the West (Stevenson et al. 2008), but these confounding factors (e.g., canopy cover, flow, turbidity) may be recognized and perhaps even factored out of descriptive stressor-response relationships.

Periphyton produce oxygen when photosynthesizing, but can deplete oxygen as well, during periods of respiration and when microbes respire in the decay of excessive periphyton,. Production and respiration in streams are can be assessed through examination of the diel DO range (Mulholland 2005). Therefore, measures of oxygen are most useful when taken frequently over several days. The pattern of oxygen production and depletion can then be associated with nutrients more comprehensively than single point measures.

Chl-a concentration in samples scraped from substrates or in the water column is an estimate of algal biomass. It was assumed that greater amounts of chl-a would be associated with greater nutrient availability (Biggs 2000, Chetalat et al. 1999, Dodds et al. 2002) and greater productivity (measured as DO dynamics).

Benthic macroinvertebrates interact directly with DO and periphyton. The effects are through pathways of respiration (oxygen supply), habitat character and food availability. These variables are affected by nutrients, so macroinvertebrates are indirectly related to nutrients. If direct nutrient – macroinvertebrate response pathways exist, they are not well defined.

Macroinvertebrates graze and inhabit periphyton communities. Some grazers prefer certain types of periphyton (Calow and Calow1975, Lodge 1991). Excessive periphyton can degrade macroinvertebrate habitat for those organisms that require substrates with sparse algal growth (Downes et al. 2000). Therefore, the indirect effects of nutrients on benthic macroinvertebrates, through periphyton, can cause varied responses in the macroinvertebrate community. These interactions can occur in both directions – with macroinvertebrates effecting periphyton through selectively grazing, sometimes to a degree that affects nutrient uptake from the water column (Wallace and Webster 1996). Benthic macroinvertebrates are responsive to many stressors other than nutrients, and the possible confounding effects should be factored out, when they are recognizable. In a study of stream conditions in the Ozark Highlands Ecoregion in Arkansas, biotic indices for three biotic assemblages were negatively correlated to nutrient concentrations (Justus et al. 2010). The algal index had a higher correlation (rho = 0.89) than did the macroinvertebrate and fish indices (rho = 0.63 and 0.58, respectively). This suggests that the more direct effects with few indirect factors were reflected in the stronger correlations.

There are many modifying factors in a stream ecosystem. For example, phosphorus and light interact to effect algal growth (Hill and Fanta 2008, Hill et al. 2009, Mulholland 2001). Under controlled conditions it takes very little P to maximize algal growth given high light. However, the relationship may not be observed if algal production is limited by other factors such as bottom substrate, turbidity, canopy cover, hydrology, or depth. The fundamental relationships might be observed in the datasets, or the modifying and co-varying factors might mask or exacerbate the expected relationships. The modifying factors were used to help in natural classification to characterize multivariate relationships.

Conceptual models were developed to represent known relationships between changes in TN and TP concentrations, biological effects, and attainment of designated uses. Conceptual nutrient models are well established and were not reconstructed for this study. Instead, the conceptual model published by EPA (2010) was used as a standard that is applicable in New Mexico streams (Figure 1). The conceptual model shows intricate pathways of effects. It illustrates interactions that might be effective though our analytical data set is insufficient to account for them. Analyses that compared indirect elements in the conceptual model (e.g., relating nutrient concentrations to macroinvertebrate responses) relied on the validity of the intermediate linkages. The conceptual model provides a means of communicating the current state of knowledge regarding the effects of TN and TP in aquatic systems and is an important tool for guiding causal analyses.

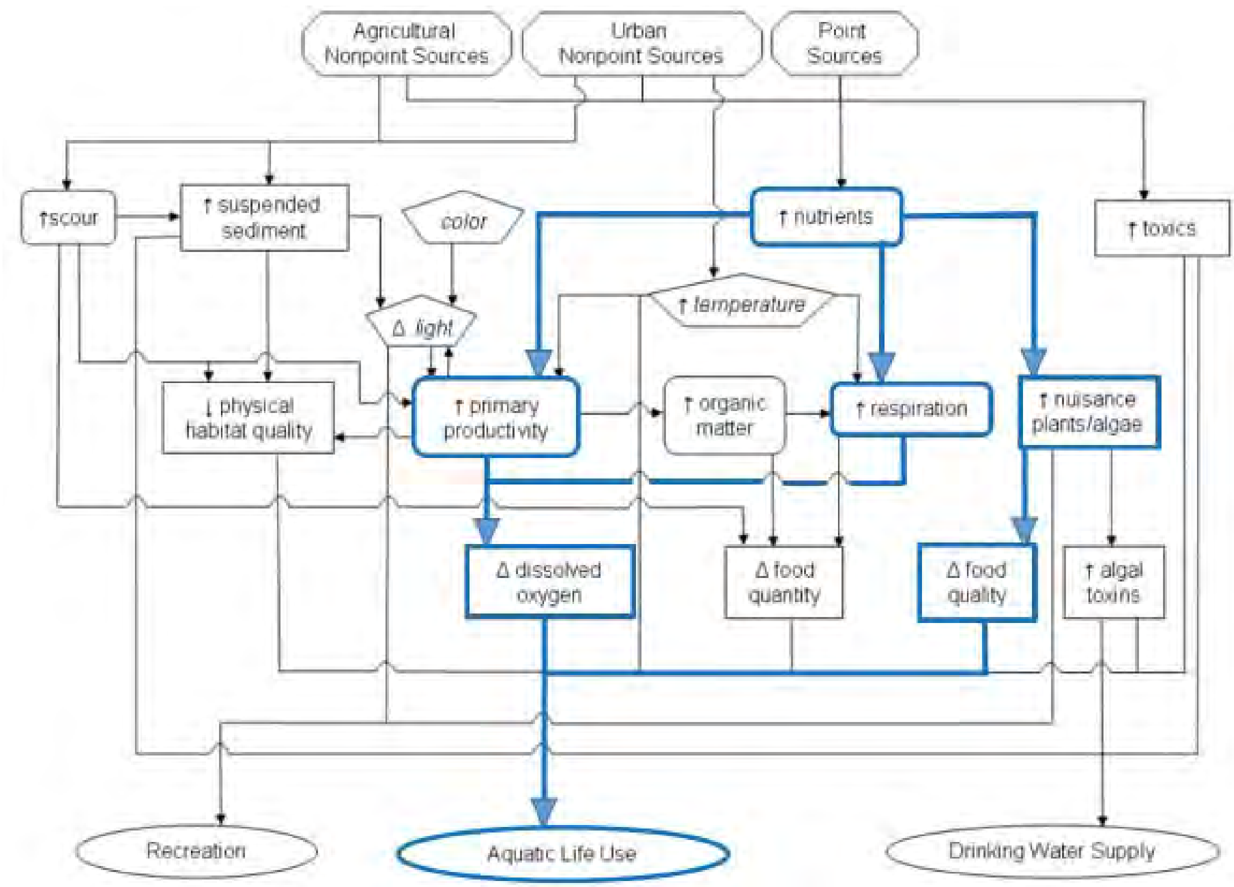


Figure 1. Conceptual diagram linking sources of human disturbance with designated uses through pathways that include nutrients (from USEPA 2010).

The linkages and relationships explored through stressor-response analysis are listed below. These relationships were analyzed as one-to-one stressor-response relationships, relationships with modifying factors, and as indirect relationships (e.g., nutrient-macroinvertebrate responses without intermediate links).

1. ↑ Nutrients = ↑ Chlorophyll a
2. ↑ Chlorophyll a = Δ DO dynamics
3. ↑ Nutrients = Δ Diatom Metrics
4. Δ DO dynamics = Δ Macroinvertebrate Metrics

These relationships were explored in stressor-response analysis for the aquatic life endpoints: diatoms and macroinvertebrates. The indirect relationships between nutrients – DO and nutrients – macroinvertebrate metrics were explored in addition to the direct nutrient – chl-a – DO – macroinvertebrate relationships. The indirect relationships were explored because data were lacking in all of the data types at all sites. The subsets of sites with chl-a and diel DO data are relatively small. Weak relationships in these small data sets might be due to sample size instead of a true lack of response. There are almost no sites with data from all data types collected in the same sampling season.

1.4 General Approach to Developing Thresholds

The analytical methods consisted of two major categories: indicator value distributions emphasizing reference conditions and stressor-response relationships. The reference condition approach includes identification of minimally disturbed sites, classification of the sites, and description of the reference condition based on characteristics in those sites in each class (USEPA 1998, 2000a, Barbour et al. 1999, Stoddard et al. 2006). In this approach, candidate thresholds were derived from distributions of nutrient concentrations in reference waterbodies, in this case, wadeable perennial streams.

Stressor-response approaches refer to analytical techniques that derive candidate thresholds by exploring the relationships between response variables and nutrient concentrations. Typical response variables in the context of nutrient threshold development include biomass and assemblage metrics (e.g., percent nutrient sensitive diatoms) and aquatic life use indicators or biocriteria indicators (e.g., trophic state indices, algal multi-metric indices, or invertebrate multi-metric indices). The value of these indicators is their association with aquatic life use designations. In New Mexico, assessment thresholds for biological indicators are established for only small, high elevation streams (Jacobi et al. 2006). This benthic macroinvertebrate index is used for assessment in this class of streams (NMED/SWQB 2013). This would provide a way to connect nutrient concentrations directly to aquatic life use protection. However, the small high streams do not cover all streams types that require thresholds. Therefore, biological metrics that were shown or presumed to respond to stressors were analyzed. The metrics represent the relative integrity of the aquatic community at a site. Maintaining metric conditions that are similar to conditions observed in reference sites is an indicator that designated aquatic life uses have been protected.

In EPA's draft guidance on Empirical Approaches for Nutrient Criteria Derivation (USEPA 2009), several methods for evaluating stressor-response relationships were presented. The approaches implemented in this analysis were adopted to take advantage of available data and to produce robust results using a combination of well-established and exploratory analytical techniques. The focus of the analysis was on the major nutrients, nitrogen and phosphorus, as they relate to the available response measures, periphyton (diatoms), chl-a, dissolved oxygen, and benthic macroinvertebrates.

The analytical techniques recommended for relating stressors and responses included correlation analysis, regression interpolation, and change-point analysis. These techniques are introduced here and are explained in greater technical detail in the methods section. Each technique has advantages and limitations that lead to differential weighting of results from the nutrient threshold analyses.

1.4.1 Reference conditions and classification

Reference streams represent least disturbed and/or minimally disturbed conditions (Stoddard et al. 2006), share similar characteristics with the waterbodies for which thresholds are being derived, and ideally support designated uses (US EPA 2000a). Reference sites were identified and a disturbance gradient defined using objective criteria for the stressors and stressor sources measured at the site or sensed remotely and analyzed using Geographic Information System (GIS). While quantitative criteria are defensible and repeatable, subjective input from knowledgeable experts was also used to confirm final reference site selection to account for factors that were not captured in the GIS analysis.

Natural, background, or reference nutrient concentrations can be inferred from conditions observed in reference streams. These are referred to as the reference conditions (Barbour et al. 1999, Stoddard et al. 2006). Reference nutrient conditions are subject to unavoidable human activities (such as atmospheric deposition), availability of suitable reference sites, and adequate recognition of natural variability.

Thresholds for a particular variable (e.g., TN or TP) were derived by first describing statistical distributions from reference waterbodies and then selecting a representative value to define expectations for reference and for all other waterbodies in that class. USEPA's nutrient criteria guidance recommends the use of percentiles derived from the reference waterbody distributions, since these waterbodies represent an example of the biological integrity expected for a region (USEPA 2000). The reference condition approach requires confident definition and identification of reference waterbodies, accounting for natural variability within site types, and availability of sufficient data from these reference waterbodies to characterize the distributions of nutrient variables.

Nutrient concentrations in New Mexico streams with minimal human disturbance were expected to have relatively low variability within homogenous landscape types. Site classification is the process by which natural gradients among sites are examined to identify sites with similar nutrient conditions in the absence of human disturbance. The purpose of classification is to minimize within-class natural variability of indicators so that anthropogenic disturbance can be recognized with less background noise (Barbour et al. 1999, Hughes et al. 1995). Potential site classification variables, nutrient indicators, and biological variables were analyzed simultaneously to identify patterns of covariance that suggested how nutrient conditions would be classified according to environmental and biological characteristics. The level III and IV ecoregions of New Mexico (Griffith et al. 2006) were considered as potential classification groupings, as indicated by previous analyses that distinguished five site classes (NMED/SWQB 2011). The grouping of the level IV ecoregions into mountains, foothills, and xeric as used in sediment assessments was also examined. In addition, NMED recognized coldwater, warm-water, and transitional (cool-water) designated uses, which are considered as another layer of site classification.

1.4.2 Frequency Distributions

Distributions of nutrient concentrations provided a baseline description of nutrient conditions throughout New Mexico. The distribution percentiles in different subsets of the data were used to describe general nutrient conditions by nutrient, site class, or disturbance status of the sites. These standards (percentiles of distributions in site categories) have long been established (USEPA 1998, USEPA 2000a, Barbour et al. 1999) and are now accepted as practical guidelines for describing reference expectations. This approach was also used in developing nutrient guidelines in New Mexico (NMED/SWQB 2011).

The 75th percentile of reference sites within site classes is a suggested value used for deriving potential thresholds for nutrients. At this level, a lower value passes the threshold and indicates that the observation is similar to the lower 75% of nutrient concentrations. If confidence in reference sites and site classes is high, less error in the reference values should be expected and a higher percentile of the distribution (such as the 90th) could be used as a guideline for establishing thresholds. If confidence is low, as when the best available reference sites are selected for a region that has a generally high intensity of disturbance, then more error in the reference sites can be expected and a lower percentile (e.g., the 50th) can be selected. An observation in the site class with low confidence in the reference conditions will only pass if it is similar to the best 50% of reference values.

The reference site selection process and the distribution of nutrient values observed in the reference sites were expected to have variability and error. Errors might be attributed to unmeasured stressors causing an incorrect reference designation, misclassified sites, unrecognized site classes in which natural conditions are unusual, or faulty measurements or recording of the nutrient endpoints.

1.4.3 Correlation and interactions

The Spearman's rho correlation coefficient and bi-plots of nutrient concentrations and response metrics were used to identify potential relationships between responses and nutrient variables. Correlation analyses identify the apparent linkages between biological condition and environmental variables. Bi-plots were examined to determine if the correlations reflected a feasible relationship.

Buffering or modifying co-variates were examined using multiple regression and recursive partitioning (also known as classification and regression trees (CART)). Variation of the response variable was explained along the gradient of nutrient concentrations and in relation to the covariates. If major covariates or modifying factors were recognized, attempts were made to account for them while estimating the direct effects in the major nutrient – biological pathways.

1.4.4 Regression Interpolation

When a clear linear relationship is evident between a nutrient concentration and a response variable with an existing threshold, then a nutrient concentration can be associated with the response threshold through intersection with the linear regression. For example in a bi-plot of the New Mexico macroinvertebrate stream condition index (NMMSCI) in high elevation streams with smaller watersheds, the value of TN that corresponds to the NMMSCI threshold value is determined as are ranges of TN values associated with error in the regression. When no response thresholds were established, the 25th or 75th quartile of the response metrics in reference sites was used to represent a protective threshold.

In this approach as in all others, variability that can be attributed to factors other than those being analyzed must be accounted for or otherwise recognized. To continue with the example above, relationships between nutrient concentrations and macroinvertebrate index values must include only sites for which the index is valid (high small streams), using consistent or comparable sampling methods, and factoring out known sources of variability (when feasible). When the modifying factors are not accounted for, then the linear regression could be driven by factors unrelated to nutrient.

1.4.5 Change-point Analysis

The change-point is the point along an environmental gradient (nutrient concentrations) at which there is a high degree of change in the response variable (chl-a, diatom, or macroinvertebrate metrics). The nonparametric deviance reduction method for identifying change-points (Qian et al. 2003, King and Richardson 2003) works well when the response is stepped, or drastically changing at a recognizable point along nutrient concentration gradient. With this method, the data are divided into two groups, above and below a potential nutrient threshold, where each group is internally similar and the difference among groups is high. This technique is similar to regression tree models, which are used to generate predictive models of response variables for one or more predictors. Using this comparison, the change-point is the first split of a tree model with a single predictor variable (i.e., nutrient concentration).

One caveat of the change-point analysis is that a change-point may be identified, and even determined to be statistically significant, when the change-point value is actually only an artifact of the analysis and not an indication of a change in system properties (Qian and Cuffney 2012, Daily et al. 2012). The methods can find change-points, even in datasets with nearly straight line relationships between X and Y. It has been well established that nutrient concentrations limit algal growth as well as species composition. Therefore, it is reasonable to believe an ecological threshold does exist between certain periphyton metrics and nutrient concentrations. We qualified the changepoint results using three assessment measures: confidence in the changepoint, coincidence of the changepoint with a break or extreme slope of the local (LOWESS) regression, and indications of a limiting relationship in a quantile regression.

1.4.6 Synthesis of Multiple Thresholds

The strength of an analysis with multiple approaches and response endpoints comes from the multiple lines of evidence. They can be used to show central tendencies and ranges in potential thresholds. The central tendency of potential thresholds shows corroborated evidence, which can give greater confidence in a selected threshold. However, values that deviate from the central tendancy may be selected if the regulating agency has a reason to adjust the level of protection. This decision may be based on confidence in an individual analytical technique or on corroborating evidence from the scientific literature.

The reference percentile selected, the stressor-response results considered, and the potential thresholds that result, must conform to the Clean Water Act (CWA) regulatory goals. The intended level of protection for designated uses should be clearly stated and used to justify the proposed thresholds. The selection of a percentile of the reference condition as a threshold is defensible when it is supported by clear reasoning and corroborating analyses.

NMED will select nutrient thresholds from the range of possible thresholds. Their selection needs to be communicated and justified transparently. To help with this, the potential thresholds from the multiple analyses and the scientific literature were tabulated for review. Each potential threshold was listed with any caveats, error, and uncertainty associated with the method or the underlying data. In addition, interpretations of the protectiveness of certain thresholds were described in terms of the designated uses.

2.0 Data Description

Data were collected from three sources: NMED monitoring programs, the National Rivers and Streams Assessment (NRSA) and the Wadeable Streams Assessment program (WSA) (Table 5). The NRSA and WSA data were collected under USEPA programs in which NMED participated. In addition, a GIS analysis of sites and their catchments was conducted to characterize sites.

All data were compiled in a single relational database (Microsoft Access), though data from each source were maintained in separate database tables. Data compilation and analysis were conducted following the Quality Assurance Project Plan (QAPP) (Tetra Tech 2011a, 2012). The QAPP primarily addresses procedures for working with secondary data. Procedures for data compilation and analysis were followed to minimize errors in transferring data from original sources into analytical databases. Although data were expected to be error-free in the original form, exploratory analysis techniques (e.g., correlation analysis, scatter plots, histograms, etc.) were used to identify potential outliers and other data quality issues.

Table 5. Data summary by source.

NMED:	883 valid sites in NM with water chemistry (targeted sampling design) Multiple samples per site (approximately 7352 samples) Years 1990 - 2012 Chemistry, site & habitat characteristics (partial data depending on site and visit) Benthic macroinvertebrate samples in 202 sites (440 samples) Periphyton (diatoms) in 212 sites Benthic chl-a in 146 sites Dissolved oxygen diel data in 175 sites
NRSA:	88 sites, each with a single visit (probabilistic sampling design) Years 2008 - 2009 44 sites in NM, others within 50-150 miles of NM Chemistry, benthic & sestonic chl-a, periphyton, site & habitat characteristics
WSA:	56 sites, each with a single visit (probabilistic sampling design) Years 2000 - 2004 10 sites in NM, others within 50-150 miles of NM Chemistry, benthic macroinvertebrates, site & habitat characteristics

The NMED data were more numerous than NRSA or WSA data. They were collected for various projects over time. The NMED data included four data types: nutrients and other water quality analytes, periphyton (benthic chl-a and diatoms), macroinvertebrates, and diel dissolved oxygen. The NMED monitored four primary water quality variables in New Mexico streams (TN, TP, benthic chl-a, and turbidity) plus a number of secondary variables including DO concentration, DO percent saturation, and pH (NMED/SWQB 2008). The NMED nutrient records were most numerous and complete, while other types of data were relatively sparse and only used in analysis when associated with nutrient information.

NRSA and WSA data were obtained from the USEPA Region 6 and the Office of Research and Development in Corvallis, OR. They included information regarding water chemistry, physical habitat, and biological assemblages. For the NRSA, information on benthic macroinvertebrates, periphyton, and both benthic and sestonic chl-a were available. For the WSA data, benthic macroinvertebrates were the only biological data available. Data for NRSA were collected in accordance with the Field Operations Manual (USEPA 2007). For WSA, data were collected using methods similar to those used in the NRSA, following procedures outlined by the USEPA (2004) and Peck and others (2006).

2.1 Sites

The study area included the state boundaries of New Mexico as well as regions in adjacent states that were within 50 miles of New Mexico and in a level 3 ecoregion that also existed within New Mexico. To the north and east of New Mexico, sites from further away (up to 150 miles) were considered because a lack of sites in the drier ecoregions was anticipated. NMED data were collected as part of the nutrient thresholds development projects and for other water quality surveys. Some of these data were targeted to focus on reference reaches for stream classification and for identifying threshold values for nutrients, algal biomass, and secondary variables (NMED/SWQB 2008). The streams were selected to span at least five ecoregions throughout the state. Monitoring focused primarily on a critical low flow index period from August to November. At some sites, the monitoring plan allowed examination of seasonal and annual variability and trends.

A uniform Station ID was assigned to each site based on the identifier used in the original surveys. In some cases, especially within the NMED data set, some sites were re-visited, but given a slightly different Station ID. Such cases were identified through GIS and NMED site list reviews. Station IDs were adjusted to reflect co-occurring sites. The Station ID was used to link information among databases. Each Station ID was associated with latitude/longitude coordinates that were used in GIS analyses.

Site characteristics

Site characteristics were either observed or measured in the field, or they were remotely sensed and derived from GIS analysis. The observed or measured data were recorded during site visits and included physical habitat assessments, channel dimensions, slope, canopy cover, riparian vegetation, riparian integrity, substrate characterizations, flow, and more. Each data source (NMED, NRSA, and WSA) included somewhat different variables for the observed and measured site characteristics. For NMED, habitat and flow variables were not collected at each site, but were often associated with benthic macroinvertebrate samples.

The remotely sensed data were derived from GIS analysis. These data include information on the setting of the sampling site and surrounding areas, such as ecoregion, land use types and intensity, roads and road crossings, population density, watershed area, and more (Table 6). The GIS variables were either for site classification or for disturbance evaluations. Analyzing every site in the NMED data set was not possible because we needed to be efficient with the GIS analysis task. The GIS analysis was conducted on a subset of sites prioritized based on data completeness and potential reference site status. There were several NMED sites that were not included in GIS analysis, including those with only nutrient data that showed no preliminary indication that they were reference quality. High priority sites were identified using the following selection criteria.

1. Sites with nutrient data and comparable response data had high priority. Sites that had periphyton (diatoms), chl-a, diel dissolved oxygen, or benthic macroinvertebrate data were valuable for detecting responses to nutrient conditions.

2. Potential reference (least disturbed) sites were high priority. These were used to characterize background nutrient conditions in relatively undisturbed sites.

A thorough GIS analysis was performed based on delineated catchments upstream of 660 sites. The GIS information is consistent throughout the project area, including sites sampled by multiple data collection programs. The information summarized from the GIS analysis includes land use, human activities, and environmental characteristics that are appropriate for reference site designation and site classification. Additional details are provided in Appendix B.

Table 6. Variables used in GIS analysis**.**

Variable	Description
Point Values	
Stream Slope	NHD Plus join with flowline attributes table
Stream Order	NHD Plus join with NHDFlowlineVAA table
Elevation (cm)	NHD Plus DEM files
Designated Use	RAD 305b Assessed Segments joined with ATTAINS data
Precipitation	PRISM
Temperature	PRISM
Level 3 and 4 Ecoregions	EPA Ecoregions
Geology	USGS Integrated Geological Map
Watershed Values	
Road density	Attila tool and TIGER 2000 files
Number of road/stream crossings	ARCGIS tools
Land Slope	ARCGIS Spatial Analysis Slope tool
Land Use and Cover	Attila tool and NLCD 2006 data
Canopy Density	Attila tool and NLCD 2001 Canopy data

2.3 Nutrients and Water Quality

The NMED nutrient database included more than 7,000 records of nutrient concentrations at 883 stream sites (including sites not GIS analyzed). Samples used in this project were collected from 1990 to 2012. The nutrients recorded were related to nitrogen (ammonia, NO_3NO_2, and TKN), phosphorus (orthophosphate and total phosphorus) and ancillary analytes (pH, specific conductance, temperature, turbidity, and dissolved oxygen). Total nitrogen was calculated as NO_3NO_2 + TKN. Measures of total phosphorus were roughly 24x more common than measures of orthophosphate, and therefore orthophosphate was not analyzed.

NMED collected and processed samples in accordance with methods documented in an EPA approved Quality Assurance Project Plan (QAPP) and associated Standard Operating Procedures (SOP). The QA/QC procedures in the QAPP included collection and analysis of replicates for 10% of water samples, adherence to calibration methods, and taxonomic verification of a subset of periphyton and benthic macroinvertebrate samples. Also included was a thorough QA review of all site and analytical data, including flagging of all parameters that were outside of the control limits.

Nutrient data from the NRSA included TN and TP as well as nitrate, nitrite, and ammonium. These data plus information on the ancillary variables pH, specific conductance, temperature, turbidity, dissolved oxygen, physical habitat, benthic macroinvertebrates, and diatoms were complete for all 88 sites, half of which were in New Mexico. WSA nutrient data included TN and TP as well as nitrate and ammonium. Data for water chemistry including ancillary analytes, physical habitat, and benthic macroinvertebrates were complete for 56 sites, 10 of which were in New Mexico.

Diel Dissolved Oxygen

Diel dissolved oxygen data were collected by NMED in stream sites throughout New Mexico between June and October (mostly August and September) from 2001 to 2012. These data were collected along with pH, specific conductance, temperature, and turbidity using multi-parameter, continuous recording sondes with recording periods of at least 48 hours and recording intervals ranging from 15 – 60 minutes. Multimeters were generally placed in deeper shaded pools of moving waters where they were stable and not conspicuous. The data from approximately 200 spreadsheets were combined in a single data set so that metrics could be calculated efficiently. Data were checked for errors and data points or whole records were revised or eliminated if they were perceived to be inconsistent. Some of the turbidity data showed erratic patterns and continuous turbidity was not analyzed. Errors that typically occur with sonde data relate to records before and after the sonde is placed in the water or in association with drifting calibration. For dissolved oxygen, drift in calibration was only suspected in early years, when probes with membranes were used. They were replaced with optical sensors over time. After QC, statistics on 175 diel DO records were calculated. Diel DO statistics were related to nutrients in 133 sites, one sample per site. Diel DO and chl-a measurements coincided in 64 sites. Sestonic chl-a measures were not taken at sites with diel DO data.

The metrics that were calculated included, but are not limited to, overall minimum DO, maximum daily fluctuations, and standard distribution statistics. NMED provided metrics on the maximum productivity and respiration in each data set based on 2, 3, and 4 hour intervals and the 4-hour interval was used in analyses. Distribution metrics were also calculated for DO percent saturation data. In addition, system metabolism was calculated as gross primary production (GPP) and ecosystem respiration (ER), which accounted for temperature, elevation, and estimates or derivations of barometric pressure, nighttime regression, and light exposure. The calculations were carried out in R software using code provided by Dr. Robert Hall (Department of Zoology and Physiology, University of Wyoming, Laramie, WY).

Data Reduction

All of the data should be considered for analysis, but some analyses are better suited to specific data types or summaries. There were four issues we addressed in reducing data for analysis.

1. Summarizing nutrient data for analysis
2. Identifying and eliminating outliers
3. Establishing estimated values for censored (non-detect) data
4. Limiting data to address seasonal variability

Summarizing nutrient data for analysis

In the NMED dataset, there were multiple samples collected at the same site over time. The median, geometric mean, or maximum of nutrient values per site were considered for describing value distributions and for site classification. Median site values were used to summarize site nutrient conditions.

For stressor-response analyses, the chemistry and response samples were limited to those collected within one month of each other. If multiple chemistry samples were collected during that period, the average value was used. Only a single stressor-response dataset was used per site so that sites with multiple response records over time would not bias patterns derived from multiple sites, most of which had only a single response record. Logarithmic transformations (base 10) were used to reduce skewness in nutrient concentrations and for other variables as needed.

Identifying and eliminating outliers

Outlier values in the database are expected to be associated with data entry errors, field and laboratory analytical errors, and anomalies in sampling conditions, such as elevated storm flows and runoff from fire damaged landscapes. Errors were not expected in large frequency because QC procedures were in place when the data were generated. Nevertheless, the database was searched for nutrient and other values that were unusual, inexplicable, or associated with anomalous sampling conditions. Approximately 150 of 10,000 NMED nutrient records were removed from analytical data sets due to high outlier values, most of which were associated with storm flows and fire runoff. The NRSA and WSA data had qualifier data that indicated QC review and did not have apparent outliers. Details of the outlier analysis are in Appendix C.

Establishing estimated values for censored (non-detect) data

Several NMED data points were designated as “non-detect”, having concentrations less than the sensitivity of the analytical equipment. For example, 17% of TKN values were flagged as non-detect in the NMED data. The current default for these values has been substitution of ½ of a standardized detection limit for all samples with values below that standard or marked as below detection at a higher reported detection limit. Alternative treatments were considered for the censored TKN, NO_3NO_2, and TP data, including elimination and adjustments using Kaplan-Meier (KM), regression on order statistics (ROS), and maximum likelihood estimation (ML). Based on a limited analysis (Appendix D) and review of similar data sets, half detection substitutions were used for all analyses. The half detection limit values were 0.015 mg/L for TP, 0.05 mg/L for NO_3NO_2, and 0.05 mg/L for TKN. In calculating TN from NO_3NO_2 + TKN, the value resulting from two non-detects would be 0.1 mg/L. The NRSA and WSA data had less than 5 values below the laboratory reporting limits of 0.02 mg/L TN and 0.004 mg/L TP. These low values were re-established at the reporting limit for analysis.

Limiting data to address seasonal variability

The NMED nutrient data were mostly collected in the spring, summer, and fall seasons. Samples were much less common in winter months (December, January, and February). Through the years, seasonal effects on nutrient concentrations were expected due to variable discharge or fertilization patterns, changes in light intensity, and variable rates of runoff and plant uptake. Therefore, patterns that might affect threshold development or application of thresholds were reviewed in the NMED nutrient concentrations over seasons as well as trends from individual sites with multiple records over time. The conclusion of the analysis (detailed in Appendix E) was to remove samples collected in the winter months (December, January, and February) from the general analysis. All of the data were accepted from the NRSA and WSA programs because they were collected within a narrowly defined index period (May through September). The numbers of samples and of years per site ranged up to 65 and 10, respectively, in the Rio Hondo site 28RHondo014.8 (Appendix F).

2.4 Response Measures

The response data were analyzed as metrics of each assemblage. The biological metrics are usually limited to those that are basic and familiar summary metrics or are known indicators of stress. Since there are more ways to measure an assemblage than there are meaningful ways to interpret several metrics, the number of metrics were limited through a preliminary screening process that discerned familiar, proven, precise, or sensitive metrics. Metrics that had high measurement error or were unresponsive to stress were not used for stressor-response analyses.

Chlorophyll a

Of the NMED wadeable stream sites with nutrient data, 174 also had benthic chl-a data (including 35 with benthic macroinvertebrate data as well). These samples were collected between 2004 and 2011 in the months of August to November. Chl-a data were also collected for 50 NRSA sites, including both benthic and water column measures.

For NMED samples, chl-a samples were extracted with 90% ethanol and analyzed with a spectrophotometer using a modified Standard Method for the Examination of Water and Wastewater, American Public Health Association, Method 446.0 (APHA 2012). The absorbance correction for ethanol (28.66 = absorbance correction for chlorophyll in ethanol) was substituted for the acetone correction of 26.7. Extraction was done according to methods in Biggs and Kilroy (2000), (extraction in ethanol boiled for 5 minutes and soaked for 12-18 hours).

Periphyton Data

Periphyton data in and around New Mexico were collected by NMED and the NRSA. Through the NMED, roughly 212 diatom samples were collected from 2002 to 2008 mostly in the fall sampling season (August - November). Soft algae samples were collected from 133 sites. Samples were collected using a targeted richest habitat sampling method (NMED 2014), which include scraping delimited areas from 5 – 9 cobbles, woody debris, or soft substrates within transects of the stream, preservation with Lugol's or formalin solution, and identification of 500-600 valves in the laboratory. Periphyton data from 69 NRSA sites in and around New Mexico were added to a single periphyton database. The NRSA periphyton samples include both diatoms and soft algae. Potential bias that might be introduced by different sampling protocols was investigated by comparing metric distributions.

For the NMED and the NRSA diatom data, metrics were calculated in a relational database. Approximately 68 diatom metrics were calculated including metrics and taxa attributes described by Porter et al. (2008), Stevenson et al. (2008), Kelly and Whitten pollution tolerance index (1995), van Dam et al. metrics (1994), and periphyton indices developed by Potapova and Charles (2007). Eight responsive metrics were selected for continued analysis in stressor-response analyses

Benthic Macroinvertebrates

SWQB monitored benthic macroinvertebrate community composition at targeted sites. Macroinvertebrate and chemistry samples collected within 30 days of each other were identified in 202 NMED sites. One benthic macroinvertebrate sample was compared to average site chemistry from samples collected within 30 days of the benthic sample. If multiple benthic methods were used on a single date, a preferred method was selected, with preferences as follows: Reachwide > Kick > Targeted Riffle > other.

The NMED macroinvertebrate samples were collected using six different methods, including reachwide, targeted riffle, kicknet, surber, Canton Hess and Jacobi Hess. Biomonitoring samples were collected in accordance with the EPA Rapid Bioassessment Protocol (RBP) (Barbour et al. 1999), the NMED Standard Operating Procedures (SOP) (NMED/SWQB 2005, 2012), and/or modified EPA EMAP macroinvertebrate sampling method (Peck et al. 2006). Opportunities to aggregate samples collected by different methods were explored and samples from multiple methods were pooled when the results of each method overlap in stressor-response bi-plots. Separate analyses were conducted for methods that could not be aggregated because of non-overlapping data points in the bi-plots. NRSA and WSA benthic data were collected with consistent reachwide or targeted riffle methods (Peck et al. 2006) and were summarized as metrics in spreadsheet format. In the WSA and NRSA datasets, 56 and 40 benthic samples (respectively) matched the chemistry samples.

NMED benthic samples were the basis for calculation of 63 metrics in categories of taxa richness, composition, pollution tolerance, feeding groups, and habit. These metrics were used in assessments or were expected to be responsive to stresses in New Mexico streams. Ten benthic macroinvertebrate metrics with consistent and strong correlations were identified. The high-small multi-metric macroinvertebrate condition index (HSMMCI, Jacobi et al. 2006) is an assessment index that NMED uses in sites with elevations >7500 feet and catchments <200mi^2.

3.0 Methods

The general approach to developing nutrient thresholds includes frequency distributions of the data and stressor-response analysis. For frequency distributions, a disturbance gradient was developed, sites were assigned to reference categories, and site classes were established to reduce natural variability. The stressor-response analysis includes regression interpolation and change-point analysis techniques. Diel DO measures were analyzed for thresholds related to reference conditions, nutrient concentrations and macroinvertebrate responses.

3.1 Reference Sites and Classification

Reference Site Identification

Reference sites were needed in the New Mexico nutrient analysis for characterizing the nutrient conditions in the absence of substantial disturbance. This allowed exploration of natural variation in nutrient concentrations across the study area and derivation of potential nutrient thresholds from distributions of nutrient values in the relatively undisturbed sites. Stream classification and reference site designations hinged upon each other to characterize nutrient conditions relative to both natural and disturbance gradients.

Reference stream sites have been identified in and around New Mexico for multiple purposes, including biological index development (Jacobi et al. 2006, Paul 2008), sediment threshold estimation (Jessup et al. 2010), and the national stream surveys. The designations established for each purpose were adopted to create a list of potential reference sites for this project. Reference designations established for the national surveys used nutrient measures as criteria for ranking disturbance levels (Kaufmann et al. 2012). This was inappropriate for our analysis and the national surveys reference designation (and all others) were reevaluated using GIS analysis to confirm the designations.

For the first cut of reference site designations, a thorough GIS analysis was performed based on delineated catchments upstream of each site. The GIS information was derived for 662 sites in the project area, including sites sampled by multiple data collection programs. The reference designations established in other studies and NMED staff review of empirically derived designations were used for confirmation. Because the NMED staff are familiar with site conditions that may not be reflected in the GIS data, they reviewed the reference designations indicated through empirical analyses and were able to change designations based on knowledge of the sites. For example GIS coverages do not reflect the intensity of grazing. Sites with contradictory indications of reference status from the multiple techniques were relegated to non-reference or "Other" categories.

Land use coverage and human activity in the catchments (Table 7) were examined for appropriate thresholds to indicate disturbance or lack of it. Development and agricultural land uses indicate catchment scale intensity of disturbance. Both pasture and crops were considered agricultural uses. Forest, water, and wetland are usually undisputable natural land covers. However, the "natural-ness" of scrub/shrub, grassland, and barren coverages are uncertain because they could be due to human activities or natural environmental factors, especially in more arid areas. Therefore, the known disturbances were emphasized. Road density and the density of road-stream crossings were used as a surrogate for intensity of human activity in the watershed.

Table 7. Variables used as reference site criteria (see Appendix B for additional details).

Variable	Description	Source
Urban Index	% low, medium and high intensity development in the catchment	CDL_NLCD (2010)
Agricultural index	% pasture/hay and cultivated crops in the catchment	CDL_NLCD (2010)
Road Density	Length of roads per area (mi/mi^2) in the catchment	Roads (Census Streets, 2010)
Road Crossing Density	Count of road-stream crossings per area ($\#/mi^2$) in the catchment	Road/Stream Crossings
Dam Density	Count of dams per mi^2 in the catchment	Dams and Diversions (NHDPlus V2)
NPDES Density	Count of NPDES discharges per mi^2 in the catchment	NPDES Permits
Superfund Density	Count of Superfund sites per mi^2 in the catchment	Superfund Sites
Mine Density	Count of producing mine sites per mi^2 in the catchment	Mines (MRDS, Producers and Past Producers)
Dam Distance	Minimum distance of a dam to the sampling coordinates (as the crow flies)	Dams and Diversions (NHDPlus V2)
NPDES Distance	Minimum distance of a NPDES discharge to the sampling coordinates (as the crow flies)	NPDES Permits
Superfund Distance	Minimum distance of a Superfund site to the sampling coordinates (as the crow flies)	Superfund Sites
Mine Distance	Minimum distance of a producing mine site to the sampling coordinates (as the crow flies)	Mines (MRDS, Producers and Past Producers)

The known human activities in the catchment (dams, NPDES permits, Superfund sites, and mines) were used to qualify reference sites. Information on these activities were available as counts in the catchment, densities (counts/catchment area), and distance to the sampling site. Because sites have variable size, densities were used to standardize the activities per unit of land area. The distance between the activity and the site weights the probable effects of the activities at the sites. Activities greater than 5 miles distant were assumed to have less effect on site conditions than those within 1 mile of the site. Dams and NPDES permits were always on the stream network. The mines in the database were limited to those that were current or past producers. Mine locations that never went into production were excluded. Site specific stressors (in-stream measures of water quality and habitat) were excluded as reference site criteria because they could introduce circular logic in the threshold development process and they often represented only instantaneous conditions (USEPA 2013).

For each of the reference criteria variables from the GIS analysis, thresholds were established for five disturbance categories from reference to extremely stressed sites (Table 8). The thresholds were derived from distribution statistics for each criterion in all sites. The percentiles were used as guidelines for establishing thresholds, but subjective adjustments were made to arrive at feasible values and adequate numbers of sites in each disturbance category. Five disturbance categories were defined from best to worst conditions: Reference, Near-Reference, Other, Stressed, and Extremely Stressed. Reference sites are more important to identify than stressed sites, but stressed sites allowed us to recognize a full scale of disturbance gradients. To receive reference status, a site must not fail any of the stressed criteria and must pass at least 7 of the 8 reference criteria. Near-Reference sites did not fail any of the stressed criteria and passed at least 7 of the 8 reference Near-Reference criteria. Near-reference sites were used in analyses when reference sites alone were too sparse regionally or in a specific analysis. The inclusion of near-reference sites is declared for each analysis that follows. Stressed and Extremely Stressed sites failed at least 2 of the Stressed or Extremely Stressed criteria, respectively.

Table 8. Reference and stressed site criteria, based on distributions of values over all 660 sites.

Variable	Reference	Near Reference	Stressed	Extreme Stress
Urban Index (% cover)	0.01	0.02	1	2
Agricultural index (% cover)	0.1	0.5	4	5
Road Density (mi/mi^2)	1	1.4	3	5
Road Crossing Density (#/mi^2)	1	1.25	2	5
Dam Density (#/mi^2)	0	0.005	0.03	0.05
NPDES Density (#/mi^2)	0	0.01	0.1	0.2
Superfund Density (#/mi^2)	0	na	0.01	na
Mine Density (#/mi^2)	0.05	0.1	5	10
Dam Distance (mi)	na	na	1	0.5
NPDES Distance (mi)	na	na	1	0.5
Superfund Distance (mi)	na	na	2	1
Mine Distance (mi)	na	na	0.5	0.25

NMED EXHIBIT 25

Reference sites identified through application of the GIS derived criteria were checked against previous reference designations where they existed. Sites with contradictory indications of reference status from the multiple techniques were relegated to the non-reference ("Other") category. The NMED staff was familiar with site conditions that were not reflected in the data (e.g. spills, fires, legacy effects) and they used this knowledge when reviewing the empirical disturbance categories for each site.

Site Classification

Natural gradients in the dataset that affect potential nutrient and biological response indicators were examined by first isolating those sites with minimal disturbance and then using appropriate statistical methods (e.g., principal components analysis, correlation analysis, and examination of bi-plots and distributions, etc.) to develop a stream classification scheme that captures the environmental variability for subsequent statistical analyses. Aggregate ecoregions used in the EMAP-West study (Stoddard et al., 2005)—Mountains, Plains, and Xeric—were considered as a starting point for stream classification, but were modified as needed and considered along with other categorical and continuous variables. The classification scheme developed for sediment assessments – Mountains, Foothills, and Xeric areas (Jessup et al. 2010) was also tested. Additional classification categories and variables were examined, including Level III and IV ecoregions (Griffith 2006), geology, latitude, longitude, stream order, elevation, drainage area, average land slope in the catchment, average annual precipitation, average annual temperature, width/depth ratio, entrenchment ratio, sinuosity, channel substrate, and stream slope.

The first step in site classification is defining the data frame, or population of streams from which data will be analyzed and to which resulting thresholds can be applied without extrapolation. The waterbodies of interest for this effort include perennial wadeable streams in New Mexico and in close proximity and similar ecoregions of neighboring states. It does not include ephemeral or intermittent streams, springs, and direct WWTP effluent. Also excluded are large rivers, that cannot be monitored effectively with methods developed for wadeable streams and generally have drainage areas greater than 2,300 square miles (NMED/SWQB 2011). The systems considered to be large rivers, and consequently exempt from this protocol, include:

1. San Juan River from the Navajo Nation to the Navajo Reservoir,
2. Rio Grande in New Mexico,
3. Pecos River from the Texas border to Sumner Reservoir,
4. Rio Chama from the Rio Grande to El Vado Reservoir (to due flow augementation from the San Juan/Chama project),
5. Canadian River from the Texas border to the Cimarron River, and
6. Gila River from the Arizona border to Mogollon Creek.

Principal components analysis (PCA)

Principal components analysis (PCA) was used as a tool for selecting site classification variables. The PCA was run in two configurations: only reference and near-reference sites and all sites. When only reference and near-reference sites were used, natural, nutrient, and stressor variables were included as determinants. When all sites are included, only natural variables were included. The advantage of using all sites is that regions with fewer reference sites will be represented. When included as supplemental variables (not influencing the organization of principal components), the stressor, biological, and nutrient variability can be compared to the principal axes. Nutrient-related axes that were correlated with biotic variables were examined to gain insight into potential scaling or classification variables that would minimize biological variability and thus focus biological responses on disturbances. Variables were transformed as needed to approximate normal distributions using logarithmic and Arcsine-Square Root transformations. Ecoregion designations and other classification variables were entered as binary code (true or false). For the PCA and other classification exercises, variables were as described in Table 9 and Appendix B.

Table 9. Classification variables.

Code	Description	Type
Latitude	Latitude	Continuous
Longitude	Longitude	Continuous
Elev_m	Elevation (m)	Continuous
DrAreaMi2	Drainage area (square miles) (log transformed)	Continuous
LndSlpAvgpct	Average land slope (%)	Continuous
PrecipAvg30	30 year average precipitation (mm)	Continuous
TempAvg30	30 year average air temperature (C)	Continuous
NMEDnutClass	NMED existing nutrient classes	Categorical
MFX	Mountain, Foothill, and Xeric classes	Categorical
Ecoreg3	Level 3 ecoregion	Categorical
GeolRockType1	Geologic rock type	Categorical

Correlation analysis was used to describe single factor relationships between nutrients and environmental variables in reference sites. In contrast to the PCA, the correlation analysis was always limited to reference sites to emphasize the effects of natural site conditions instead of disturbance levels. The non-parametric Spearman rank order correlation coefficient was used because it is less sensitive to skewed distributions.

The relationships suggested by PCA and correlations were examined in box plots and bi-plots. For example, the distribution of nutrient concentrations in reference sites of the existing site classes were plotted and examined for precision within classes and differences among classes. Distributions that showed high variability within a class indicated a need for more refined classification. Classes with similar interquartile ranges show possibilities for combining classes. If the box plots showed precise and distinct distributions, then confirmation of proposed classes was indicated. Bi-plots were used to show patterns of relationships between variables and to highlight tertiary attributes of the relationships such as reference status, ecoregion, or other covariants.

It is likely that multiple factors affect response variables, including stream shading, flow, substrate, turbidity, and others. The degree to which these other factors mask or accentuate responses between nutrients and response measures can sometimes be recognized and factored out. However, extensive analysis to recognize possible factors can suggest data parsing that is unreasonable for the sample sizes available for analysis. If the nutrient-periphyton analysis was reduced to one type of sample with similar characteristics (e.g., NRSA sites with >75% canopy, cobble dominated substrates, in cold water Southern Rockies streams), there would be few data points from which to find meaningful relationships. Therefore, while the distinct, categorical site classification does not account for all possible natural variability in nutrients conditions within each site class, nutrient observations could be adjusted based on regression residuals for the co-varying factors. This was further explored in the section on correlations and interactions.

Recursive Partitioning

Classification and Regression Tree (CART) models (also called recursive partitioning) account for variation in a dependent variable by progressively splitting samples into two bins that best partition the total variation among samples. This process forms a prediction tree based on a series of binary splits in the data. The first split occurs at the value of the predictor variable that most efficiently (as measured by the mean within-group standard deviation [SD]) partitions overall variation of the dependent variable into two groups. CART then partitions each of these two groups, if justified, into two smaller groups or nodes in the same manner, although the partitioning variable may differ. Trees were pruned to the complexity parameter value associated with the lowest cross-validation error. CART models were built with the R routine, 'rpart' (version 3.0.2; R Development Core Team, http://www.r-project.org/), for both TP and TN.

The CART analysis results in a cross validation error for each additional split of the model. When the cross validation error is minimal, the number of splits is maximized. Additional splits can overfit the data – where the model is very good at predicting within the training data, but is poor at predicting for new data. The splits can inform site classification – giving variables and thresholds that partition the data by nutrient levels. At the end of each branch of the tree, TN or TP values are predicted as the average for that group.

A random forest routine (R: randomForest) was conducted to find the most important variables in 500 runs of CART using random subsets of the data for each run. The variable importance is the relative frequency with which each variable entered into the models. Importance can be used to confirm the selection of variables in the predictive CART model. Random forests do not generate a predictive model. At first, only quantitative variables (Table 9) were used to predict splits relative to site average TP and TN (log transformed) in reference and near-reference sites.

Categorical variables were added to the models to determine whether existing classifications were as strong as the quantitative variables.

3.2 Frequency Distributions

Non-parametric quantiles were calculated from frequency distributions of nutrient concentrations in subsets defined by site classes and disturbance category. The distributions were based on median TN and TP concentrations in each site. NMED preferred to use the median values as the best representation of site conditions because the data were log normally distributed and the median was a better estimate of the central tendency of the data. Also, mean values can be biased by few extreme values. The frequency statistics included data from all data sources for nutrients. The reference and near-reference sites were combined after confirming that the nutrient distributions were similar. It was assumed that statistics from a larger data set would be more robust than those from reference sites alone.

The non-parametric median, 75th, and 90th quantiles of the reference site summary nutrient concentrations were reported. The 75th, and 90th quantiles were candidate thresholds below which values were characteristic of most reference sites. Confidence intervals (90%) were calculated for each quantile using 1001 bootstrap iterations. Analysis was conducted using R software.

3.3 Correlations and Interactions

In the correlation analyses, relationships were examined as outlined for the stressor-response approach, including the following linkages:

1. ↑ Nutrients = ↑ Chl-a
2. ↑ Chl-a = Δ DO dynamics
3. ↑ Nutrients = Δ Diatom Metrics
4. Δ DO dynamics = Δ Macroinvertebrate Metrics

Spearman non-parametric correlation was used to explore direct one-to-one relationships not only for these primary linkages, but also for the indirect nutrients – DO relationship and the covariates that were suspected to have strong direct or indirect effects. GIS-derived site characteristics were consistently available for all sites. These variables included ecoregion, land use types and intensity, roads and road crossings, population density, watershed area, and other variables (see Table 6). Site measurements of water quality and chemistry, physical habitat features, channel dimensions, slope, canopy cover, riparian vegetation, riparian integrity, substrate characterizations, flow, and more were measured at some sites, but not consistently in all sites. The commonly measured variables were included in analyses of covariates. Canopy cover and flow were two variables that were assumed to modify

NMED EXHIBIT 25

relationships between nutrients and algal growth, but that were not consistently measured with all samples.

The analysis resulted in correlation matrices for all data available or in subsets by site class and data source. Scatter plots were used to illustrate relationships with strong correlation coefficients to check that the relationships were not driven by a few extreme values. Scatter plots were also used to highlight tertiary variables and covariates by marking symbols in categories.

Forward stepwise multiple regression analysis was used to predict responses based on several variables. Multiple regression is a technique that prioritizes the most influential variables for the selected dependent variable. Multiple variables can enter into the regression equation, though usually with decreasing effectiveness and reduced significance after the first 2-3 variables.

As described for site classification, random forest analysis was used to find relative importance among sets of predictor variables for each dependent variable of interest. The output of the random forest analysis is a prioritized list of variable importance in the multiple models. This was another technique used to find strong modifying variables in the expected relationships.

The correlation analysis was also used to reduce our long list of macroinvertebrate and periphyton metrics. More metrics were calculated than could be meaningfully interpreted. Those metrics that showed relatively strong and consistent responses among the nutrient, DO and chl-a conditions were retained for further analysis.

3.4 Regression Interpolation

Simple linear regression provides an estimate of the linear relationship between a response variable and an explanatory variable (such as TN or TP). The regression results in coefficients for the intercept and slope of a straight line representing the relationship between the two variables. A stressor-response relationship estimated by linear regression predicts the value of the response variable, given a particular nutrient concentration. Hence, if the value of the response variable that supports the designated uses is known for a waterbody, the stressor response relationship can “translate” this response threshold to a numeric criterion value (USEPA2010). In our regression analysis, the simple linear regression was calculated between response variables (macroinvertebrate and diatom metrics, diel DO statistics, and chl-a) and nutrient stressors. TN and TP were log transformed. All of the samples were matched within a ±30 day sampling window.

The critical quartile of the reference distribution (25th or 75th) was determined for each response metric in each site class. The quartile values were used in lieu of response impairment thresholds for the biological assemblages, because such thresholds are not widely established in New Mexico. For metrics that decreased with increasing stress, the 25th quartile was used, assuming that higher metric values represent conditions similar to most reference sites within the site class.

Stressor values for each metric were interpolated and interpreted as candidate thresholds. The y-axis response was intersected with the regression line and then reflected down to the x-axis stressor, solving for x given the regression equation and y. Results exceeding the observed range of nutrient values and from non-significant regressions (p>0.05) were de-emphasized.

Figure 2 illustrates how the nutrient-diatom metric relationship was used in deriving nutrient thresholds. For each site class and each metrics, a meaningful percentile of the reference metric distribution (such as the 25th) was identified. Nutrient values associated with the reference metric values were interpolated by entering the graph from the y-axis, turning at the regression line, and projecting down to the x-axis. This gives one potential threshold value. Other values can be associated with projections from the confidence intervals around the regression line or other reference metric percentiles.

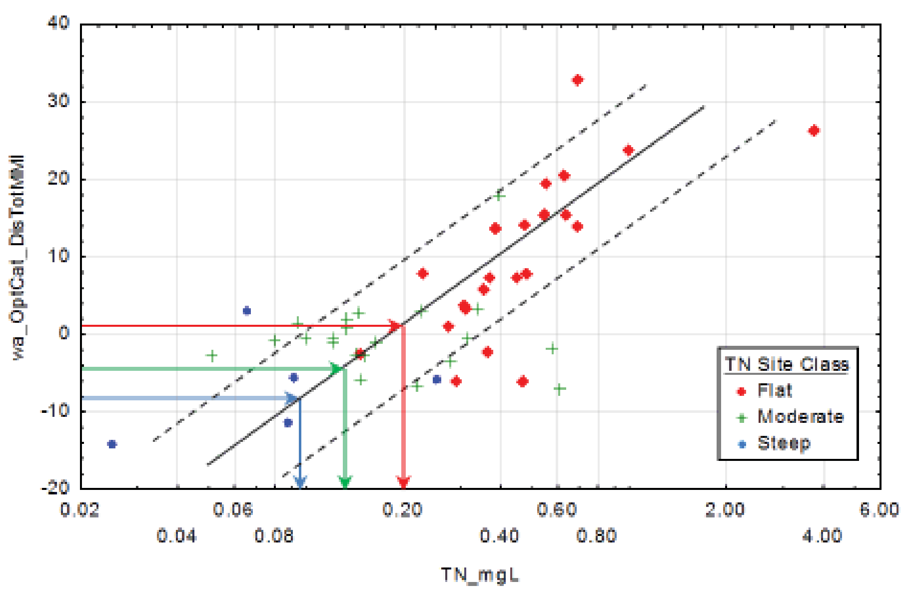


Figure 2. Diatom metric values (weighted average total disturbance multimetric index) against TN concentrations, marked by site class; NRSA data. This figure shows derivation of potential thresholds based on reference percentiles of the metric value and interpolation of nutrient values.

3.5 Change-point Analysis

Change-point analysis with deviance reduction was conducted in R software using the recursive partitioning (rpart) code (Therneau et al. 2013). Output from the change-point analyses included the change-point as well as 95% confidence intervals estimated from a bootstrap re-sampling technique. The plots also included 90% quantile and LOWESS regression lines to allow interpretation of the identified change-points. Results were tabulated and plotted for each site class, nutrient, and response variable. A change-point will be identified whether or not it is a realistic representation of the point at which stressor levels are having critical effects on the response variable. The confidence interval, LOWESS regression, and quantile regression were used to qualify the change-point, which was disregarded if it was considered unrepresentative (Figure 3).

The width of the confidence interval relative to the range of all values indicated precision of the identified change-point. Confidence intervals that included more than half of the stressor scale indicate an imprecise threshold. However, a wide confidence interval alone might not be sufficient reason to disregard a change-point if the LOWESS and quantile regressions suggest an appropriate change-point. The width of the confidence interval was rated as narrow (< ¼ of the entire scale), moderate (¼ to ½ of the scale), or wide (> ½ of the scale).

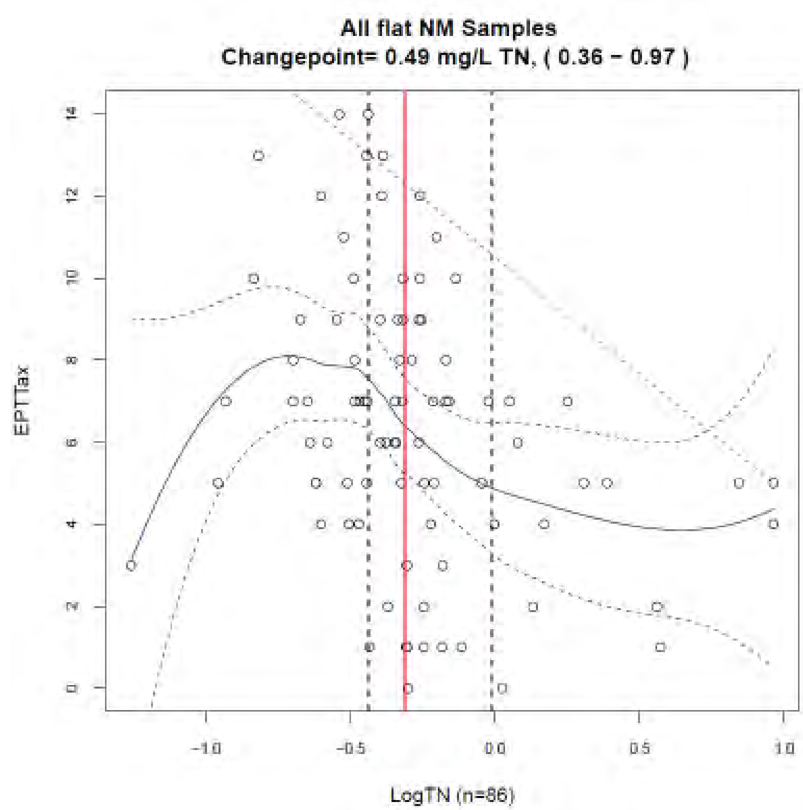


Figure 3. Macroinvertebrate metric values (EPT taxa) against log TN concentrations. The validity of the change-point (verticle solid line) is determined by qualifying the 90% confidence interval (vertical dashed lines), the LOWESS regression line (blue curve) and the 95% quantile regression (dashed sloping line).

The ideal application for change-point analysis is a step-function response. If the LOWESS curve was steep at the change-point, it indicated a step in the response at that point. If the LOWESS fit did not show a visually recognizable change at the identified change-point, then the change-point was de-emphasized. The LOWESS technique (Cleveland 1979) is designed to address nonlinear relationships. LOWESS fits simple models to locally weighted subsets of the data to build up a function that describes the deterministic part of the variation in the data, point by point. A bandwidth that considered 75% of the data for smoothing the slope at each data point was used. The LOWESS regression line was used in combination with other indicators of nutrient change-points, primarily as a visual confirmation of changing biological measures at certain nutrient concentrations.

A second check on the general response pattern uses quantile regression to confirm limiting effects of nutrient concentrations on the response variable. Quantile regression is a method for estimating relationships between variables along the upper (or lower) boundary of a distribution of stressor-response data points (Cade et al. 1999). The quantile regression line represents biological potential (plotted on the y-axis) in relation to the stressor of interest (plotted on the x-axis). If limiting factors such as nutrients act as constraints on organisms, then the potential maximum biological condition is observed as a sloping line on a wedge-shaped scatter plot of a biological metric against a nutrient variable. Points that are not along the slope of the wedge represent sites where biological condition is affected by factors not represented on the x-axis. The 90th quantile regression line illustrates the change in the potential biological resource for each increment of disturbance, especially when it is consistent with expectations of trends with increasing nutrients and the LOWESS regression slope at the change-point is in the same direction as the quantile regression line. “R” software (R Core Team 2013) and associated code (quantreg) was used to estimate limited relationships with quantile regression.

3.6 Synthesis of Multiple Thresholds

The frequency distribution and stressor response techniques resulted in multiple candidate thresholds; by stressor, biological assemblage, response measure, site class, and analytical technique. The candidate thresholds were described in the context of strengths and limitations for each analytical method. Results of the multiple methods are expected to agree with each other. When outlier nutrient threshold values were encountered, they were addressed individually and included or excluded from consideration based on analytical integrity (e.g., significance of regressions), feasibility (e.g., within the observed range of values), and corroboration of evidence (e.g., agreement of LOWESS and quantile regression slopes for change-point analysis). The ranges of candidate threshold values and central tendencies were described in narrative, tables, and cumulative distribution function (CDF) curves. The curves illustrated the candidate threshold derived from the reference frequency distribution in relation to candidate thresholds derived through stressor response techniques (Figure 4).

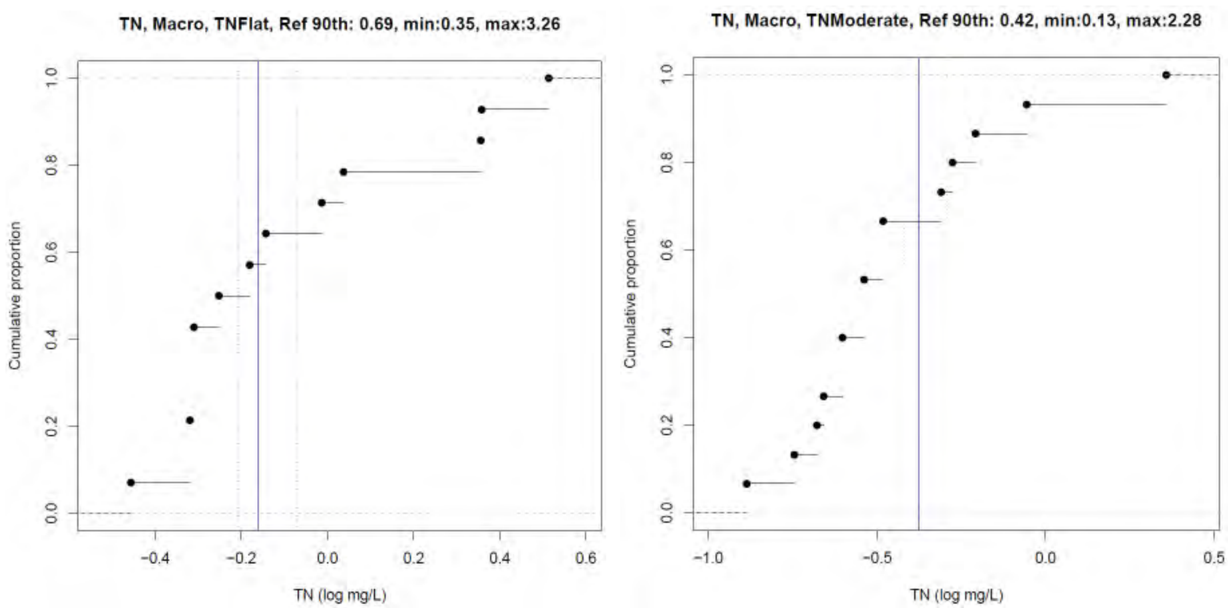


Figure 4. Examples of a CDF curves showing candidate TN threshold values derived from reference frequency distribution (vertical solid line with confidence limits) and from multiple stressor-response analyses of macroinvertebrate metrics using change-point and regression interpolation (points along the curve). The log values in the x-axis are back transformed to mg/L in the titles. These graphs show results for two site classes: TN Flat (left) and TN Moderate (right).

In the example, each point represents a specific threshold value related to particular analytical technique or metric in the tabulated results. In the TN Flat site class, the reference-derived value falls near the 0.58 cumulative value (left graph in Figure 3). If the threshold is established at the reference-derived value, it would higher than ~58% of the stressor-response candidate thresholds. About 70% of the stressor-response-derived values are at or below the reference-derived value in the moderate site class (right graph). On the logarithmic scale, the stressor-response thresholds in the upper right portion of the graphs are much higher than the others, especially those that are to the right of the points with long horizontal leaders.

4.0 Results

4.1 Reference Sites and Classification

The reference site analysis and disturbance gradient designations resulted in 20% of sites identified as least disturbed reference sites (Table 10, Appendix F). Another 11% were designated as near-reference. This is a reasonable proportion of reference sites because sites with potential for least-disturbed reference status were targeted when selecting sites for sampling and analysis. Smaller percentages of sites were designated as stressed (7%) or extremely stressed (6%). The remaining sites were designated as “other”, having moderate levels of disturbance.

Most of the designations (83%) assigned by numeric site criteria based on GIS analysis of land use coverage and human activity in the catchments were confirmed during the NMED review. Of the 114 designations that were not confirmed by NMED, 70 were reductions from a better category to a worse one. When NMED suggested changes that were only one category (e.g., NearRef -> Ref), further review was not required. The 29 sites that changed by more than one category (e.g., Other -> Ref) were reviewed by the workgroup using site history, known stressors, and aerial photos to resolve designations for each site. Site reviews used landscape and historical input, not water quality information. However, there were three sites that were downgraded from ‘NearRef’ to ‘Other’ because high NO_3NO_2 in relation to TKN indicated nutrient additions.

Reference sites were sought in all regions of New Mexico using the three site classes established for stream sediment analysis (Jessup et al. 2010) to compare the distribution of reference sites throughout New Mexico. As expected, mountainous regions had a greater percentage of reference sites in comparison to either the foothills or xeric areas. Conversely, stressed sites were more common in the xeric areas compared to the foothills or mountains.

Table 10. Reference site designations by reference status and sediment region.

Region	N	Ref	NearRef	Strs	XStrs	%Ref	%Strs
Mountains	225	66	29	10	7	29.3	7.6
Foothills	197	33	19	12	4	16.8	8.1
Xeric areas	240	14	23	25	30	5.8	22.9
Total	662	113	71	47	41	20.5	13.3

For site classification, the data frame contained 542 wadeable stream sites with complete landscape analysis and nutrient concentrations, summarized per site. Of the 662 sites identified for GIS analysis, 120 were in non-wadeable rivers, were intermittent, were duplicates of other analyzed sites, or lacked critical data. Preliminary explorations (Appendix G) indicated that we could pool nutrient data across data sources (NMED, NRSA, and WSA) and that the reference and near-reference sites should be combined for the remaining classification exercises. Existing classification schemes based on level 2 ecoregions (Stoddard et al. 2005) or sediment regions (Jessup et al. 2010) showed insufficient separation of nutrient distributions and a new analysis was warranted.

Phosphorus

Phosphorus values were first partitioned by longitude in the CART models both with and without categorical variables (Figure 5). Cross validation for CART is calculated with random permutations, leading to different results for each run. In most runs, cross validation indicated overfitting after the first split based on longitude. In other iterations, several splits could be included without overfitting and these are shown in the figure. The additional splits were based on average land slope, latitude, and precipitation. To interpret the correct number of splits, TP values were plotted with the variables used in the CART analysis. Excessive partitioning of the data would be conceptually (if not statistically) overfitting the data and many or small site classes would add unnecessary complexity. The random forest analysis suggested that the most important classifying variables were longitude (importance measure = 3.04), land slope (2.73), latitude (2.32), and precipitation (2.09). These relative importance measures using continuous variables did not change when repeating the analysis with categorical variables included.

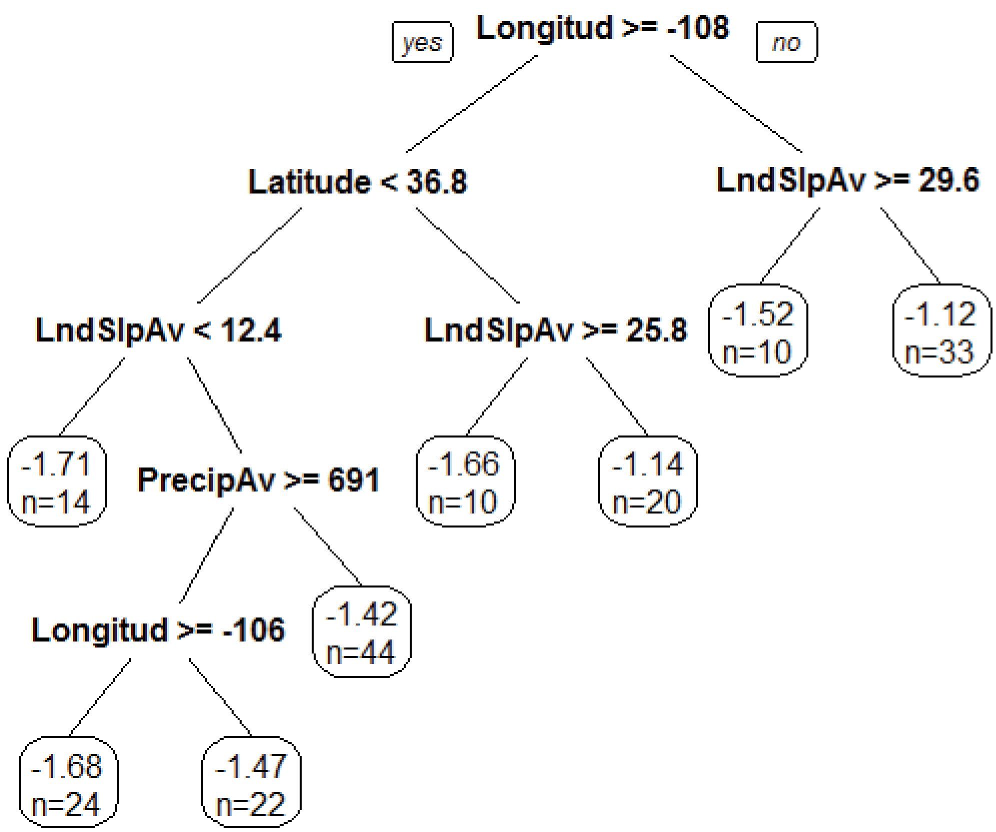


Figure 5. Classification and Regression Tree (CART) for average total phosphorus (TP). At the first split, 134 of 177 reference and near-reference sites east of longitude -108.1 were partitioned to the left of the tree. Additional splits in the data were based on latitude, land slope and precipitation. At the end of each branch the average TP concentration (log mg/L) and number of sites are displayed.

Longitude was consistently an important variable, occurring in the first CART split and having the greatest importance in the random forest analysis. The split was defined at longitude -108.13, which includes western ecoregions (Colorado Plateaus [ecoregion 20], Arizona/New Mexico Mountains [23], Madrean Archipelago [79], and the Chihuahuan Desert [24]). The western parts of these ecoregions had higher TP than the eastern parts (Figure 6). Reference sites in the Arizona/New Mexico Plateau (22) were either east of longitude -108 or mostly drained other ecoregions. In the Arizona/New Mexico Mountains, longitude -108 is an approximate watershed boundary between the Rio Grande and Gila River basins.

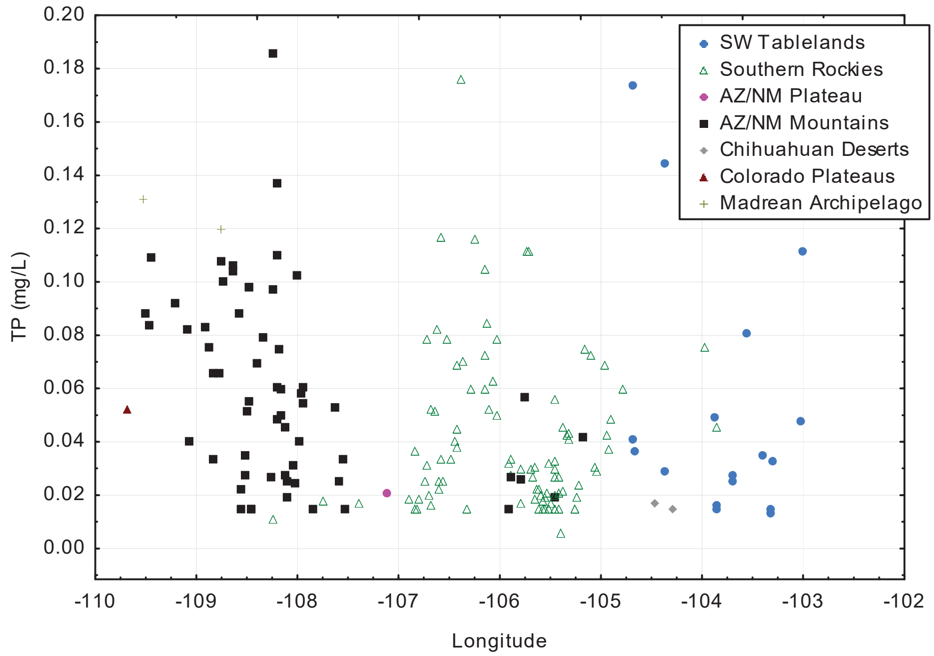


Figure 6. Total Phosphorus (TP) average values per reference or near-reference site in relation to longitude, showing the dominant ecoregion of the site catchment.

CART analysis split the eastern data by latitude, but with a latitude threshold that was so far north in the state (latitude 36.8 passes north of Ensenada, NM) that the threshold did not make sense for site classification in New Mexico. Land slope was the first split of CART analyses conducted separately for sites in western or eastern classes. Steeper sites have lower TP, in general (Figure 7). A CART analysis forcing land slope as the classification variable in all sites resulted in a split threshold of 29%.

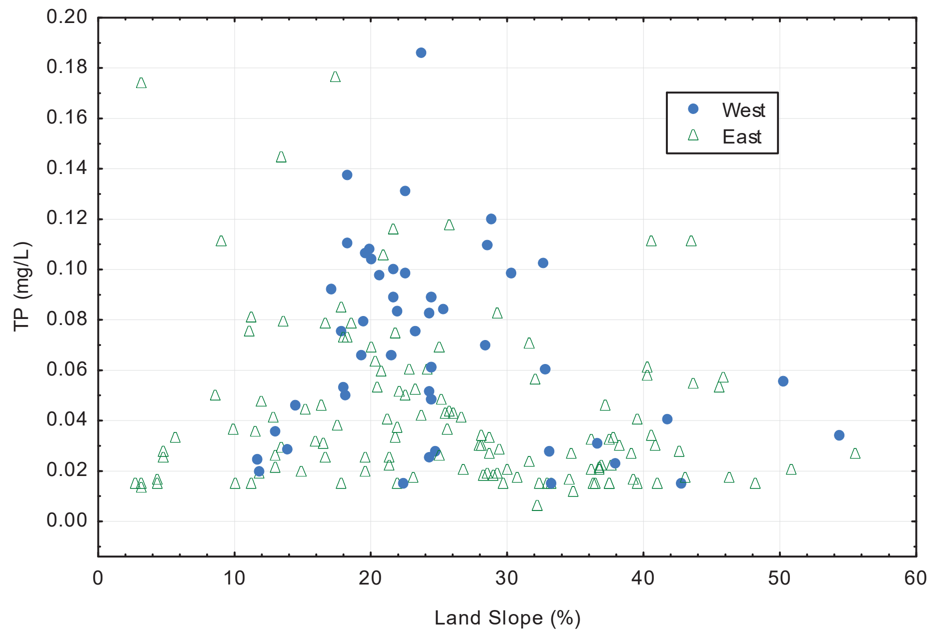


Figure 7. Total Phosphorus (TP) average values per reference or near-reference site in relation to average land slope in the catchments, showing East and West regions (longitude -108).

NMED reviewed the initial classification analysis resulting in classes defined by longitude and land slope. The longitude split appeared to be driven by the large number of reference sites in the higher background TP watersheds in SW New Mexico. Higher background TP was suspected of being related to volcanic geology, but the geologic designations alone could not explain differences in reference TP. While all of the high TP reference sites were in volcanic regions, other volcanic formations did not have high background TP. Instead, specific basins (8-digit HUCs) were identified with high TP in reference sites. These watersheds correspond to those shown to have high soil TP (Woodruff et al. 2015).

The TP High-Volcanic site class was defined for regions with relatively high background TP, most of which were associated with volcanic geology (Table 11). Flat western sites of the initial classification had more homogenous reference TP values when non-volcanic basins were removed from this group which became the TP High-Volcanic group with the addition of other volcanic and high soil TP basins. The TP High-Volcanic site class includes the following basins: the Upper Gila, the Upper Gila-Mangas, the San Francisco, the Mimbres, and the San Antonio/Conejos. The San Antonio/Conejos is the only basin that is not in southwest NM. It is a volcanic region along the central section of the northern border of New Mexico. The following smaller basins (12-digit HUCs) were excluded though they are in the Upper Gila basin: Diamond, Taylor and Beaver Creeks (HUCs 150400010404, 150400010406, 150400010402, 150400010403, 150400010305, and 150400010302). The Jemez basin was suspected of being part of this class, but was not because background TP levels were not as high as in other TP High-Volcanic sites.

Sites not in the TP High-Volcanic class were separated into two classes based on 29% average catchment land slope. The TP Steep class has sites with slopes greater than 29% and background TP concentrations that were the lowest of the three classes. The TP Flat-Moderate class has flatter landscapes, though three basins with marginally flat sites (<31.8% land slope) were included because background TP concentrations were higher than typical TP Steep sites. These exceptions included drainages in the Vallecitos, Pajarito and Sulfer/Redondo basins (HUCs 130202020204, 130202010204, and 130202020202).

These three classes had significantly different TP values (Figure 8) based on the non-parametric Kruskal-Wallis test (p<0.01 for all comparisons).

Table 11. Site classes for TP and TN.

TP High-Volcanic –The class includes all sites in the San Antonio and Conejos, the Upper Gila, Upper Gila-Mangas, San Francisco, and Mimbres basins. In the Upper Gila basin, it excludes sites in the Diamond, Taylor and Beaver Creek sub-basins (HUCs 150400010404, 150400010406, 150400010402, 150400010403, 150400010305, and 150400010302).
TP Flat-Moderate - This class includes all sites less than or equal to 29% average land slope and not in the TP High-Volcanic site class. It also includes sites in three drainages of the Jemez basin, the Vallecitos, Pajarito, and Sulpher/Redondo sub-basins (HUCS 130202020204, 130202010204, and 130202020202).
TP Steep - The Steep class includes all sites with average land slopes greater than 29% and not in the TP High-Volcanic site class.
TN Flat - TN Flat sites have average catchment land slopes less than 15%
TN Moderate - TN Moderate sites have average catchment land slopes from 15% to 32%
TN Steep - TN Steep sites have average catchment land slopes greater than 32%

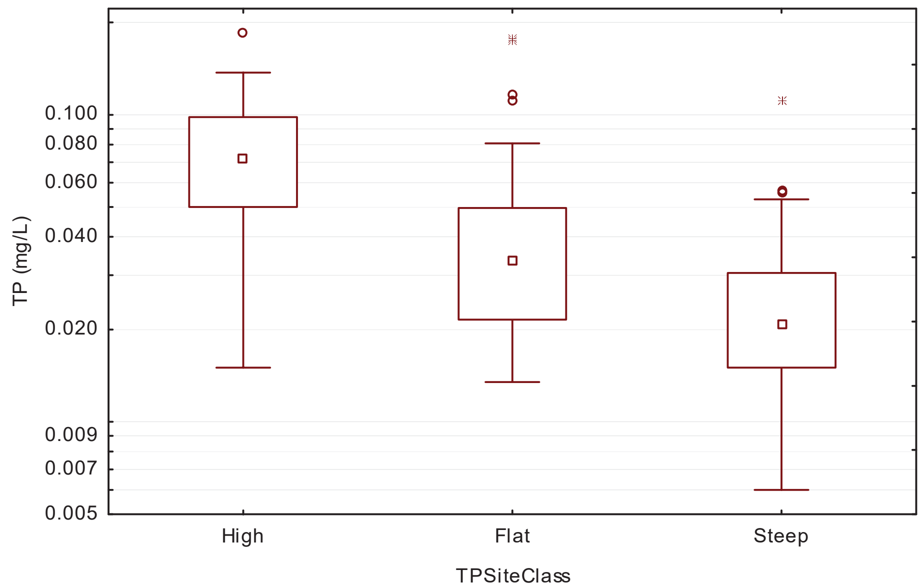


Figure 8. Total Phosphorus (TP) concentrations in reference or near-reference sites by potential site classes for TP. Sample sizes are 55, 76, and 48, in the order displayed.

Nitrogen

Similar to phosphorus, total nitrogen values were first partitioned by longitude in the CART models both with and without categorical variables (Figure 9). Importance coefficients in the random forest analysis were as follows: longitude (1.92), land slope (1.76), precipitation (1.57), latitude (1.44), and temperature (1.28). Before the tree was pruned to avoid over-fitting, land slope, longitude, and precipitation appeared in additional branches to further classify the 131 western warmer sites.

The split for longitude was at -105.2, with higher TN values in the east (Figure 10). Eastern ecoregions include the Southwestern Tablelands, High Plains, eastern portion of the Chihuahuan Desert, and small parts of Southern Rockies and Arizona/New Mexico Mountains. Of the 32 eastern reference sites, 25 were in the Southwestern Tablelands, 5 were in the Southern Rockies, and 2 were in the Arizona/New Mexico Mountains. The 5 Southern Rockies sites had TN values that were similar to other Southern Rockies sites that were just west of the longitudinal threshold. Because the ecoregions align with the longitudinal threshold and make more ecological sense in explaining nutrient conditions than a line of longitude, the 'Eastern' sites were defined by ecoregion, including Southwestern Tablelands and the eastern portion of the Chihuahuan Desert (east of longitude -105). The High Plains would be included in the Eastern class if samples were collected there, but they weren't.

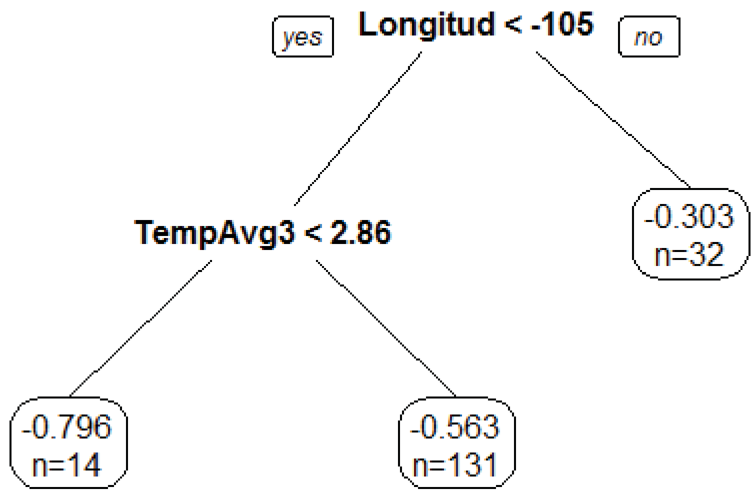


Figure 9. Classification and Regression Tree (CART) for average Total Nitrogen (TN). At the first split, 145 of 177 reference and near-reference sites west of longitude -105.2 were partitioned to the left of the tree. An additional split was based on air temperature. At the end of each branch the average TN concentration (log mg/L) and number of sites are displayed.

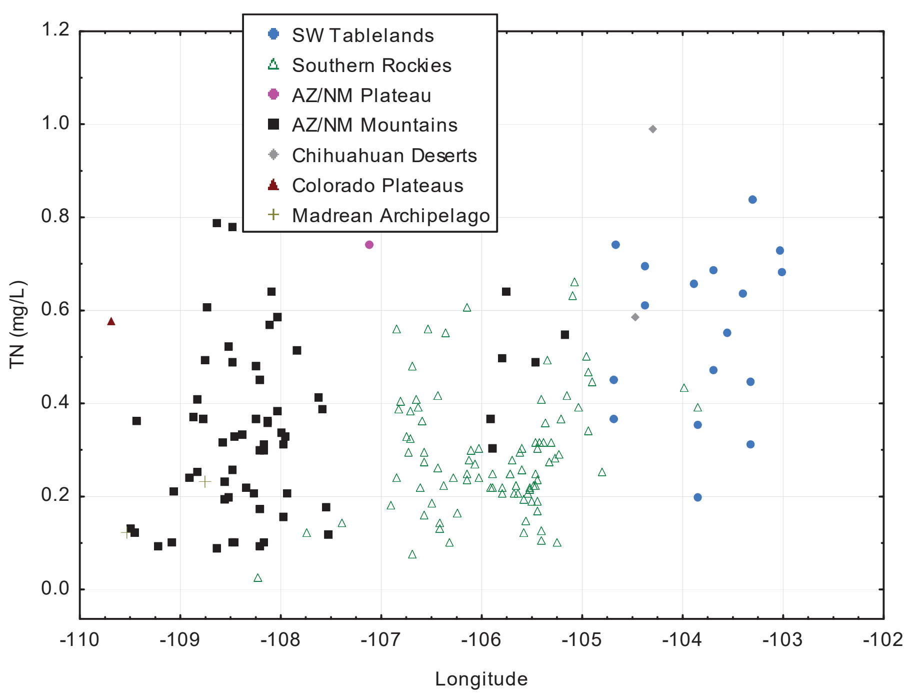


Figure 10. Total Nitrogen (TN) average values per reference or near-reference site in relation to longitude, showing the dominant ecoregion of the site catchment.

Cross validation indicated overfitting after the second split in the CART analysis, which included average air temperature splitting the western group. The air temperature split resulted in a small (N = 14) low temperature group with low TN. The random forest analysis showed that importance was lower for temperature compared to other variables and this small group was not valid as a site class.

Land slope was explored as a classification variable because it was important in the random forest analysis. A CART analysis with all sites forcing only land slope in the model resulted in 2 splits at 15% and 32%. The flattest landscapes were mostly associated with eastern sites, though some western sites had flat slopes and similar TN values to the eastern sites with flat slopes (Figure 11). The eastern streams in the moderate slope category had TN values in the same range as western streams in that slope category. In the steep category, there were three notable outliers with higher TN values that could not be explained by the classification variables (77Diamon033.2, 57RBonit061.1, and 77Turkey001.8).

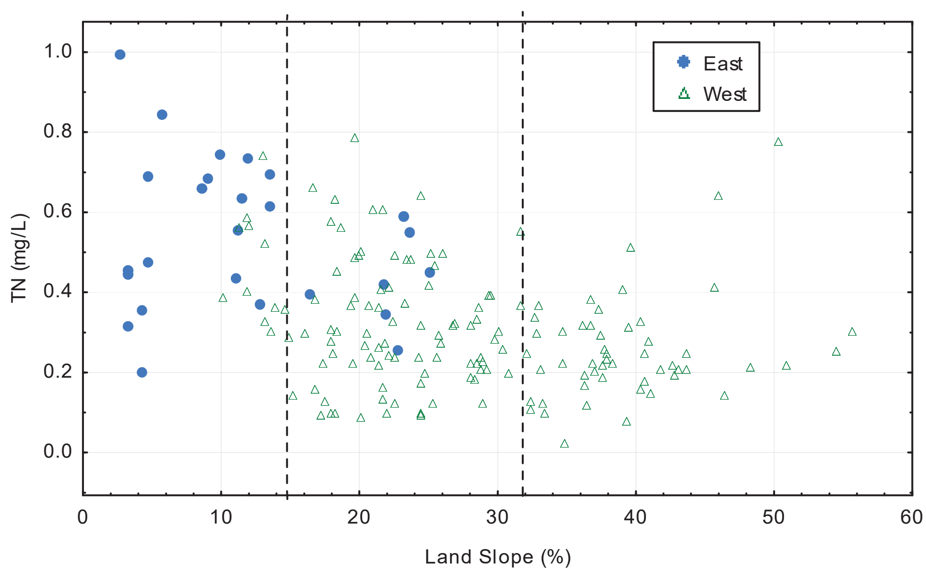


Figure 11. Total Nitrogen (TN) in relation to land slope, showing east and west designations derived from the first CART split (longitude -105).

The western streams with the flattest landscapes were represented by only 12 sites. Because this is a small group and because land slope appears to partition TN values as well as or better than longitude and land slope, classes were based on land slope alone. Thresholds of 15% and 32% defined TN Flat, TN Moderate, and TN Steep classes, regardless of longitude (Table 11). This classification scheme resulted in distinct TN values within the classes (Figure 12). The TN values were significantly different based on the non-parametric Kruskal-Wallis test. The differences in relation to the Flat class ($p<0.001$) were greater than the difference between the Moderate and Steep groups ($p=0.03$).

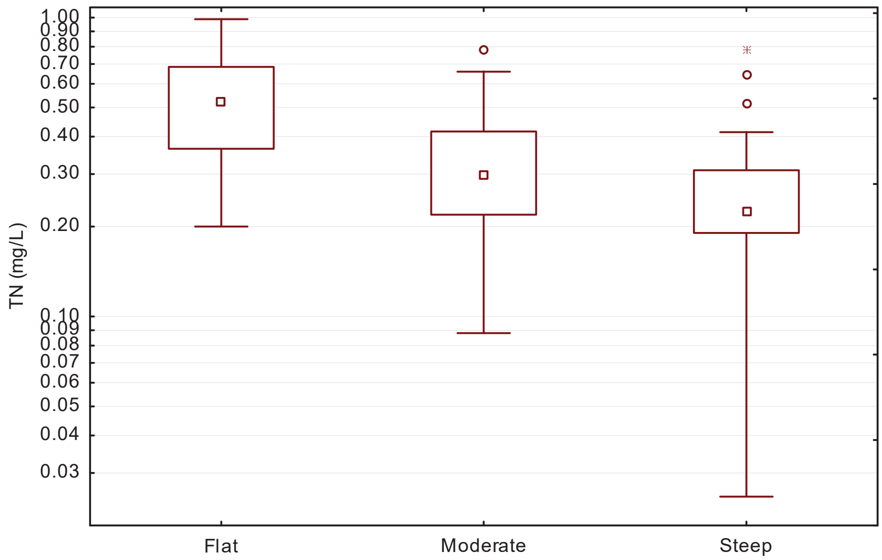


Figure 12. Total Nitrogen (TN) concentrations in reference and near-reference sites by potential site classes. Sample size for TN Flat, TN Moderate, and TN Steep site classes are 31, 95, and 51, respectively.

Considerations for application

NO_3NO_2 was suspected to be dominant in the sites with high TN concentrations. However, this was not necessarily true. In the steep TN class, both NO_3NO_2 and TKN had reference and near-reference concentrations generally below 0.20 mg/L. In the TN Flat class, TKN was higher (upper quartile = 0.56 mg/L in reference and near-reference sites) while NO_3NO_2 was still low (generally below 0.20 mg/L).

Different site classes for TN and TP were not anticipated when classifying sites to partition nutrient variability. In the independent analyses for each nutrient, similar classification variables, longitude and land slope, were identified. Though identical site classes for TN and TP were attempted (Appendix G), the nutrient specific classes were more precise and are appropriate for application of nutrient thresholds.

Maps of the site classes show that land slopes are variable within the ecoregions (Figures 13 and 14). For TP (Figure 13), most of the TP Steep sites are in the eastern arm of the Southern Rockies (Sangre de Cristo Mountains). TP Steep sites are also found in the Black Range and Sacramento Mountains of the Arizona/New Mexico Mountains ecoregion. The TP High-Volcanic sites are mostly in the San Francisco Mountains northwest of Silver City. The TP Flat-Moderate sites are throughout the state. For TN (Figure 14), the TN Steep sites are in the same general area as the TP Steep sites, except that the TN Steep sites extend further west in the San Francisco Mountains where they are recognized as the TP High-Volcanic class for TP. The TN Flat sites (<15% land slopes) are mostly in the xeric ecoregions.

NMED EXHIBIT 25

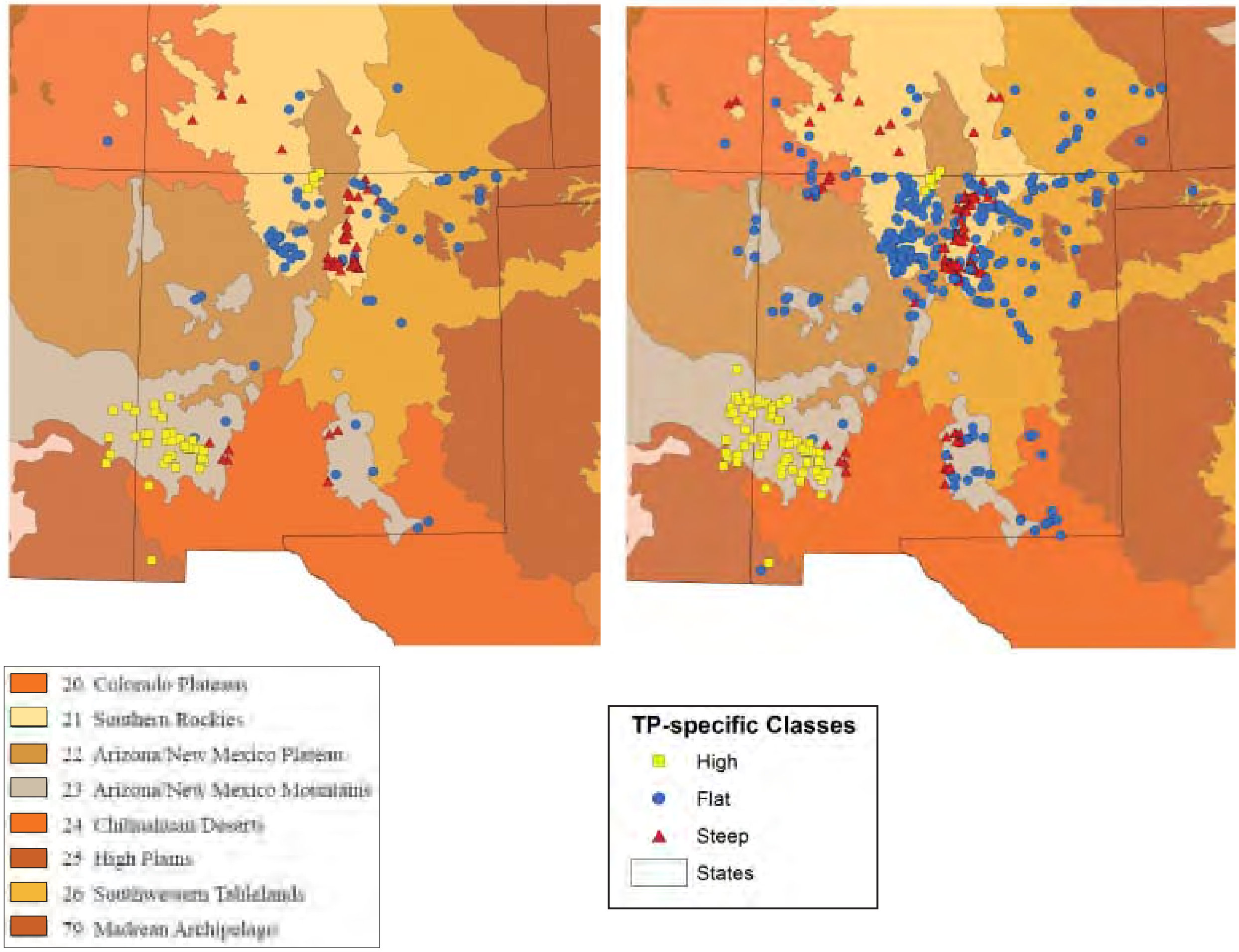


Figure 13. . Sites in the ecoregions of New Mexico showing reference and near-reference sites (left) and all sites (right), marked by the TP-specific site classes.

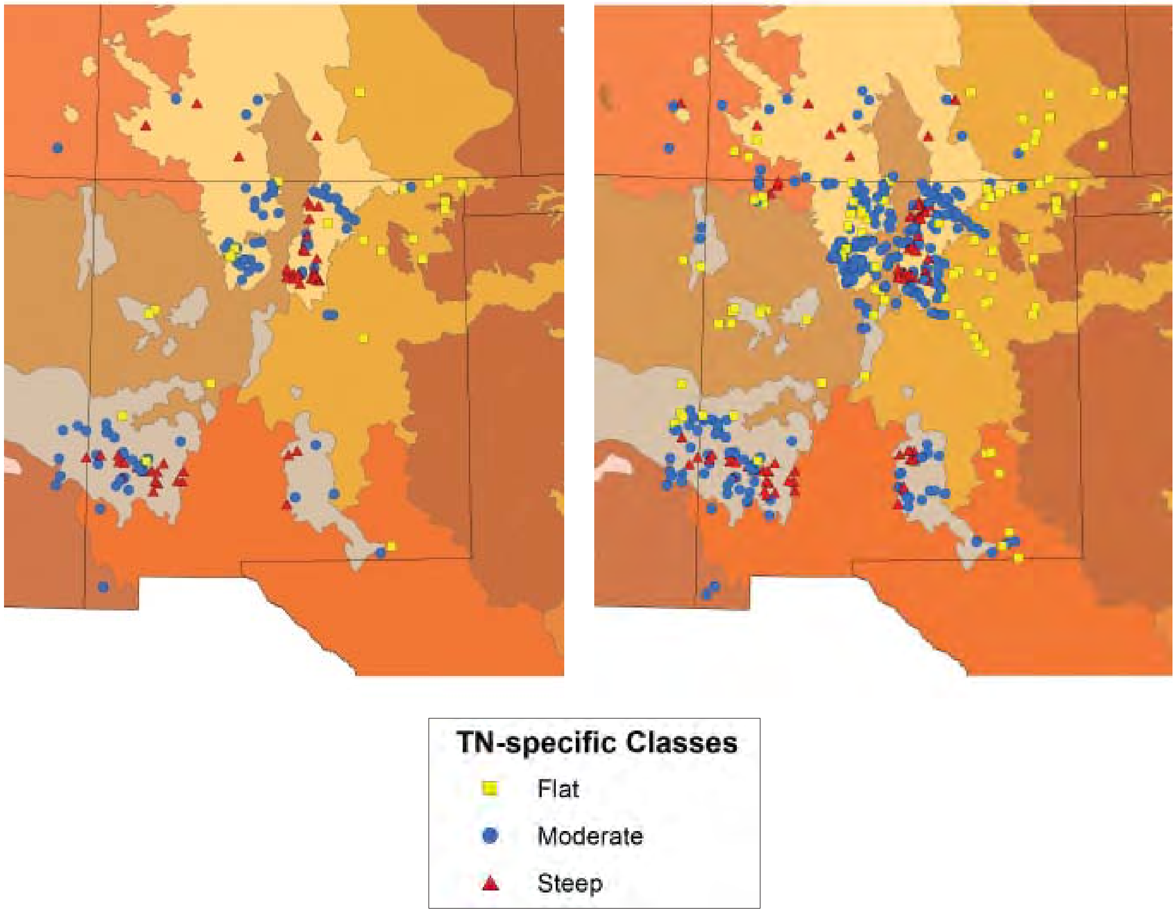


Figure 14. Sites in the ecoregions of New Mexico showing reference and near-reference sites (left) and all sites (right), marked by the TN-specific site classes. Ecoregions are as in Figure 13.

4.2 Frequency Distributions

The reference condition analysis resulted in quantiles from frequency distributions that were considered as candidate thresholds for TN and TP in data subsets by site class. Within sites, the long term medians of TN and TP concentrations were used instead of an average to reduce the influence of temporary extreme values. Benthic chl-a concentrations were evaluated in the TP classes and had only one observation per site. Among sites and within site classes, the median, 75th, 80th, 85th, and 90th quantiles of the concentrations were presented to characterize the reference and near-reference sites (combined) (Table 12). NMED chose to emphasize the 90th quantile to represent candidate thresholds for nutrients. Quantile selection for candidate threshold determination is dependent upon the data, and the certainty one has that they accurately reflect reference conditions. The quantile selected must be protective of the designated uses. The U.S. EPA generally recommends using the 75th quantile of reference sites (USEPA 2000). For this analysis, there was a high level of certainty in reference site selection.

The 75th quantile of median site values was considered and rejected because this value did not include naturally enriched systems in the reference data set. In addition, the 90th quantile was more closely aligned with the benthic macroinvertebrate and diatom change point analyses, and is hence assumed protective of the applicable designated aquatic life use(s). Therefore, the 90th quantile was preferred to represent candidate thresholds in New Mexico streams.

Table 12. Frequency distribution statistics for median TP, TN, and benthic chl-a concentrations in valid reference and near-reference sites. The preferred candidate threshold (90th quantile) is shown in bold-type.

	TP (mg/L)			TN (mg/L)			Chl-a (ug/cm^2)		
Quantile	Lower 90% CI	Value	Upper 90% CI	Lower 90% CI	Value	Upper 90% CI	Lower 90% CI	Value	Upper 90% CI
	TP High-Volcanic (N=55)			TN Flat (N=30)			TP High-Volcanic (N=25)		
50th	0.049	0.058	0.071	0.38	0.47	0.56	1.05	2.41	3.52
75th	0.072	0.084	0.09	0.55	0.61	0.67	2.74	4.41	6.01
80th	0.08	0.088	0.104	0.56	0.62	0.7	3.21	5.00	6.65
85th	0.084	0.092	0.106	0.59	0.65	0.84	3.7	5.66	8.5
90th	0.089	**0.105**	0.114	0.62	**0.69**	0.85	4.38	6.39	11.9
	TP Flat-Moderate (N=76)			TN Moderate (N=96)			TP Flat-Moderate (N=42)		
50th	0.016	0.025	0.033	0.23	0.25	0.28	1.64	2.24	3.18
75th	0.034	0.041	0.05	0.33	0.35	0.37	3.24	4.93	14.95
80th	0.036	0.048	0.058	0.35	0.37	0.41	3.98	8.06	19.03
85th	0.043	0.054	0.061	0.36	0.40	0.45	4.09	15.68	24.15
90th	0.051	**0.061**	0.069	0.38	**0.42**	0.51	8.38	20.98	25.67
	TP Steep (N=48)			TN Steep (N=53)			TP Steep (N=14)		
50th	0.015	0.015	0.015	0.18	0.20	0.21	0.73	1.66	3.31
75th	0.015	0.015	0.018	0.21	0.23	0.27	1.74	3.33	13.53
80th	0.015	0.016	0.023	0.22	0.25	0.3	1.89	7.29	17.47
85th	0.015	0.018	0.035	0.24	0.28	0.33	2.42	13.22	23.86
90th	0.016	**0.030**	0.053	0.26	**0.30**	0.34	2.91	13.51	23.86

To illustrate the validity of using reference quantiles to derive thresholds for the New Mexico data sets, distributions of TP, TN and benthic chl-a were plotted by site class and reference status (Figures 15-23). For TN and TP, reference distributions were similar to near-reference distributions within each site class. Nutrient concentrations generally increased with increasing disturbance. The stressed site distributions were similar to the reference distributions only for TP in the TP High-Volcanic site class (Figure 15). Stressed and Highly Stressed categories included only 3 and 2 sites, respectively. In the other classes, the stressed and extremely stressed sites had at least 50% of the values greater than the 75th quantile of the reference and near-reference site values. For benthic chl-a (Figures 21-23), median values in Stressed and Highly Stressed categories were consistently higher than medians in Reference and Near-Reference categories, though the stressed categories were represented by fewer than five samples in all but the TP Flat-Moderate class.

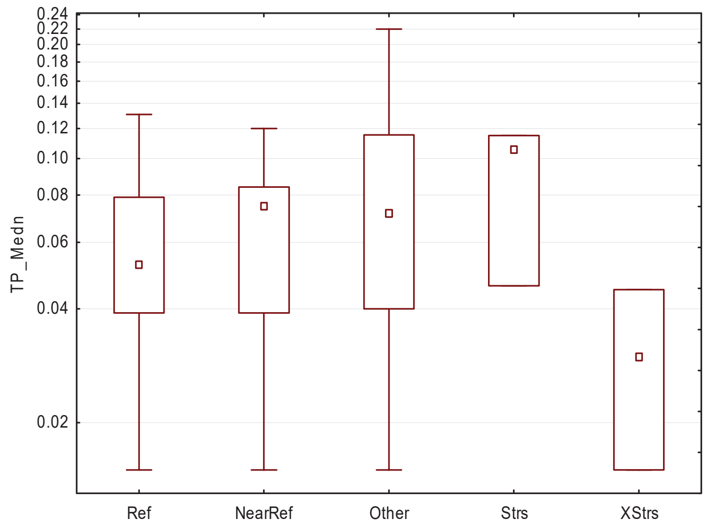


Figure 17. Site median TP value distributions along the disturbance gradient for sites in the TP High-Volcanic site class.

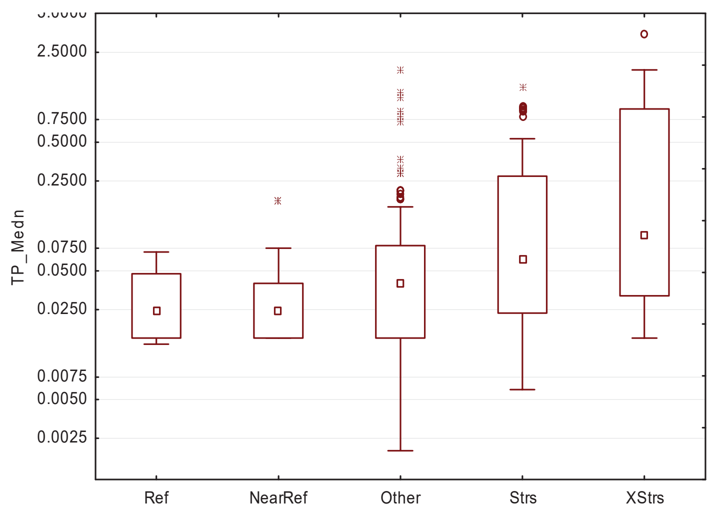


Figure 16. Site median TP value distributions along the disturbance gradient for sites in the TP Flat-Moderate site class.

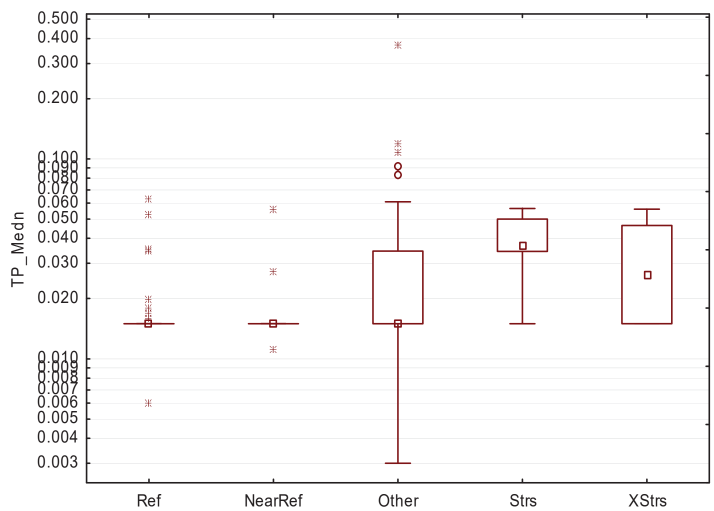


Figure 15. Site median TP value distributions along the disturbance gradient for sites in the TP Steep site class.

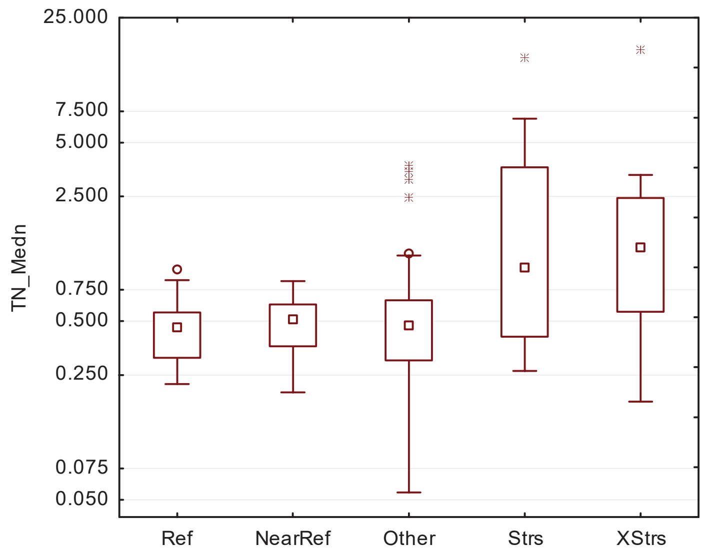


Figure 18. Site median TN value distributions along the disturbance gradient for sites in the Flat site class.

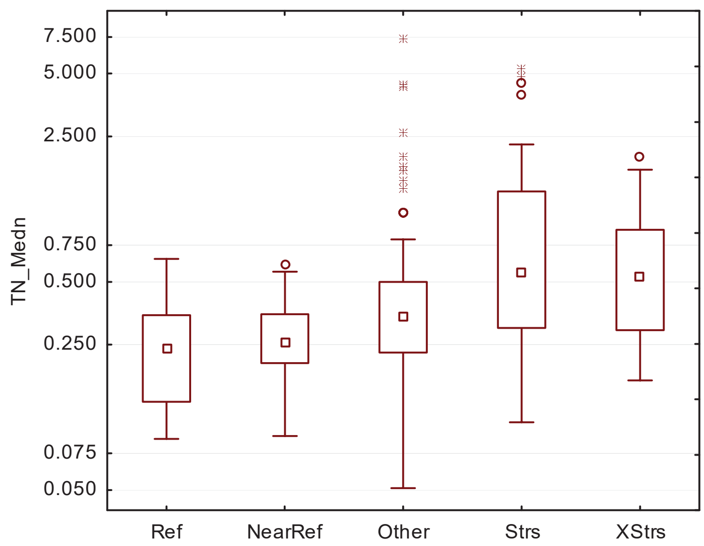


Figure 19. Site median TN value distributions along the disturbance gradient for sites in the Moderate site class.

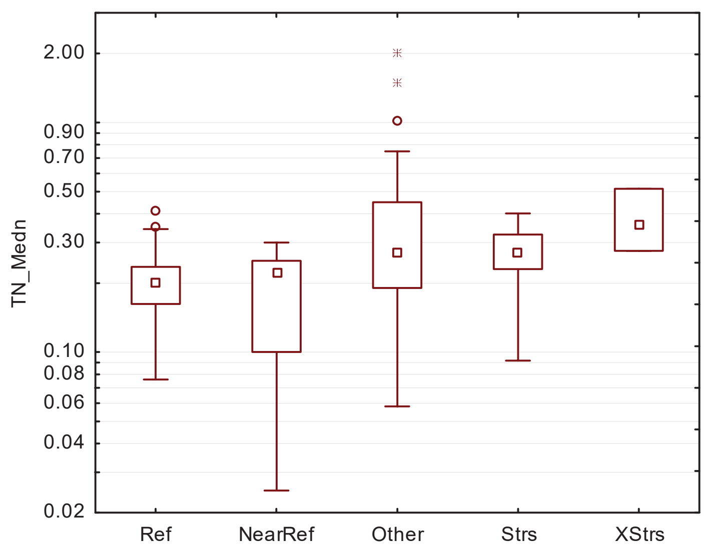


Figure 20. Site median TN value distributions along the disturbance gradient for sites in the Steep site class.

NMED EXHIBIT 25

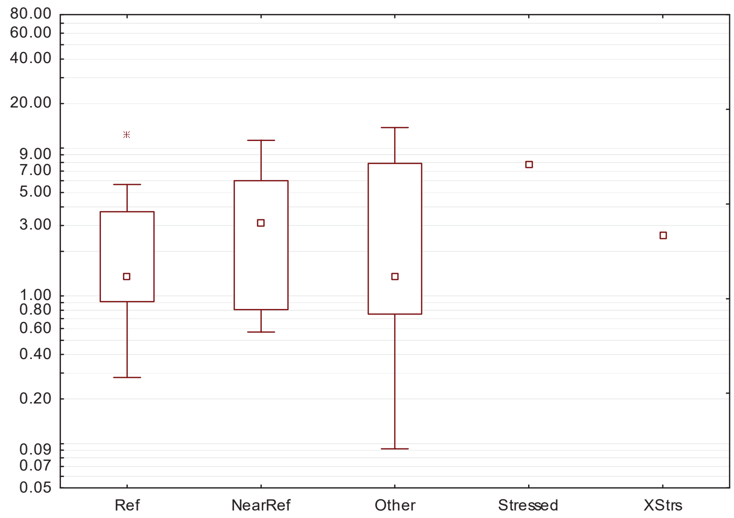


Figure 21. Chl-a distributions along the disturbance gradient for sites in the TP High Volcanic site class.

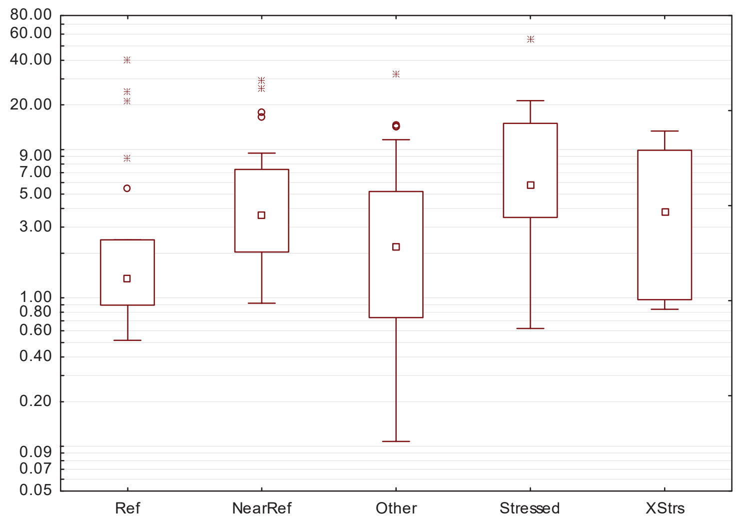


Figure 22. Chl-a distributions along the disturbance gradient for sites in the TP Flat-Moderate site class.

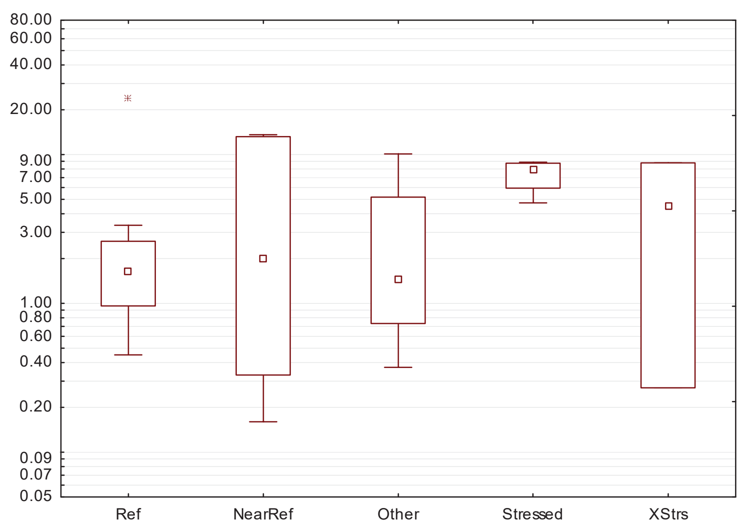


Figure 23. Chl-a distributions along the disturbance gradient for sites in the TP Steep site class.

NMED EXHIBIT 25

Quantiles of DeltaDO and Pmax4hr diel DO measures in reference and near-reference sites were similar in the High-Volcanic and TP Flat site classes and were relatively lower in the TP Steep site class (Table 13). DeltaDO and Pmax4hr increased with increasing stress in the streams, especially in the TP Flat site class (Figure 24).

Table 13. Frequency distribution statistics for diel DO statistics in valid reference and near reference sites. The preferred candidate threshold (90th quantile) is shown in bold-type.

Delta DO	High-Volcanic			Flat			Steep		
Statistic	50th	75th	90th	50th	75th	90th	50th	75th	90th
lower 90% CI	1.93	2.17	3.13	1.22	2.28	3.52	1.10	1.10	1.40
quantile	2.17	3.27	**5.02**	1.82	3.06	**4.08**	1.13	1.57	**1.79**
upper 90% CI	3.03	4.29	7.24	2.50	3.98	7.26	1.57	2.37	2.37
Prod4hr	High-Volcanic			Flat			Steep		
Statistic	50th	75th	90th	50th	75th	90th	50th	75th	90th
lower 90% CI	0.176	0.331	0.460	0.148	0.296	0.493	0.095	0.105	0.126
quantile	0.304	0.501	**0.635**	0.208	0.501	**0.682**	0.105	0.186	**0.284**
upper 90% CI	0.439	0.648	0.720	0.393	0.678	1.200	0.196	0.490	0.490

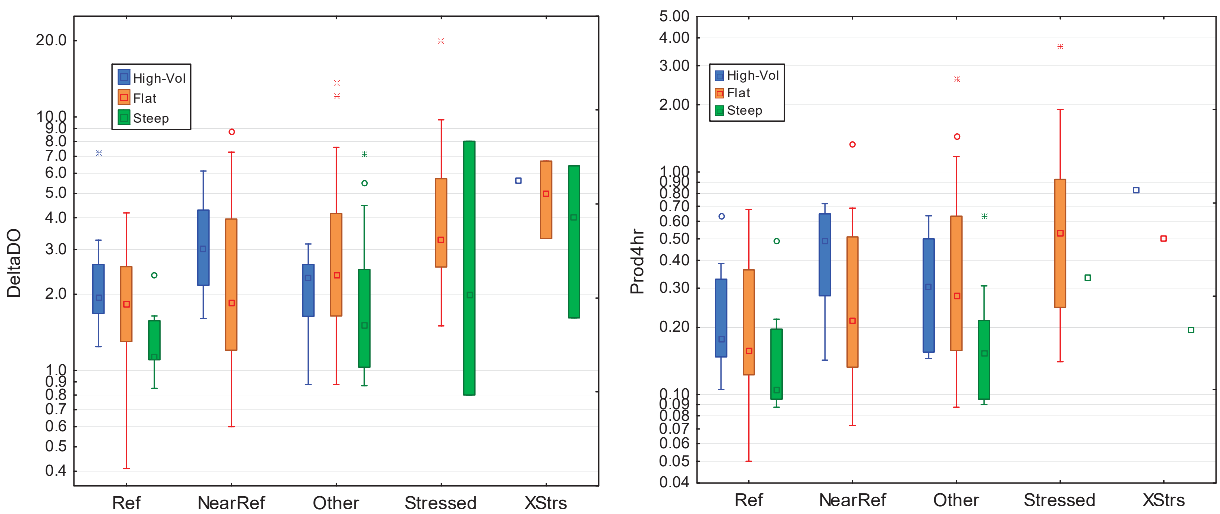


Figure 24. Distributions of Delta DO and maximum 4-hour productivity in disturbance categories and TP site classes.

NMED EXHIBIT 25

4.3 Correlations and Interactions

The site classes were a good starting point for developing nutrient expectations though there was variability remaining within the site classes. To strengthen understanding of the primary linkages in the conceptual model (nutrients - chl-a, chl-a - DO dynamics, nutrients - diatom metrics, and DO - macroinvertebrate metrics), each relationship was explored in further detail to determine whether consistent modifiers could be factored out to refine the general relationship. The explorations included correlation analysis, multiple regression, CART, random forest, and graphic displays. Nutrient concentrations collected within 30 days of the response variable were averaged. Censored data were assigned a value of half the detection limit and retained for these analyses.

Distributions statistics for TN, TP and frequently collected water quality variables (grab samples) characterize the perennial wadeable streams in New Mexico (Table 14). The water quality variables include NO3NO2, TKN, pH, conductivity (EC), turbidity, temperature, and DO. Spearman rank correlation analysis for TN and TP and water quality variables shows positive relationships between the nutrients and between nutrients and other water quality measures (Table 15). Positive correlations with pH and EC were stronger for TN than for TP. DO and pH were positively correlated with each other over all sites ($r = 0.22$, $p<0.05$) and in all site classes. Turbidity and temperature had stronger correlations with TP than with TN. The correlation between DO at the time of sampling was negative with TP and positive with TN. Diel DO measures were examined in a subset of sites (see Section 4.3.2). Diel DO measures are more reliable for correlation analysis because they not subject to the high daily variations that are inherent to instantaneous grab data.

Table 14. Distribution statistics for nutrients and water quality variables in stream sites.

	Valid N	Minimum	Lower Quartile	Mean	Median	Upper Quartile	Maximum
TN (mg/L)	538	0.03	0.22	0.59	0.33	0.54	16.44
TP (mg/L)	542	0.002	0.015	0.099	0.036	0.072	3.420
NO3NO2 (mg/L)	441	0.05	0.05	0.31	0.07	0.16	14.00
TKN (mg/L)	444	0.05	0.17	0.41	0.27	0.49	6.55
pH (su)	476	5.6	7.8	8.0	8.1	8.3	10.7
EC (uS/cm)	476	32	159	653	318	656	9195
Temperature (°C)	477	3.9	11.8	15.0	14.7	17.8	63.5
DO (mg/L)	439	3.6	8.0	8.6	8.7	9.2	17.7
Turbidity (NTU)	472	0.0	1.1	20.2	4.2	13.2	1184

Table 15. Spearman rank correlation coefficients for nutrients and water quality variables in all sites and in site classes. Significant correlations (p<0.05) are marked with an asterisk (*).

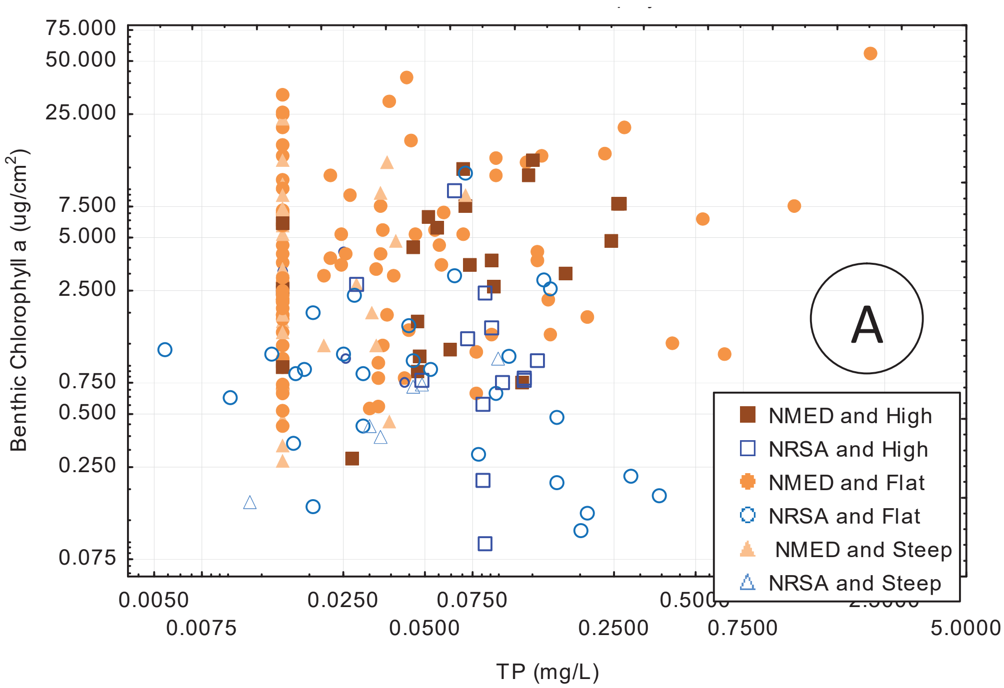
Nutrient	Data SubSet	TN	TP	NO3NO2	TKN	pH	EC	Turb	Temp	DO
TP	All Classes	0.39*		0.13*	0.54*	0.12*	0.13*	0.48*	0.24*	-0.23*
	TP High Volc.	0.38*		0.35*	0.51*	0.05	0.32*	0.28*	-0.01	-0.04
	TP Flat&Mod.	0.45*		0.17*	0.55*	0.18*	0.09	0.61*	0.13*	-0.26*
	TP Steep	0.30*		0.06	0.39*	0.08	0.06	0.41*	0.17	-0.13
TN	All Classes		0.39*	-0.09	0.42*	0.57*	0.76*	0.28*	0.05	0.54*
	TN Flat		0.40*	0.04	0.26*	0.64*	0.88*	0.06	0.13	0.53*
	TN Mod.		0.37*	-0.16*	0.40*	0.57*	0.75*	0.24*	0.02	0.45*
	TN Steep		0.36*	0.02	0.22*	0.72*	0.47*	0.06	0.04	0.37*

4.3.1 Chlorophyll a

A Spearman rank-order correlation analysis was conducted with TN and TP against benthic and sestonic chl-a concentrations. For benthic chl-a, a total of 192 valid samples from NMED and NRSA sites were included in the analysis. On average, NRSA benthic chl-a concentration was less than NMED chl-a (Figure 25) as NMED used a targeted richest habitat sampling, so the data were analyzed separately by source. Of all the Spearman correlations, only TP and chl-a in NMED TP High-Volcanic and all sites were significantly correlated (Table 16).

Table 16. Sample sizes (N) and Spearman rank correlation coefficients (rho) for benthic chl-a by nutrient and site class. Significant correlations (p<0.05) are marked with an asterisk (*).

	NMED		NRSA	
TP (Site Classes)	N	rho	N	rho
All sites	140	0.17*	50	-0.16
TP High-Volcanic	23	0.48*	13	-0.29
TP Flat-Moderate	90	0.16	28	-0.29
TP Steep	27	0.05	7	0.94
TN (Site Classes)				
All sites	142	0.02	50	0.09
TN Flat	26	0.04	24	0.28
TN Moderate	94	-0.04	21	0.13
TN Steep	22	-0.04	5	N/A



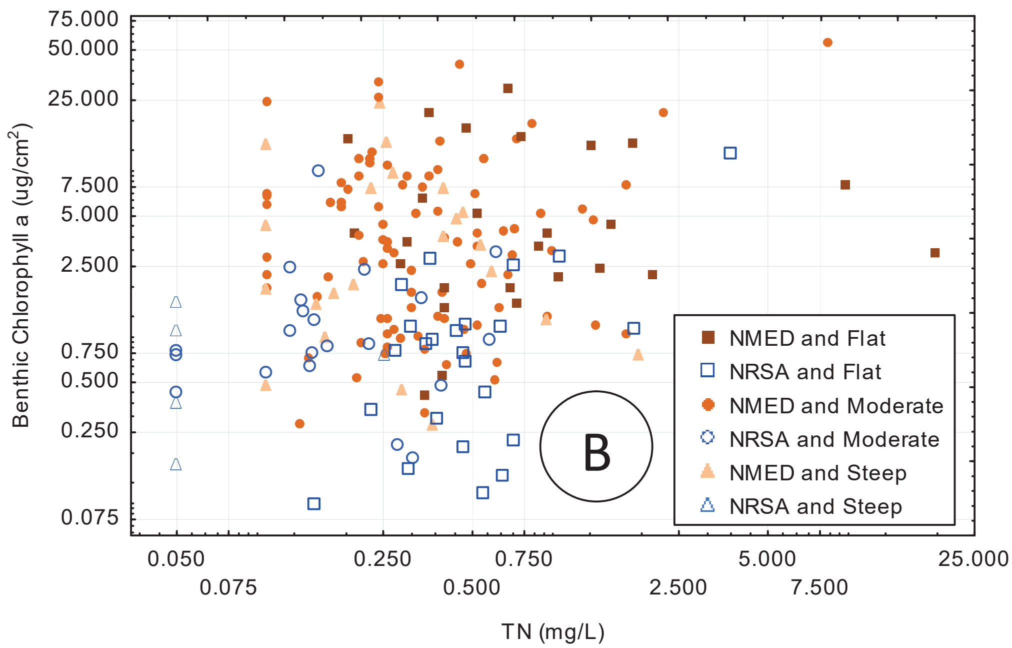


Figure 25. Benthic chl-a in relation to TP and TN, showing site classes and sources.

NMED EXHIBIT 25

Positive correlations were expected between nutrients and benthic chl-a. However, a number of biotic and abiotic variables influence algal biomass accrual (Marks et al 2000). For example, hydrologic disturbances have a strong influence on algal biomass (Biggs 2000; Peterson et al. 1994). Other modifying factors that might be confounding the assumed relationship between nutrients and benthic chl-a were investigated, including canopy cover, stream flow, elevation, land use types, drainage area, latitude, longitude, conductivity, temperature, pH, and turbidity. However the dataset did not have sufficient information to account for canopy cover and stream flow influences.

Greater canopy cover (reducing light in the stream) was expected to be associated with less benthic chl-a. Canopy cover was available in all NRSA sites and few NMED sites. Mountain, foothill, and xeric sites were analyzed independently because of differences in vegetation among those regions that could affect canopy cover. Contrary to expectations, canopy cover was positively correlated to benthic chl-a in xeric and foothill sites (Spearman rho = 0.24 and 0.42, respectively), though the coefficients were not significant ($p>0.05$).

Without canopy cover data for all sites, catchment size was considered as a possible surrogate for canopy cover, assuming that larger streams would have more open canopies. Catchment size was compared to canopy cover in 38 NRSA sites. Canopy was negatively correlated to catchment size in all NRSA sites (Spearman rho = -0.16) and in mountain sites (Spearman rho = -0.29), although none of the correlation coefficients were significant ($p>0.05$). In the foothills the correlation was positive (Spearman rho = 0.20) and in the xeric areas there was almost no relationship (Spearman rho = -0.04). Because these relationships were weak, variable, and not significant, catchment size was not used as a surrogate for canopy cover.

Additional explorations of modifying factors for the relationship between nutrients and benthic chl-a are described here and detailed in Appendix H. In multiple regression and random forest analyses, benthic chl-a was related to conductivity, TP, elevation, drainage area, latitude, longitude, and pH. Of the variables considered (lacking hydrology and groundwater information), conductivity was consistently the most important predictor of benthic chl-a. Conductivity could be a stressor related to intensive land uses and not a valid classification variable. However, it might be related to natural geological and groundwater inputs. Relationships between benthic chl-a, conductivity, and covariates of conductivity (catchment size, land use types, elevation, latitude and longitude) were further investigated. Hydrologic conditions and evidence of groundwater influences were not available in enough sites to be used in the analysis.

It was determined that conductivity was positively related to catchment size and agricultural uses, though the agricultural and urban uses never amounted to any large percentages of the catchments. Elevation, percent forest cover, and longitude were more important predictors of conductivity than land uses. Conductivity was lowest in small forested catchments. Conductivity might be related to hydrology also, but flow data were sparse and were not tested. Although conductivity appears to have natural sources, when it was accounted for as a natural factor affecting benthic chl-a concentrations, remaining relationships between nutrients and benthic chl-a were not significant. Variability of chl-a within sites also affects the ability to explain benthic chl-a in terms of site characteristics.

Water Column Chl-a

Correlations between nutrients and water column (sestonic) chl-a were positive in the NRSA data set for data pooled across site classes (Table 17, Figure 26). Within the site classes, significant correlations were found in data subsets with more than 15 samples. In a random forest analysis, four variables were more important than TP but less important than TN in classifying sestonic chl-a values, including elevation (Figure 27), conductivity, turbidity, and drainage area. Sestonic chl-a was not significantly correlated with benthic chl-a (Spearman rho = 0.15, p > 0.05) or with instantaneous DO (Spearman rho = -0.16, p > 0.05). Sestonic chl-a data were not available for the NMED sites. High chl-a values (> 10ug/L) were noted for four sites (Table 18).

Table 17. Sample sizes (N) and Spearman rank correlation coefficients (rho) for sestonic chl-a by nutrient and site class. Marked correlations were significant (p<0.05).

TP	N	rho	TN	N	rho
All Sites	44	0.36*	All Sites	46	0.69*
TP High-Volcanic	10	-0.02	TN Flat	23	0.66*
TP Flat-Moderate	27	0.55*	TN Moderate	18	0.62*
TP Steep	7	0.77	TN Steep	5	0.00

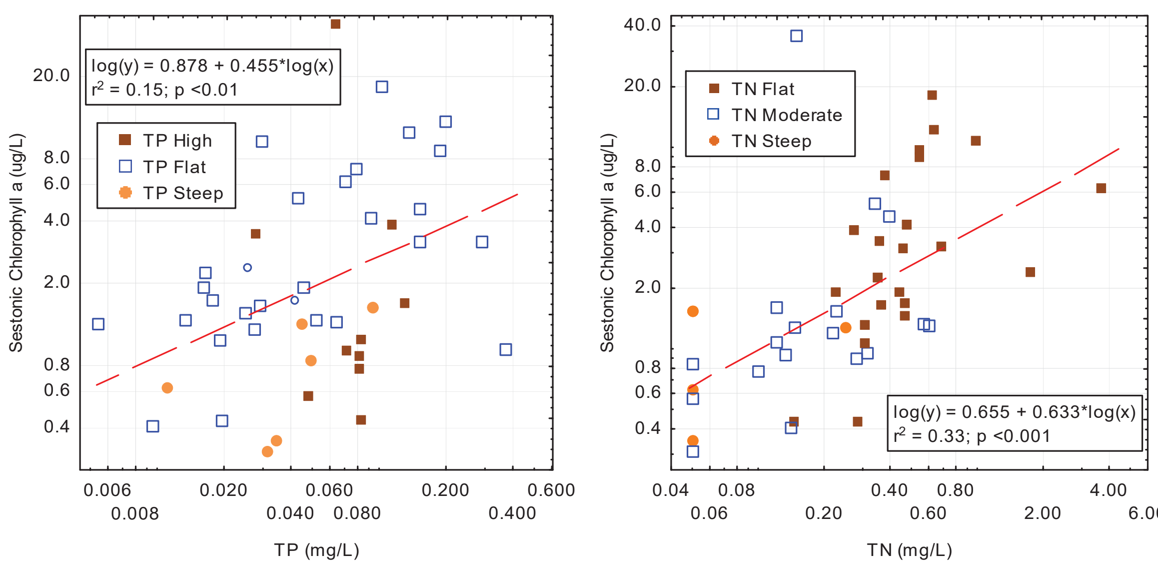


Figure 26. Sestonic chl-a in relation to TP and TN, showing site classes.

NMED EXHIBIT 25

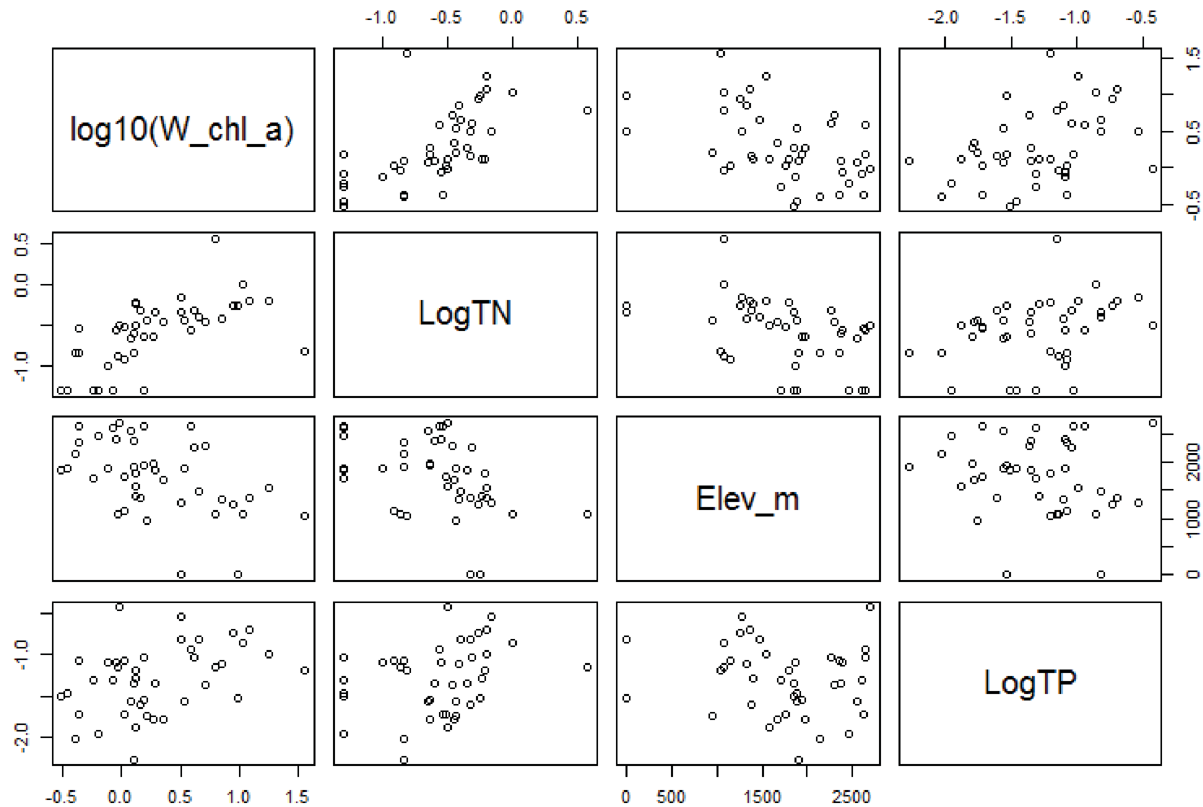


Figure 27. Relationships between sestonic chl-a and TN, elevation, and TP, using NRSA data.

Table 18. Sites with sestonic chl-a > 10ug/L.

Station ID	Stream Name	Sample Date	Chl-a (ug/L)
FW08AZ139	San Francisco River, AZ	5/7/2009	35.64
FW08NM025	Gallinas River, NM	8/2/2008	17.904
FW08NM013	Conchas River, NM	7/31/2008	12.08
FW08CO020	Wolf Creek, CO	7/29/2008	10.624

↑ Nutrients = ↑ Chlorophyll

In the correlation analyses, a positive relationship was found between benthic chl-and TP in the NMED sites. Relationships were not significant (p>0.05) for TN in NMED sites nor for TP or TN in the NRSA sites. Multiple records were at the minimum detection limit for TP. Benthic chl-a was also related to conductivity, which appears to be confounding the nutrient relationships, but once accounted for, the nutrient relationships were not evident. A positive relationship between sestonic chl-a and both TP and TN was apparent.

4.3.2 Dissolved Oxygen

A Spearman rank correlation analysis was conducted with TN, TP, and benthic chl-a against diel DO statistics. There were four record sets with minimum DO greater than 10 mg/L that were removed as outliers. Production (Pmax4hr) and respiration (Rmax4hr) were negatively correlated to each other (Spearman rho = -0.92, $p<0.05$) as were gross primary production (GPP), and ecosystem respiration (ER) (Spearman rho = -0.55, $p<0.05$). TP was positively correlated with productivity measures and maximum daily change in DO (DeltaDO) (Table 19). Both TP and TN were negatively correlated with minimum DO (rho = -0.18, $p<0.05$). TN was also negatively correlated with Rmax4hr and positively correlated with Pmax4hr and DeltaDO ($p=0.06$). Benthic chl-a was positively correlated to DeltaDO, Pmax4hr (Figure 28), and ER. The correlation with ER was expected to be negative, as it was with Rmax4hr. The bi-plots show weak positive relationships between the nutrients and DeltaDO and Pmax4hr (Figures 29 and 30) and weak negative relationships between nutrients and minimum DO (Figure 31).

Table 19. Spearman correlation coefficients for TN, TP, and benthic chl-a versus diel DO statistics; minimum DO (DOmin), maximum daily DO change (Delta DO), 4 hour maximum production (Pmax4hr), 4 hour maximum respiration (Rmax4hr), gross primary production (GPP), and ecosystem respiration (ER). Asterisk (*) denotes significant correlations ($p<0.05$).

	DO_min	DeltaDO	Pmax4hr	Rmax4hr	GPP	ER
TN	-0.18*	0.17	0.17	-0.19*	0.05	0.11
TP	-0.18*	0.30*	0.29*	-0.31*	0.19*	0.01
Benthic chl-a	-0.11	0.28*	0.38*	-0.25*	0.09	0.38*
DO_min		-0.58*	-0.50*	0.45*	-0.31*	0.04
DeltaDO			0.91*	-0.90*	0.53*	0.12
Prod4hr				-0.92*	0.62*	0.08
Resp4hr					-0.62*	-0.06
GPP						-0.55*

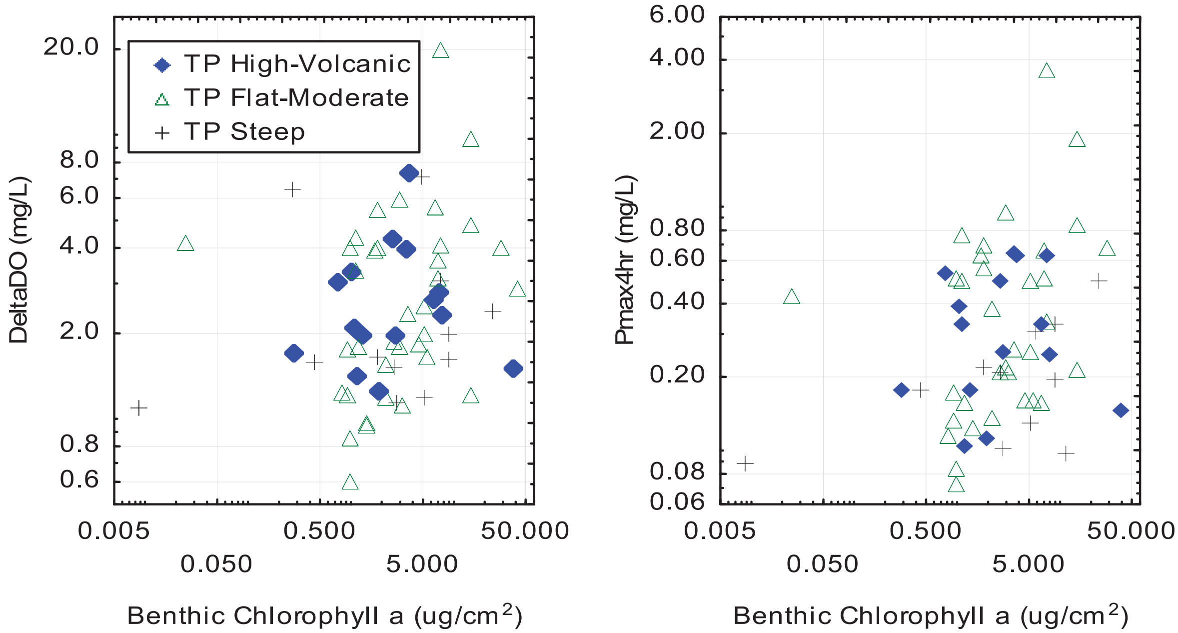


Figure 28. Benthic Chlorophyll a in relation to DeltaDO and Pmax4hr, showing TP site classes.

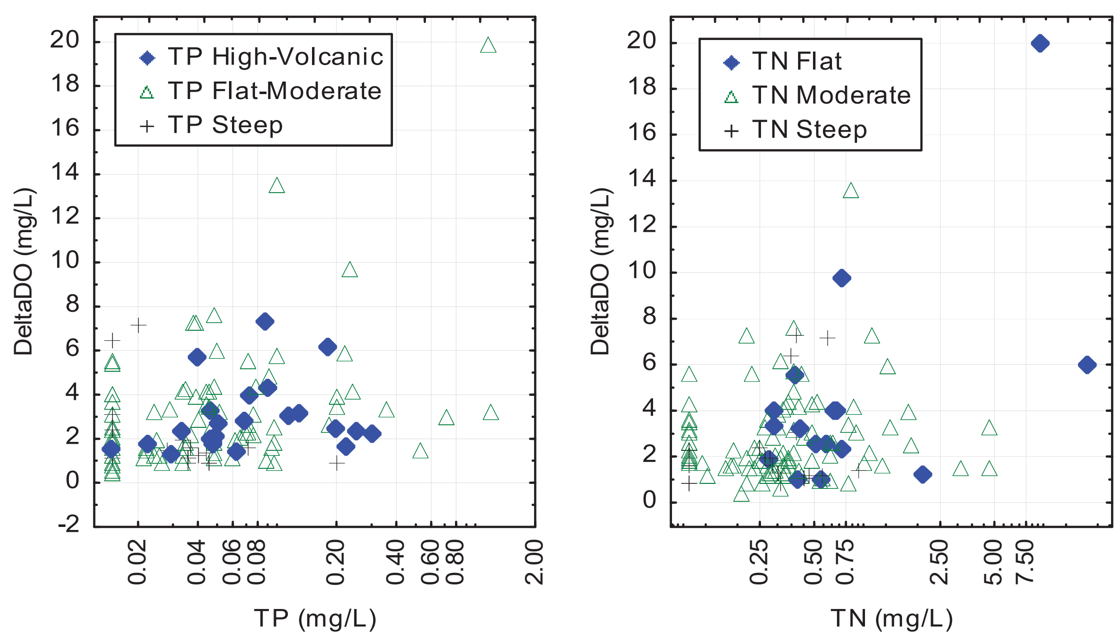


Figure 29. DeltaDO in relation to TP and TN, showing site classes.

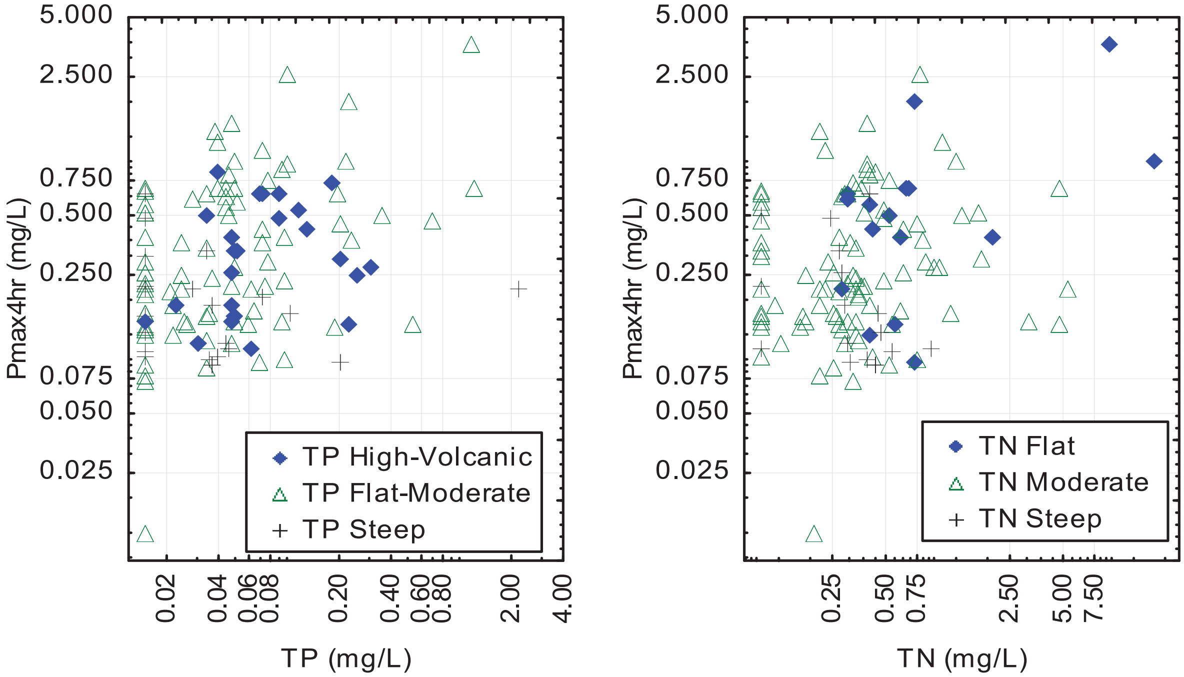


Figure 30. Pmax4hr in relation to TP and TN, showing site classes.

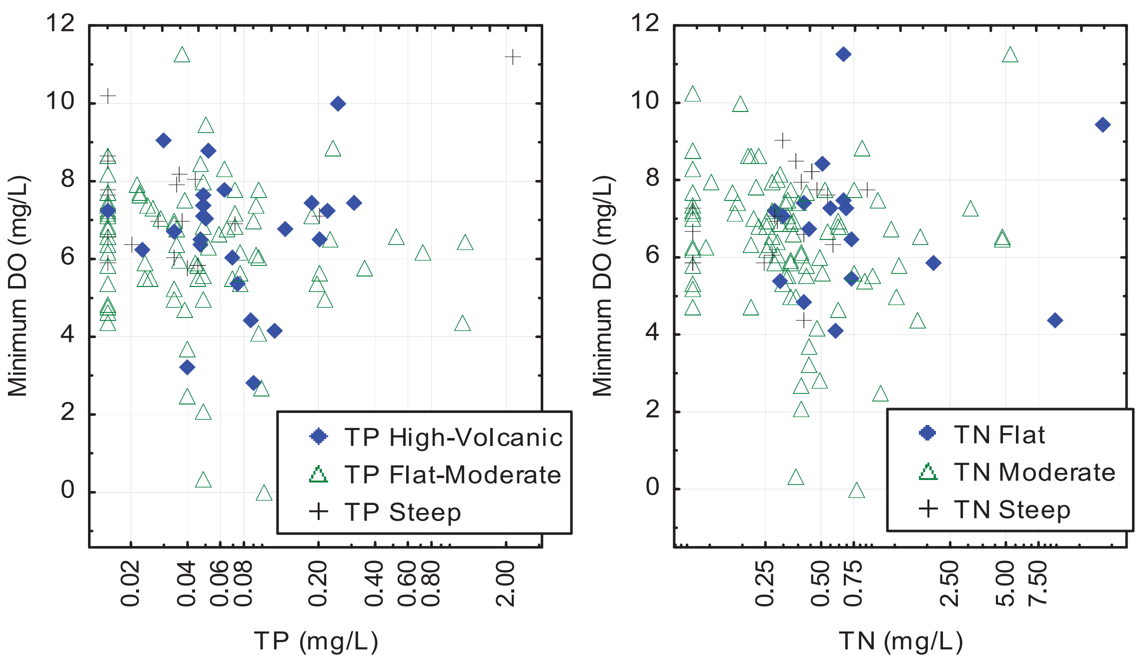


Figure 31. Minimum DO in relation to TP, showing site classes.

NMED EXHIBIT 25

↑ Chlorophyll = Δ DO dynamics

Correlations of TP, TN, and benthic chl-a were positive with Delta DO and Pmax4hr and were negative with minimum DO and Rmax4hr. DeltaDO, Pmax4hr, and minimum DO were emphasized in ongoing DO analyses because of the demonstrated relationships, ability to collect continuous diel data sets using sondes and data loggers, and NMED's use of minimum DO criteria in previous nutrient assessment protocols.

4.3.3 Diatoms

A Spearman rank-order correlation analysis of nutrient values associated with diatom metrics was conducted. Sixty-eight (68) diatom metrics were correlated with TN, TP, and potential modifying factors in 151 NMED sites and 49 NRSA sites. The analysis started with NMED sites only and then addressed NRSA sites and combined data sets. The data in the analysis were limited to one sample per site when nutrient and diatom samples were collected within 30 days of each other. Details of the analysis are in Appendix I.

Diatoms appear to be more sensitive to TP than to TN, based on the number of significant correlations. The fewest significant relationships were between metrics and chl-a. Significant correlations were mostly identified in the TN Flat site class for TN and in the TP Flat-Moderate site class for TP, which had the most samples and broad range of nutrient conditions (Figure 31). This pattern was consistent for both the NMED and the NRSA data sets. TN was positively correlated to conductivity, which was also a good predictor of metric values. Conductivity (or pH or turbidity) was not factored out in the analysis of nutrient-diatom relationships. Based on significant correlations and metric types, eight responsive metrics were selected for continued analysis in stressor-response analyses (Table 20).

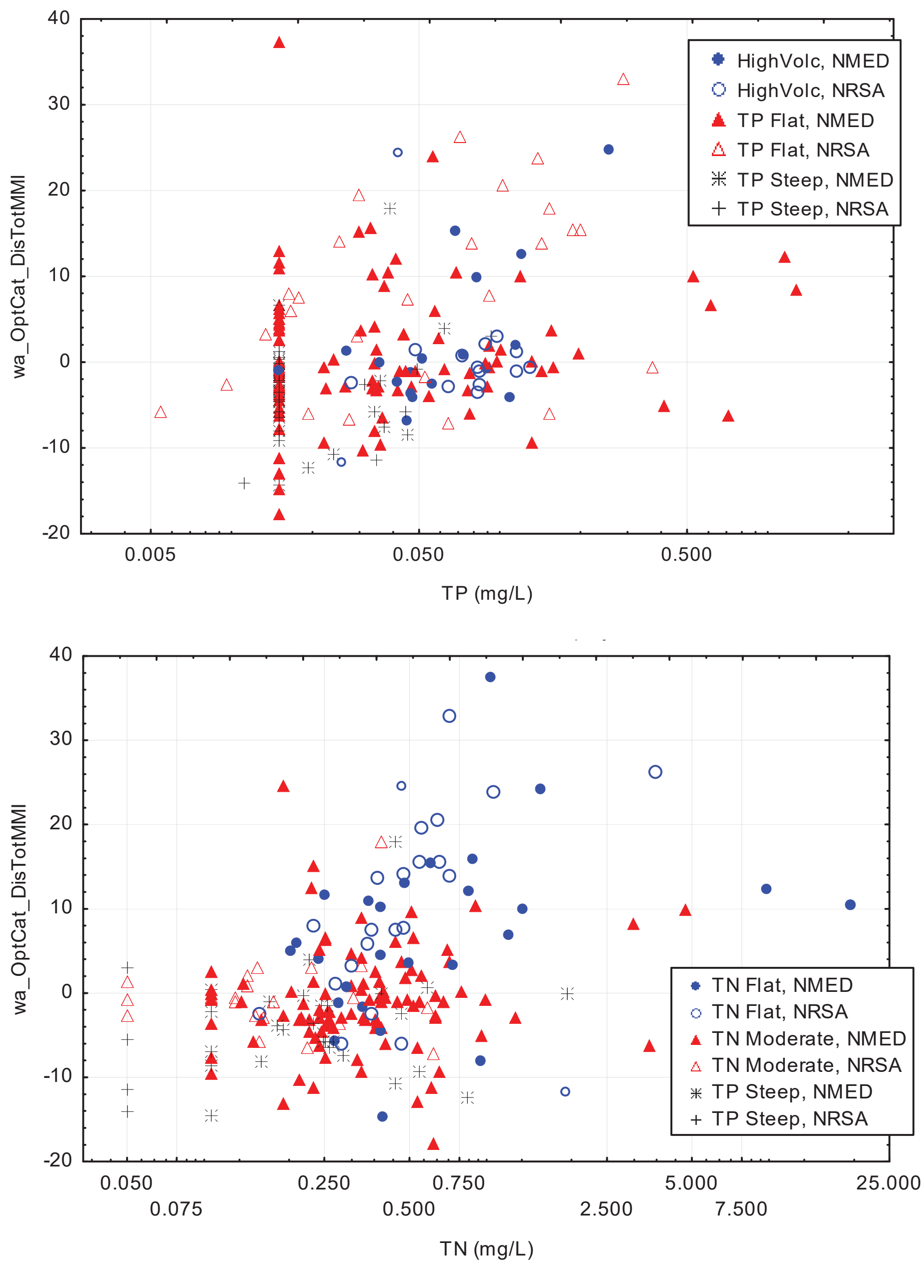


Figure 32. The diatom multi-metric index of disturbance in relation to TP and TN, showing site classes and data sources.

NMED EXHIBIT 25

Table 20. Diatom metrics showing responsiveness in correlation analysis and used in stressor-response analysis.

Metric code	Metric description	Metric type
wa_OptCat_DisTotMMI	Multi-metric index of disturbance	Weighted average, general disturbance
wa_OptCat_L1DisTot	Sum of disturbances	Weighted average, general disturbance
wa_OptCat_L1Ptl	Western EMAP TP score	Weighted average, TP
wa_OptCat_LNtl	Western EMAP TN score	Weighted average, TN
wa_OptCat_NutMMI	Western EMAP multi-metric index	Weighted average, nutrients
pi_NAWQA_TN_1	% TN tolerant diatoms	Percent Individuals, TN
pi_Ptpv_TP_all_Hi	% high TP diatoms, all regions	Percent Individuals, TP
x_Shan_e	Shannon-Wiener Diversity Index	Taxa diversity

Data source (NMED or NRSA), sampling year, and sampling location (latitude and longitude) were tested as possible confounding variables that could be factored out before assessing nutrient-metric relationships. Despite indications from multiple regressions that these factors have some effects, adjustments were not made to residuals nor were the data sets further classified. Sampling year and location were related due to the sampling design, which was not a valid reason for adjustments. The NMED and NRSA data overlapped in nutrient-metric bi-plots, suggesting that keeping them separate was not necessary.

↑ Nutrients = Δ Diatom Metrics

Several diatom metrics were correlated with TN and TP. Eight metrics were selected for stressor response analysis based on responsiveness to both nutrients. Though there are apparently some modifying factors or covariates related to nutrients and diatom metrics (e.g., conductivity with TN), they were not factored out or further classified.

4.3.4 Benthic Macroinvertebrates

A Spearman rank-order correlation analysis of nutrients, diel DO, and benthic and sestonic chl-a associated with benthic macroinvertebrate metrics was conducted. The samples were limited to one per site when nutrient or chl-a and macroinvertebrate samples were collected within 30 days of each other. For diel DO statistics, the analysis was limited to DO and macroinvertebrate samples collected within the same season (within 80 days). Distributions of metric values collected with different sampling methods were overlapping in stressor-response biplots (e.g. Figure 33). Therefore, all wadeable stream samples were pooled, including multiple methods

NMED EXHIBIT 25

and data from NMED, WSA, and NRSA. Only early kicknet samples from NMED and low gradient samples from NRSA were eliminated. The data screening resulted in 438-440 samples for TP and TN, respectively, from 313 sites. For diel DO and benthic chl-a samples, there were 76 and 193 samples, respectively. Dissolved oxygen grab samples were collected along with macroinvertebrate samples with greater frequency than diel DO samples. However, because the variability inherent to DO over time, the DO grab data were not emphasized.

Dissolved Oxygen

The minimum DO (DO_min) and maximum 4 hour productivity (Pmax4hr) had the highest numbers of significant correlations in all sites (15-16 of 63 metrics, each) (Appendix J). Other DO statistics had fewer significant correlations (GPP: 5, ER: 4, and Rmax4hr: 10). The strongest correlations for DO_min were positive with shredder taxa, shredder percent, and Plecoptera percent (Spearman rho = 0.39, 0.34, and 0.31, respectively). Other metrics with high positive correlations (rho = 0.30) included Ephemeroptera taxa, Beck's index, and intolerant percent. Gastropod percent and the HBI were negatively correlated (rho = 0.30). EPT taxa, a familiar and responsive metric, was positively correlated and showed that responses were similar among sampling methods (Figure 32). Low DO (<5.5 mg/L) was consistently related to lower EPT taxa. Low EPT taxa were also observed with higher DO_min, possibly due to other stressors including the alteration of habitat by abundant algal growth.

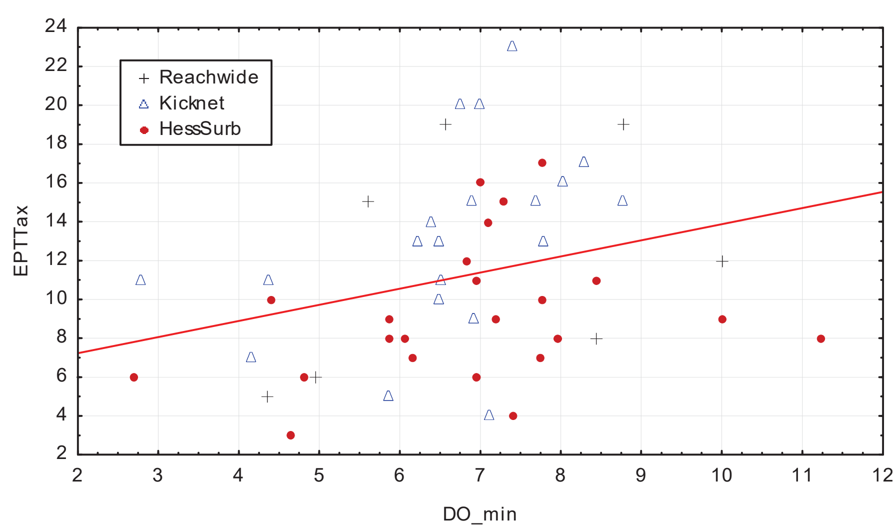


Figure 33. Relationship between EPT taxa richness and minimum DO (Spearman rho = 0.27).

With productivity (Pmax4hr), the strongest metric correlations were negative (rho = -0.37 - -0.42) with Plecoptera taxa, Plecoptera percent, Beck's index, and intolerant taxa (Appendix J). These relationships and other metric responses were similar in the TP Flat-Moderate site class.

Fewer metrics were significantly correlated to productivity in the TP High-Volcanic and TP Steep site classes.

Benthic chlorophyll

Benthic chl-a was correlated to 14 macroinvertebrate metrics in all sites. The strongest correlations were with the Shannon-Wiener diversity index and intolerant taxa (Spearman rho = 0.37 and -0.34, respectively). A positive correlation with Shannon-Wiener diversity (Figure 34) and a positive correlation with Trichoptera taxa and percent Trichoptera indicates that higher benthic chl-a increases some aspects of the macroinvertebrate assemblage diversity. Similar correlations were observed in the individual site classes, especially in the TP Flat-Moderate sites.

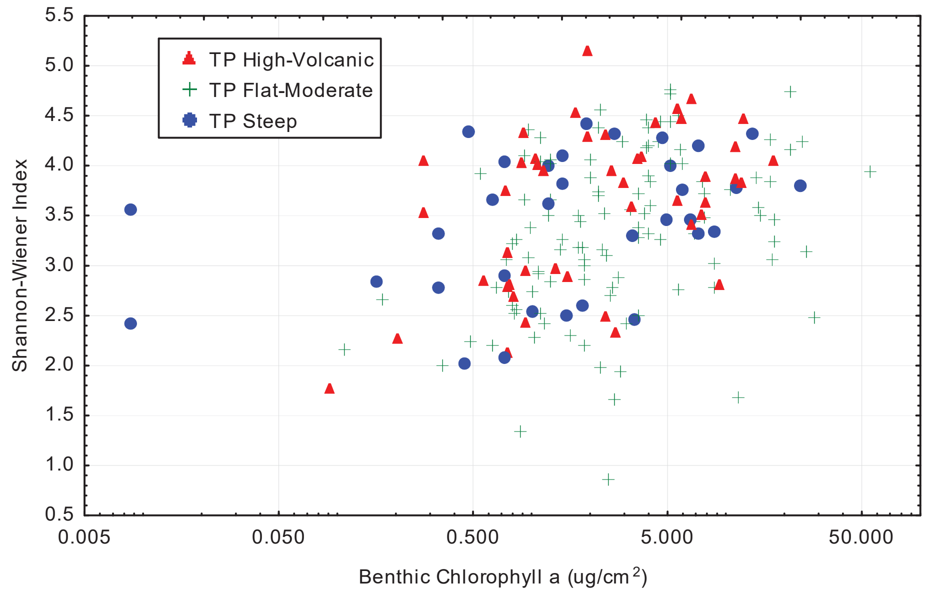


Figure 34. Metric values (Shannon-Wiener index) against benthic chl-a concentrations, marked by site class.

Sestonic chlorophyll

Sestonic chl-a in NRSA samples was negatively correlated ($p<0.05$) to six macroinvertebrate metrics, including total taxa, ETP taxa, Plecoptera taxa, intolerant taxa, percent Plecoptera, and clinger taxa. Correlation coefficients were between -0.34 and -0.43. More intolerant taxa were generally found in sites with less than 2 µg/L sestonic chl-a (Figure 35).

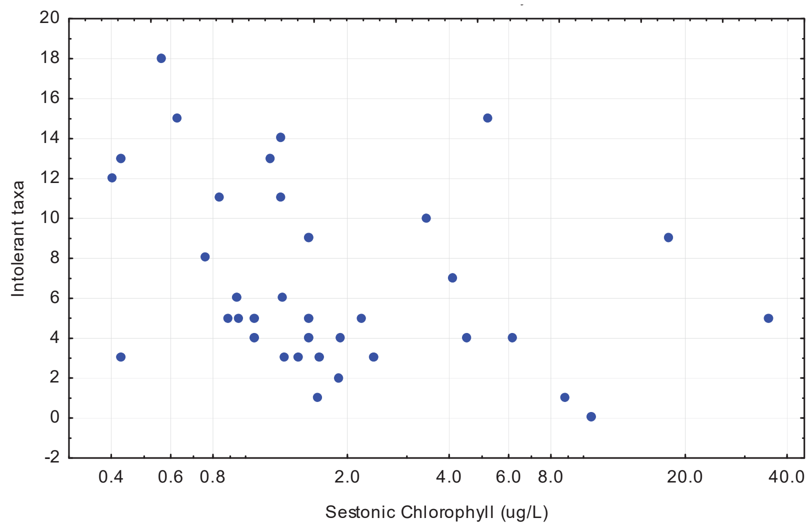


Figure 35. Metric values (intolerant taxa) against sestonic chl-a concentrations.

Nutrients

For TN, 42 of the 63 metrics were significantly ($p<0.05$) correlated with nutrient concentration in all sites (Appendix J). Fewer metrics were significantly correlated in each site class, with 28, 25, and 6 in the TN Flat, TN Moderate, and TN Steep classes, respectively. Only predator taxa and % predators were correlated in all site classes. The strongest correlations (all negative) were in the TN Flat and TN Moderate classes for the total taxa metric (Figure 36A), EPT taxa metric, Beck's Biotic Index (weighted richness of sensitive taxa, Figure 36B), and the clinger taxa metric. These metrics represent richness of sensitive or specialized organisms. In TN Steep sites, the % predators metric had one of the stronger negative correlations with TN (Figure 36C).

The relatively unresponsive metrics in the steep site class might be due to lower nutrient concentrations in general, with fewer values >0.5mg/L TN than in the TN Flat and TN Moderate site classes. Conversely, nutrient concentrations in the TN Flat site class are generally higher than in the other classes. The TN Moderate site class is the largest and shows a typical wedge-shaped plot for many metric responses to TN (Figures 36b, 36C).

For TP, fewer correlations were significant and the strength was weaker, compared to the TN correlations (Appendix J). There were 21 significant ($p<0.05$) correlations when including all site classes. Correlations varied among site classes. In the TP High-Volcanic, TP Flat-Moderate, and TP Steep classes, 17, 12, and 6 metrics were significantly correlated, respectively. Percent Coleoptera had the strongest of all correlations in the TP High-Volcanic site class (Figure 37A). Percent scrapers were negatively correlated in all site classes (Figure 37B). EPT taxa were correlated in the TP High-Volcanic and TP Flat-Moderate sites (Figure 37C). Of the few metrics correlated in the TP Steep class, Oligochaete metrics were notable increasers. Macroinvertebrates appear to be more responsive to TN than to TP. The positive correlation between TN and TP was not very strong in this data set (Spearman rho = 0.28, $p < 0.05$).

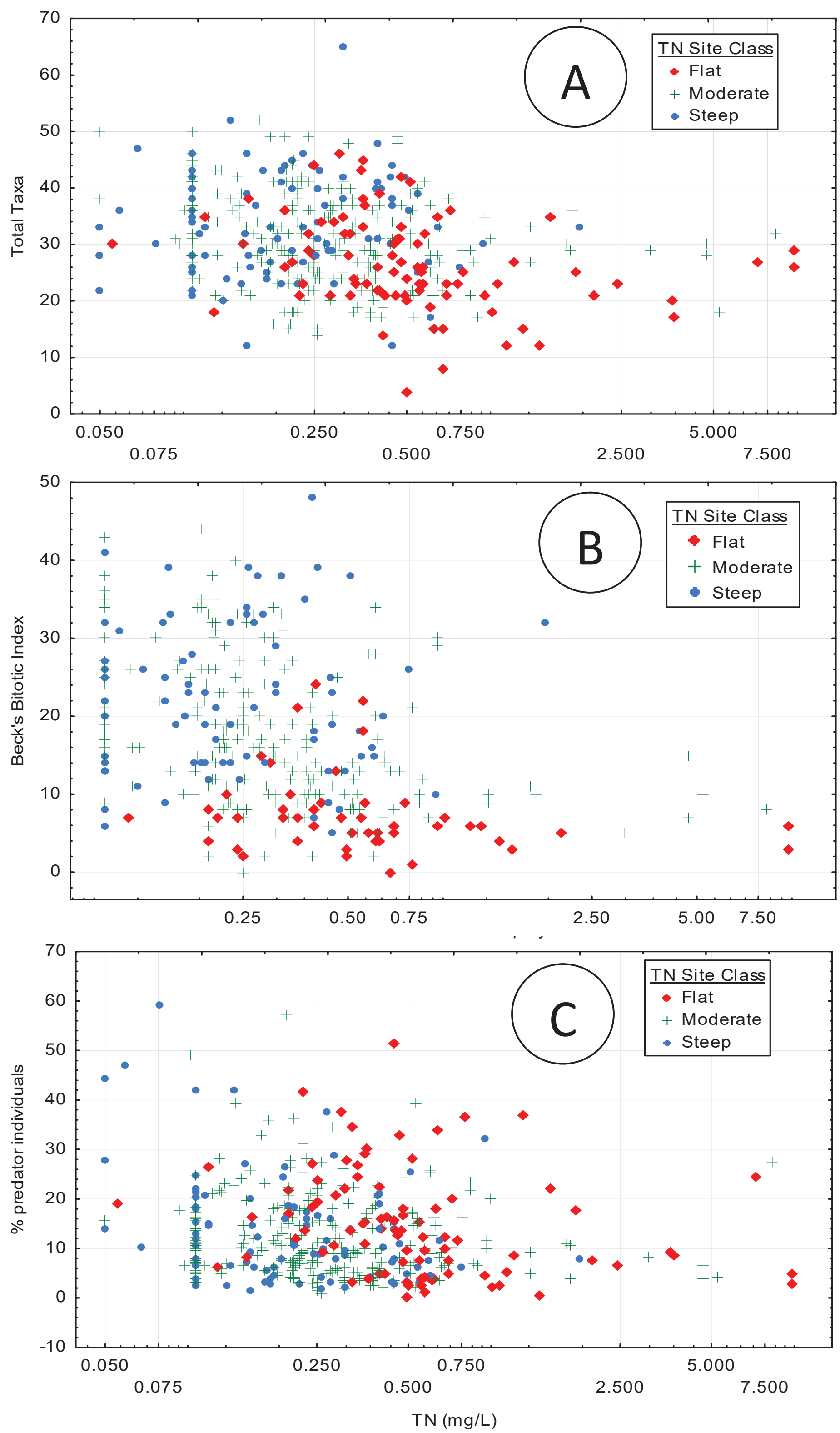


Figure 36. Metric values (A: total taxa, B: Beck's Biotic Index, and C: % predator individuals) against TN concentrations, marked by site class.

NMED EXHIBIT 25

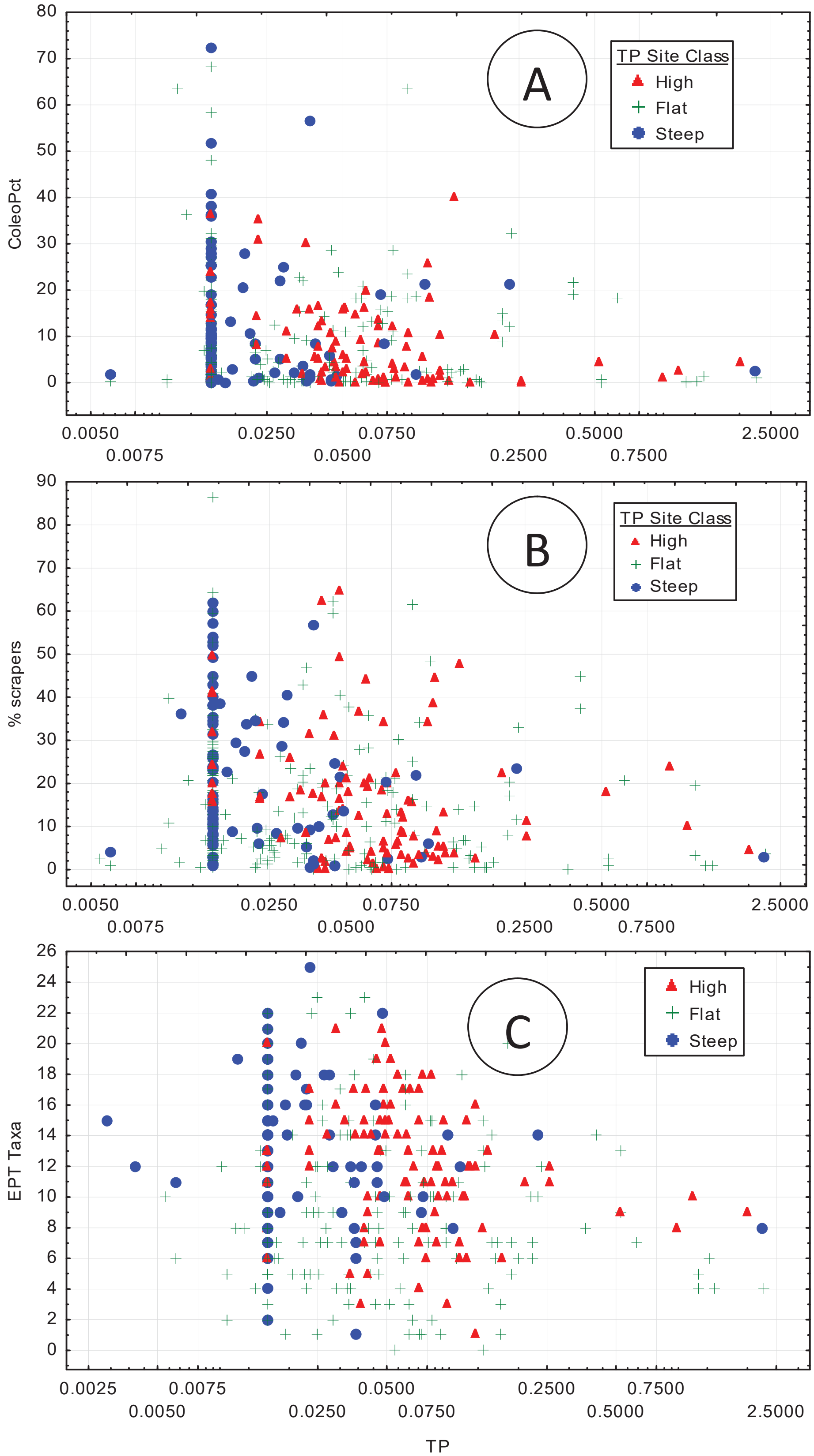


Figure 37. Metric values (A: % Coleoptera, B: % scrapers, and C: EPT taxa) against TP concentrations, marked by site class.

Several benthic macroinvertebrate metrics were related to nutrients, benthic chl-a, and DO, but only ten were selected for ongoing analyses to simplify interpretation of the stressor-response relationships. Responses for 19 candidate metrics were qualified as strongly positive, positive, negative, or strongly negative in relation to multiple measures of nutrients, benthic chl-a, and DO. The ratings were based on correlation coefficients in all sites and in the individual site classes or methods (Appendix J). Ten benthic macroinvertebrate metrics with consistent and strong correlations were identified (Table 21, bold font). These included EPT taxa, Ephemeroptera taxa, Plecoptera taxa, percent EPT, percent Plecoptera, percent non-insects, intolerant taxa, percent tolerant, shredder taxa, and percent clinger. The percent EPT metric was selected despite weak responses because it is a familiar metric that summarizes sample composition of three generally sensitive taxa groups.

Table 21. Qualitative response trends for macroinvertebrate metrics to nutrients, benthic chl-a, and DO. The trends of responses were negative (Neg) or positive (Pos). Stronger relationships (more significant correlations in site classes) are shown in bold type.

		TN	TP	Chl-a	DO[a]	Overall
Richness	Total Taxa	Neg	Neg	Pos	Mix	Mix
	1 EPT Taxa	**Neg**	**Neg**	Mix	**Neg**	Neg
	2 Ephemeroptera Taxa	**Neg**	**Neg**	Neg	**Neg**	**Neg**
	3 Plecoptera Taxa	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
	Trichoptera Taxa	**Neg**	**Neg**	Pos	Mix	Mix
	Shannon-Winer Index	**Neg**	**Neg**	**Pos**	Mix	Mix
Composition	**4 EPT percent**	Neg	Mix	Mix	Mix	Neg/Mix
	Ephem percent	Mix	Mix	Mix	Mix	Mix
	5 Pleco percent	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
	Trich percent	**Neg**	**Neg**	**Pos**	Mix	Mix
	6 NonIn percent	**Pos**	Pos	Pos	Pos	**Pos**
Tolerance	**7 Intolerant Taxa**	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
	8 Toler percent	**Pos**	Pos	Pos	**Pos**	**Pos**
Feeding Group	Cllct percent	**Pos**	**Pos**	**Neg**	Mix	Mix
	Scrap percent	**Neg**	**Neg**	**Pos**	Mix	Mix
	Shred percent	**Neg**	Neg	**Neg**	**Neg**	**Neg**
	9 Shredder Taxa	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
Habit	Brrwr percent	**Pos**	**Pos**	**Neg**	Pos	Mix
	10 Clngr percent	**Neg**	**Neg**	Mix	Mix	Neg

a: The DO measures characterized in the qualitative correlations were Pmax4hr and GPP, which gave opposite responses compared to Rmax4hr and minimum DO.

The following series of plots illustrates several linkages between nutrients and benthic macroinvertebrates, focusing on the intolerant taxa metric, which was negatively related to nutrients and chl-a and positively related to minimum DO (see Appendix J). The immediate stressor on intolerant taxa was assumed to be DO. Field measured DO might have been taken at any time of day, adding variability to the measure, so the analysis emphasized minimum DO and Pmax4hr. As minimum diel DO decreased, especially below 6 mg/L, intolerant taxa decreased in all site classes (Figure 38).

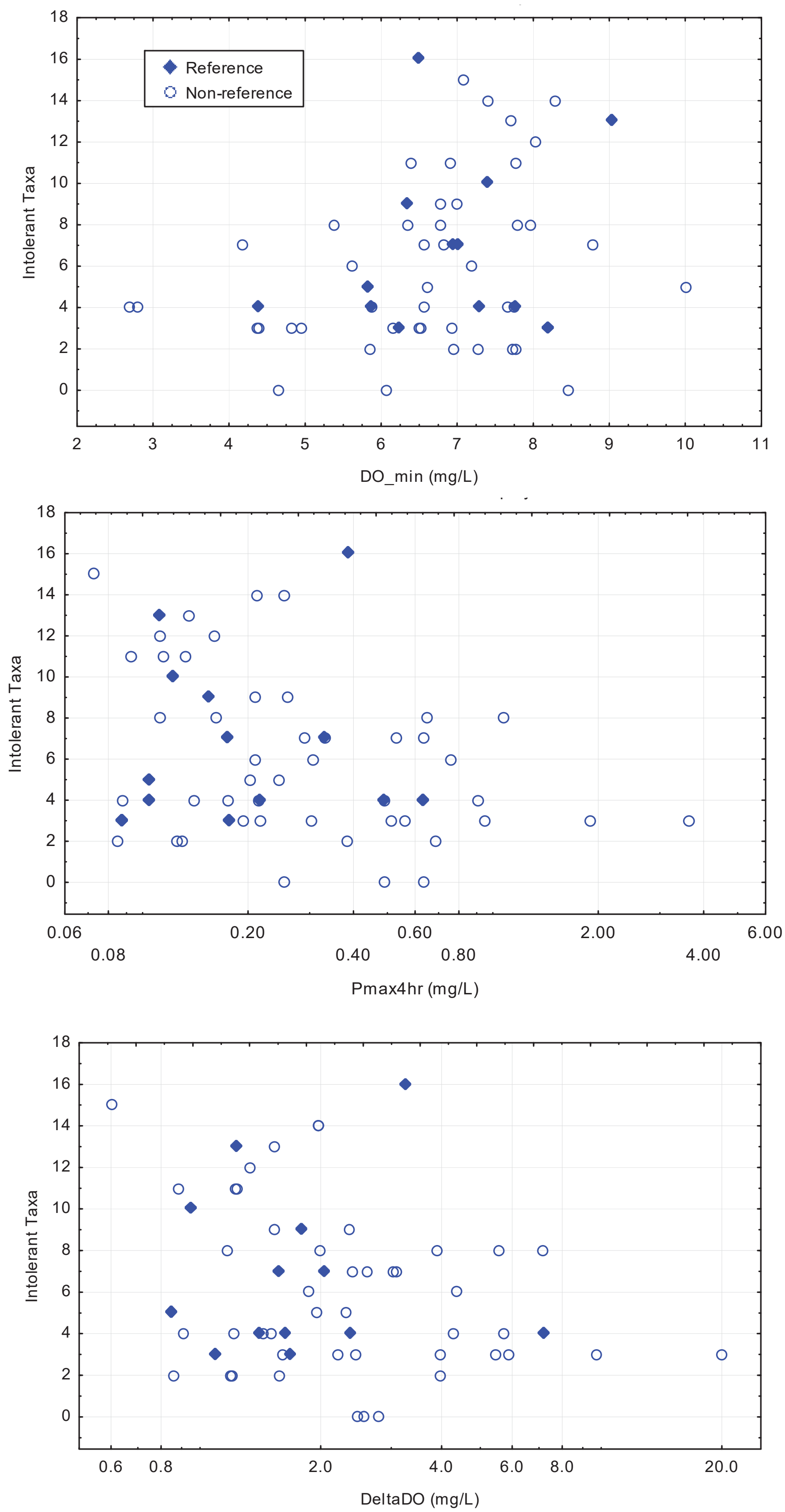


Figure 38. Intolerant taxa metric versus minimum DO, Pmax4hr, and DeltaDO, marked by reference status.

Intolerant taxa generally decline with increasing benthic chl-a, though there are also low numbers of intolerant taxa with low chl-a (Figure 39). Macroinvertebrates generally have an optimal preference across stressor gradients with unimodal relationships, so low numbers on either side of the optimum is expected (USEPA 2006). The low chl-a, low intolerant taxa sites might be either oligotrophic (supporting few taxa because of generally low production) or toxic (containing an unmeasured toxicant though nutrients are low). Minimum DO and chl-a are not strongly related (Figure 40). However, the relationships of chl-a with Pmax4hr and DeltaDO are somewhat stronger, supporting the causal linkage between chl-a and DO.

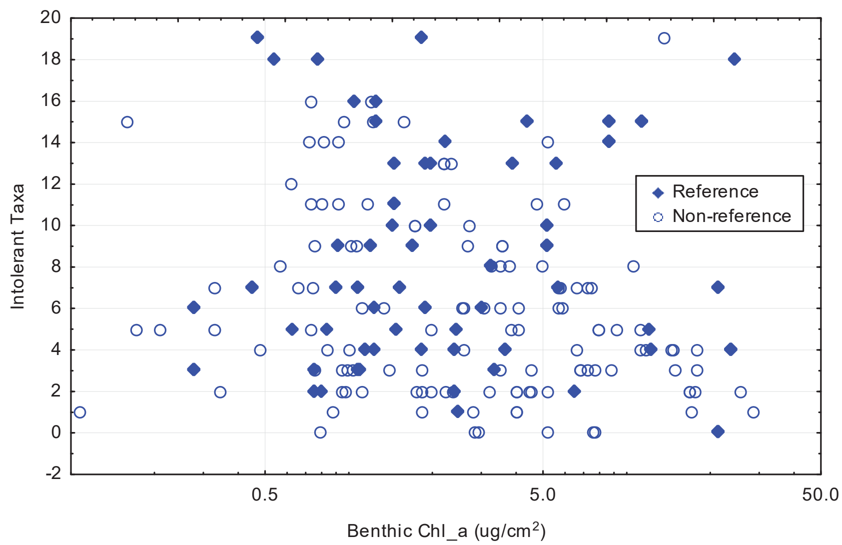


Figure 39. Intolerant taxa metric versus benthic chl-a, marked by reference status.

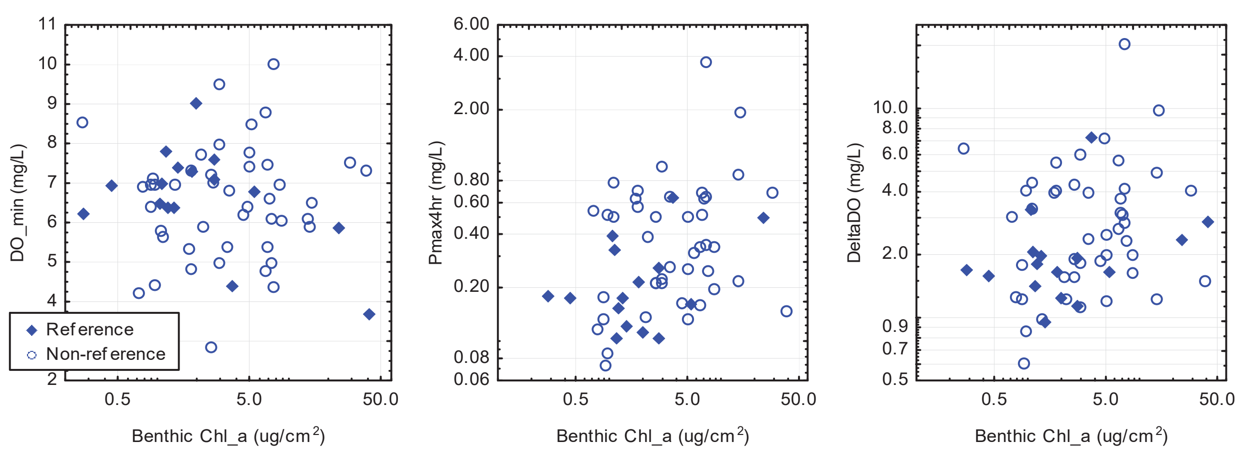


Figure 40. Relationship between benthic chl-a and DO measures; minimum DO, Pmax4hr, and DeltaDO, marked by reference status.

The final link to nutrients is seen in the relationships between TP, TN, and benthic chl-a (Figure 41). The relationships with chl-a were variable, so the indirect relationships between nutrients and DO were explored (see Figures 29-31), showing increased DeltaDO and Pmax4hr with increasing nutrients, and decreasing minimum DO. In another indirect relationship, nutrients were compared to the intolerant macroinvertebrate metric (Figure 42). Fewer intolerant taxa were associated with increasing nutrient concentrations. Macroinvertebrate metrics and nutrients were examined in stressor-response analyses because, though the effects are indirect, the relationships were relatively clear. The intermediate stressors (chl-a and DO) showed trends that support the causal model, though they were variable. The chl-a and diel DO data sets were smaller in comparison to the macroinvertebrate metric data set, which might affect the apparent strength of relationships with nutrients.

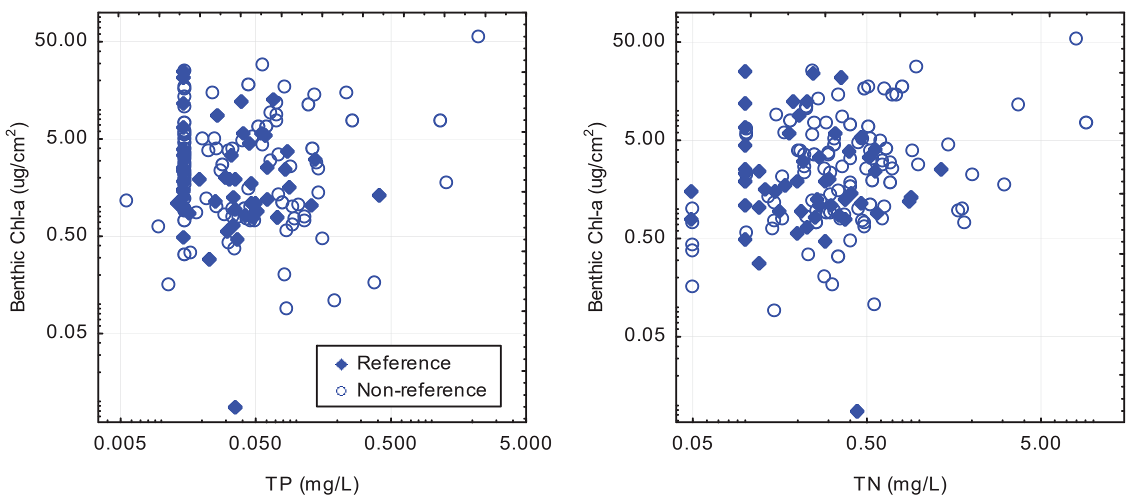


Figure 41. Benthic chl-a versus TP and TN, marked by reference status**.**

NMED EXHIBIT 25

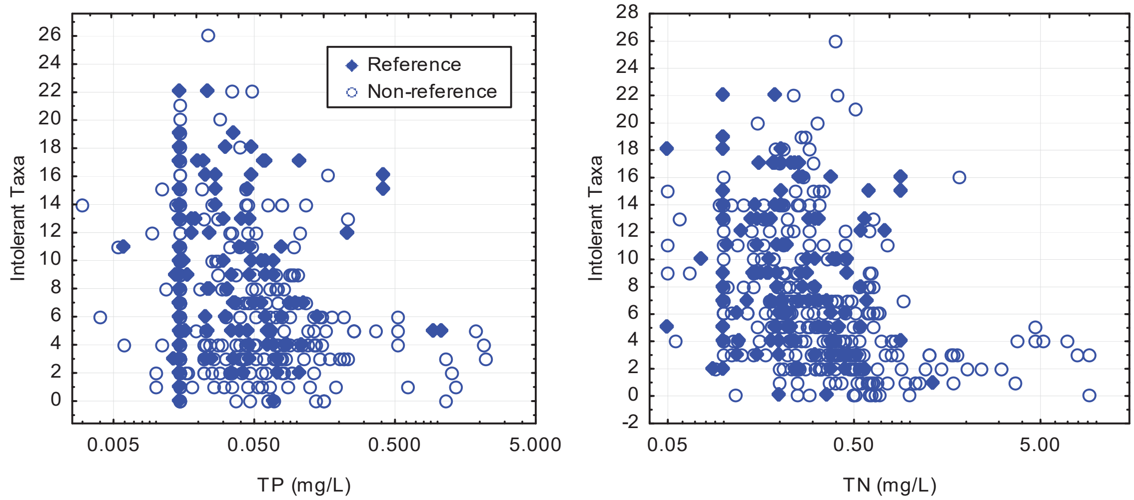


Figure 42. Intolerant macroinvertebrate taxa versus TP and TN, marked by reference status.

In a final comparison, intolerant taxa were found to be sensitive to other stressors, such as conductivity measured within 30 days of the macroinvertebrate sample (Figure 43). Conductivity was correlated with nutrients, especially TN (see Table 15). The nutrient-macroinvertebrate relationship was not adjusted for such co-occurring factors.

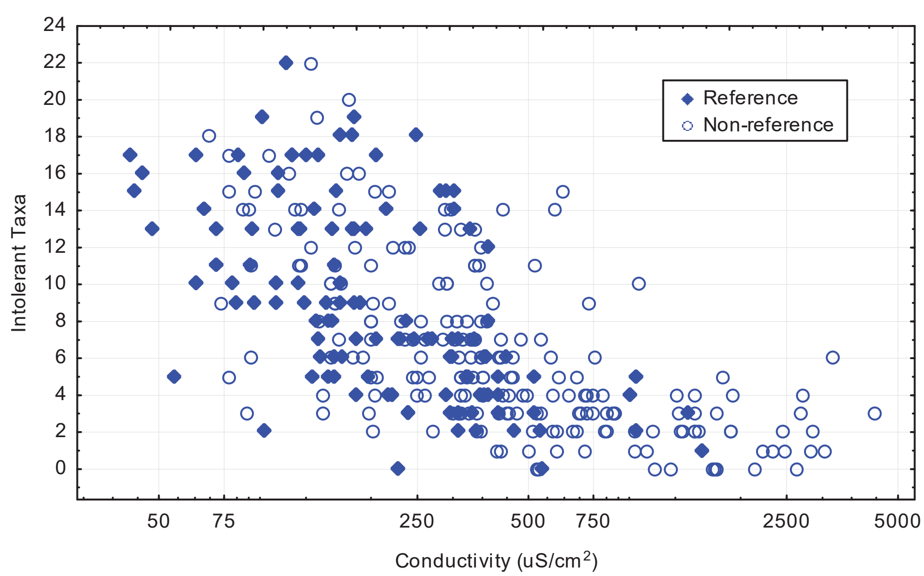


Figure 43. Relationship between intolerant taxa and conductivity (EC), marked by reference status.

↓ Minimum DO = Δ Macroinvertebrate Metrics

As with diatom metrics, the most responsive macroinvertebrate metrics were selected for continuing analysis of stressor-response effects. These included 10 metrics that are commonly used in bioassessments. In the conceptual model, macroinvertebrates respond directly to minimum DO conditions, which are related to chl-a. Other measures of DO (Pmax4hr and DeltaDO) were also related to macroinvertebrate metrics, though these were not specified in the conceptual model. However, in these analyses, the strongest relationship was directly between nutrients and macroinvertebrate metrics (bypassing DO or chl-a). This might be due to a larger data set for nutrients relative to datasets for DO or chl-a. Different macroinvertebrate sampling methods were indistinct in biplots of stressors and metrics. Therefore, data from multiple sampling methods were pooled in stressor-response analyses.

4.4 Regression Interpolation

Ten macroinvertebrate and eight diatom metrics were regressed against TN and TP. The regressions included all nutrient and biological samples that were taken from the same site within a 30 day window. Data from all site classes were used to derive the regression equations because this assured a complete nutrient gradient on the x-axis. Regressions within the individual site classes would have resulted in shorter stressor gradients. In some classes, the gradients would not include enough high nutrient concentrations to show significant relationships.

The scatter plots of metrics on nutrients were often wedge-shaped, with the heel of the wedge containing samples with poor response metrics though the nutrient stressors were low (Figure 44). These samples might have poor metrics because of other stressors, such as sediment and temperature. The entire data set was used to derive the regression equations because sufficient information for removing samples with non-nutrient stressors was not available. This resulted in a mean regression slope that is not as steep as the effective slope observed as a regression of the upper quantiles of the data. Shallow slopes of the regression equations result in large changes in interpolated nutrient values for each incremental change of the reference metric value.

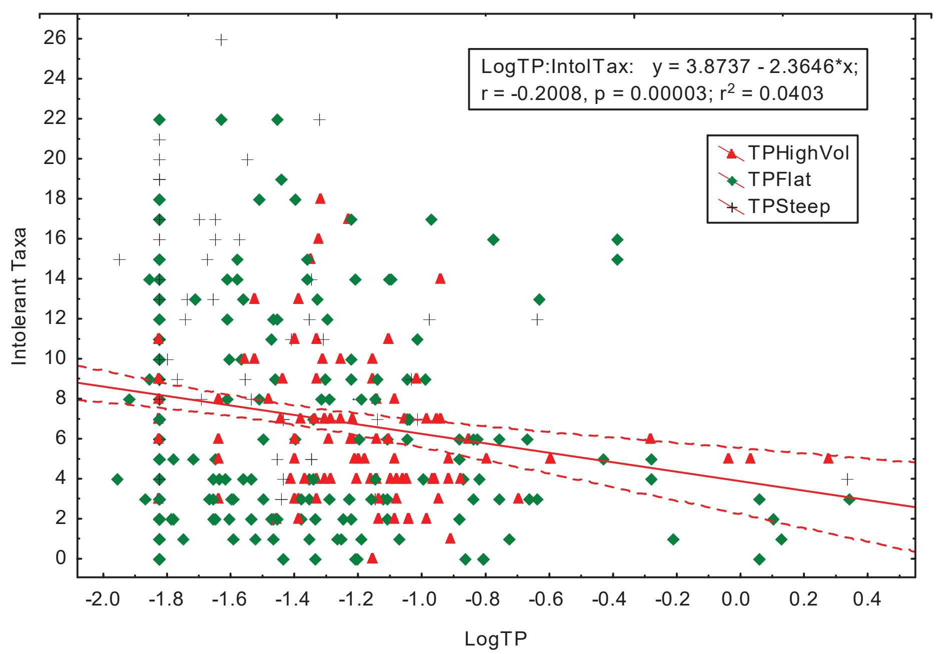


Figure 44. Relationship between TP and intolerant macroinvertebrate taxa, showing the regression equation with sites marked by site class.

NMED EXHIBIT 25

The reference 25^{th} (or 75^{th}) quantile of metric values in each nutrient site class were interpolated to a nutrient value on the x-axis. These quartiles of reference observations were selected as the critical values to represent reference expectations. Metric quartiles for the TN Flat class were substantially different than those in the other classes. For example, the EPT taxa quartile was 10 and 12 in the TN Steep and TN Moderate classes, but was only 5 in the TN Flat class. This led to invalid interpolated values for many metrics. The high-small multi-metric macroinvertebrate condition index was not used, though it had an associated threshold of impact, because it could only be applied in a limited number of sites.

The nutrient values associated with reference metric quartiles were interpolated by substituting the critical metric value as y in the equation and solving for x (Appendix K). The results were only considered as candidate nutrient thresholds if the regression equation was significant ($p<0.05$) and the interpolated nutrient value was within the range of observed values. Any values extrapolated beyond the observed range (excluding extreme values) in each site class were disregarded.

The resulting valid candidate thresholds ranged from 0.13 to 3.26 mg/L for TN and from 0.003 to 1.74 mg/L for TP (Table 22). For TN, all metrics except the Shannon-Wiener index for diatoms were significantly related to nutrients in at least one site class. Median candidate threshold values in the TN Moderate and TN Steep site classes were close to the values derived from the 90^{th} quantile of the reference distributions, though comparatively lower in the TN Moderate sites and higher in the TN Steep sites.

For TP, six of the ten macroinvertebrate metrics were significantly related to nutrient concentrations using regression interpolation (see Appendix K). All of the TP values interpolated from macroinvertebrate metrics were higher than the 90^{th} quantiles of the reference distributions and the interpolated values that were retained in the analysis were at the high ends of the observed ranges. All diatom metrics except the Shannon-Wiener index were significantly related to TP concentrations. Interpolated TP values from diatom metrics were generally lower than the 90^{th} quantiles of the reference distributions in the TP High-Volcanic and TP Steep site classes, and comparatively higher in the TP Flat-Moderate site class.

Regression interpolation of TN and TP from critical minimum DO of 5 or 6 mg/L did not yield valid results. The regression equations were not significant ($p > 0.10$) and the interpolated values were orders of magnitude greater than the observed maximum nutrient concentrations. Critical values for maximum productivity (log transformed) were derived from their regression with critical minimum DO values ($r^2 = 0.26$, $p<0.001$). Interpolated nutrient concentrations related to 6 mg/L minimum DO (Pmax4hr = 0.50 mg/L) were 4.4 mg/L TN and 0.98 mg/L TP. These results were high compared to the reference 90^{th} quantile values. Interpolated nutrient concentrations related to 5 mg/L minimum DO were orders of magnitude greater than the observed nutrient concentrations and were therefore disregarded. This analysis was conducted on a statewide basis, not within site classes.

Table 22. Candidate thresholds derived from regression interpolations on selected macroinvertebrate and diatom metrics. Values in gray font were not valid because they did not have significant regression equations or were outside of the observed range of values in the site classes.

	TN (mg/L)			TP (mg/L)		
	TN Flat	TN Moderate	TN Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
EPTTax	3.70	0.18	0.43	0.11	3.39	0.11
EphemTax	2.27	0.62	0.62	1.00	211	1.00
PlecoTax	3.26	3.26	3.26	1.61	1.61	0.15
IntolTax	3.48	0.53	0.85	0.88	6.22	0.33
Toler percent	501	0.29	0.33	0.22	3.11	0.017
EPT percent	398	0.13	21.47	59102	31.91	491758
Pleco percent	0.49	0.49	0.49	1.74	1.74	0.80
NonIn percent	28.33	0.21	0.37	1.46	0.281	0.003
ShredTax	2.28	2.28	0.64	56.47	56.47	0.60
Clngr percent	108	0.88	2.44	13.22	5.01	0.50
BMI Medians	2.28	0.49	0.46	0.11	1.61	0.11
wa_OptCat_DisTotMMI	10.35	0.36	0.19	0.042	0.168	0.028
wa_OptCat_L1DisTot	18.26	0.30	0.19	0.024	0.358	0.027
wa_OptCat_L1Ptl	7.45	0.43	0.29	0.068	0.145	0.029
wa_OptCat_LNtl	10.49	0.33	0.18	0.057	0.311	0.054
wa_OptCat_NutMMI	9.26	0.32	0.23	0.047	0.193	0.025
pi_NAWQA_TN_1	1.28	4.36	5.32	0.457	0.129	0.010
pi_Ptpv_TP_all_Hi	7.98	0.25	0.69	0.083	0.152	0.011
x_Shan_e	2.26	16.63	161700	9.272	7.272	0.012
Diatom Medians	1.28	0.33	0.21	0.052	0.168	0.026
Median of all valid interpolated values	2.27	0.33	0.35	0.063	0.237	0.025
Reference 90th quantile	0.69	0.42	0.30	0.105	0.071	0.054
Maximum in site class	3.44	2.63	0.75	0.22	1.82	0.12

For the regression interpolation of DO statistics on nutrient concentrations, both nutrient concentrations and DO stats were log transformed. The regression equations were calculated with all sites classes combined. Regression equations in the three individual TP site classes resulted in non-significant regressions in the TP High-Volcanic and TP Steep classes. However, in the TP Steep class, the relationships between TP and both Delta DO and Pmax4hr were negative and significant ($p<0.05$). The negative relationships were only seen in the TP Steep site class. Equations for the TP Flat-Moderate class were similar to those in all sites, so we emphasized results from equations for all site classes combined (Table 23). Regression interpolation in the

TP High-Volcanic and TP Steep site classes were at the extreme high and low (respectively) ends of the range of observed values.

Table 23. Candidate thresholds for DO statistics derived from regression interpolations on reference 90th quantile nutrient concentrations. Values in gray font were not valid because they were at the extremes of the range of values.

	Delta DO			Pmax4hr		
	TP High-Volcanic	TP Flat-Moderate	TP Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
TN	16.39	3.34	1.13	3.23	0.47	0.13
TP	12.63	4.06	0.92	2.36	0.56	0.08

4.5 Change-point Analysis

The change-point analysis always identifies a change-point, but that change-point can be subject to the shape of the response curve. If there was an emphasis on either least disturbed or highly disturbed sites in site selection, the concentration of samples could affect the location of the change-point. Confidence intervals were calculated for each change-point to illustrate the possible ranges of change-points. All of the change-point graphs are presented in Appendix L. The decisions to accept the change-points as valid candidate thresholds were based on valuation of the 95th quantile regression line, the relative size of the confidence interval around the change-point, and coincidence of an appropriate slope in the LOWESS regression line at the change-point.

Change-points were identified for both TN and TP from 10 macroinvertebrate metrics, 8 diatom metrics, and 2 DO measures (Table 24). The ranges of valid change-points were fairly narrow for each nutrient and site class (at most 1.24 mg/L for TN and 0.08 mg/L for TP). For TN, median candidate thresholds were greatest in the TN Flat site class and least in the TN Steep site class. Likewise for TP, TP Steep sites had lower median change-points and increasing change-point medians were in the TP Flat-Moderate and TP high-Volcanic classes. The medians of all valid change-points was lower than the 90th quantile of the reference distributions for each site class and nutrient (Table 24). The EPT taxa, Plecoptera taxa, weighted average disturbance (wa_OptCat_L1DisTot), and weighted average nitrogen preference (wa_OptCat_LNtl) metrics had the most valid change-points associated with them.

For TN, the change-points derived from DO measures were similar to the 90th quantile of reference values, even in the TN Flat site class, where the change-points were not valid. All change-points for macroinvertebrates and diatoms were valid in the TN Flat site class and most of them were lower than the reference 90th quantile value. Valid TN change-points were variable in the TN Moderate and TN Steep site classes, with only one valid change-point derived from macroinvertebrate metrics in the TN Steep class.

Table 24. Change-points (CP) as candidate thresholds from selected benthic macroinvertebrate (BMI), diatom and dissolved oxygen (DO) metrics. Values in gray font did not pass the tests for valid change-points.

	TN (mg/L)			TP (mg/L)		
Metric	TN Flat	TN Moderate	TN Steep	TP High-Vol	TP Flat-Moderate	TP Steep
EPTTax	0.49	0.25	0.42	0.067	0.044	0.030
EphemTax	0.49	0.22	0.28	0.058	0.044	0.030
PlecoTax	0.56	0.33	0.25	0.063	0.041	0.027
IntolTax	0.48	0.29	0.39	0.061	0.051	0.029
Toler percent	0.66	0.40	0.26	0.083	0.052	0.041
EPT percent	0.97	0.36	0.22	0.047	0.014	0.029
Pleco percent	0.35	0.33	0.14	0.114	0.044	0.027
NonIn percent	0.72	1.26	0.23	0.083	0.014	0.018
ShredTax	0.48	0.25	0.23	0.047	0.151	0.017
Clngr percent	1.09	0.49	0.28	0.122	0.051	0.022
Median CP BMI	0.53	0.31	0.28	0.063	0.044	0.029
wa_OptCat_DisTotMMI	0.48	0.52	0.16	0.068	0.056	0.035
wa_OptCat_L1DisTot	0.50	0.38	0.26	0.068	0.066	0.034
wa_OptCat_L1Ptl	0.48	0.52	0.13	0.066	0.032	0.036
wa_OptCat_LNtl	0.47	0.39	0.19	0.068	0.078	0.035
wa_OptCat_NutMMI	0.47	0.52	0.15	0.066	0.056	0.035
pi_NAWQA_TN_1	0.66	0.67	0.13	0.084	0.028	0.019
pi_Ptpv_TP_all_Hi	0.52	0.71	0.21	0.094	0.032	0.029
x_Shan_e	0.70	0.51	0.25	0.071	0.034	0.027
Median CP diatoms	0.49	0.45	0.18	0.068	0.056	0.035
DO_min	0.63	0.34	0.30	0.066	0.039	0.035
Pmax4hr	0.70	0.37	0.36	0.059	0.099	0.035
Median valid CP BMI, diatoms, & DO	0.50	0.36	0.22	0.067	0.044	0.035
Reference 90th quantile	0.69	0.42	0.30	0.105	0.071	0.054

Change-points for Delta DO and Pmax4hr were calculated based on macroinvertebrate metrics and nutrient concentrations (Table 25). Using nutrient concentrations in the CPA as a response to DO statistics is somewhat circular and might not be an appropriate application of the technique. However, median values for the DO change-points derived from macroinvertebrate metrics were equal to the medians when the nutrient-derived change-points were also included. Change-points were derived for all sites and for the TP Flat sites. In the TP High-Volcanic and TP Steep site classes, there were not enough samples for valid change-point analyses.

Table 25. Change-points (CP) as candidate thresholds from selected benthic macroinvertebrate (BMI) metrics and nutrient concentrations. Values in gray font did not pass the tests for valid change-points.

	Delta DO		Pmax4hr	
Metric	All sites	Flat	All sites	Flat
EPTTax	1.74	1.99	0.358	0.254
EphemTax	1.60	1.88	0.298	0.254
PlecoTax	2.34	2.09	0.275	0.254
IntolTax	2.37	2.42	0.254	0.254
Toler percent	2.46	2.44	0.474	0.439
EPT percent	1.72	2.44	0.290	0.338
Pleco percent	2.02	1.99	0.214	0.214
NonIn percent	2.41	2.42	0.298	0.322
ShredTax	1.56	2.44	0.145	0.214
Clngr percent	2.26	2.44	0.331	0.254
LogTN	5.77	5.73	0.679	0.679
LogTP	2.03	2.06	0.269	0.351
Median	2.30	2.42	0.290	0.254

5.0 Synthesis

The following synthesis of results summarizes the range of candidate thresholds based preceding analyses and workgroup feedback for the purpose of expressing possible thresholds. Thresholds that NMED decides to apply within CWA regulatory programs may deviate from the candidate thresholds presented in this report. NMED should express the basis for threshold decisions in the appropriate place, time, and manner.

5.1 Method strengths and limitations

Three basic methods were used for identifying candidate nutrient thresholds for two nutrients (TN and TP). The methods were applied in three site classes per nutrient and used two biological assemblages (diatoms and macroinvertebrates) as well as DO minimum and maximum productivity (Pmax4hr). The methods included frequency distributions in reference sites, regression interpolation, and change-point analysis.

Candidate thresholds derived from frequency distributions in reference sites are dependent on proper identification of sites with minimal disturbance, classification of those sites to limit natural variability, and selection of an appropriate quantile of the distribution to represent a threshold. The reference sites represent sites with the least disturbance based on reference site criteria and a review processes that allowed quantitative screening of sites based on land uses and activities within the catchment, qualitative evaluation of the sites based on NMED staff familiarity, and identification of individual samples that might have had temporary circumstances with higher than normal disturbance. The site classification based on gradient and location reduced variability in the nutrient conditions. Reference nutrient distributions were quite different among site classes and relatively homogenous within classes.

The quantile selected by NMED was based on preliminary analyses, confidence in reference site selection, reconciliation with existing thresholds, and alignment with stressor-response analyses. The selection of the 90th quantile as opposed to lower quantiles reflects confidence in the reference sites. The 90th quantile of reference values are higher than the current ecoregional thresholds, which range from 0.25 to 0.53 mg/L for TN and 0.02 to 0.09 mg/L for TP (NMED/SWQB 2013; Table 3). In comparison, ranges for the 90th quantiles of reference are from 0.30 to 0.69 mg/L for TN and 0.055 to 0.105 mg/L for TP. The 90th confidence limits around each quantile were shown to further illustrate ranges of possible final nutrient thresholds.

Regression interpolation is a straightforward technique that allowed a direct association of expected response measures to the nutrient conditions. The strength of this approach was its simplicity in direct association through the mean regression equation. The mean regression would best represent nutrient effects if nutrients were the only stressor acting on the biologic assemblages. However, there are many cases where poor biological metrics are associated with low nutrient concentrations, probably due to oligotrophic conditions or unmeasured stressors. These points in the heel of the wedge of a scatter-plot dilute the stressor-response regression,

NMED EXHIBIT 25

resulting in flatter regression slopes. With a flatter slope, slight changes or inaccuracies in the expected response condition are translated into large differences on the x-axis. Even with a significant regression, interpolated results can be outside of the realistic range of nutrient thresholds.

Change-point analysis was used to determine the point along the x-axis (nutrients) at which the sets of metric values above and below the x value had the least deviance or most precision. The technique can result in change-points even when the change in metrics with nutrients is very gradual. The best use of the technique is with a step-function response, with a clear and consistent change in metric values above and below the change-point. The change-points were evaluated based on indications of a limiting response (quantile regression), precision of the change-point (the breadth of the confidence interval), and coincidence with a local inflection of values (the LOWESS regression line). Even with these evaluation techniques, valid change-points were not always representative of a clear step-function.

Of the two assemblages, a more direct conceptual linkage exists between nutrients and diatoms compared to the indirect linkage between nutrients and macroinvertebrates. It was assumed that diatoms were directly responsive to nutrient conditions. It was also assumed that macroinvertebrates were responsive to secondary effects of nutrients, specifically dissolved oxygen depletion from excess respiration of nutrient-dependent algae, loss of habitat, and change in food quality. However, results of the diatom assemblage were not weighted over results from the macroinvertebrate assemblage. The relationship between nutrients and macroinvertebrates was explored in our analysis of correlations and interactions. There was evidence that nutrients caused changes in DO, but a multiple linkage model (nutrients -> chl-a -> DO -> macroinvertebrates) was less precise than a direct comparison (nutrients -> macroinvertebrates).

Frequency distributions based on the 90th quantile of reference site nutrient values were given the most weight when synthesizing information from all techniques. The stressor-response methods gave valuable supporting or qualifying evidence. Presentation of the 90th quantile of reference sites in the context of all other valid results puts the primary thresholds in the context of thresholds derived through all methods.

5.2 Nutrient and DO Thresholds

Based on the preceding analyses, summaries of candidate nutrient thresholds and ranges of possible final thresholds were compiled (Table 26). The primary thresholds are based on frequency distribution of nutrient values observed in reference sites and site classes. Evidence from the stressor-response analyses general supports the 90th quantile values as thresholds, though medians of valid thresholds developed through change-point analysis and regression interpolation are generally lower than the 90th quantile values. Median stressor-response values are less than the 75th quantile of reference in the TN Flat, TN Moderate, and TP High-

Volcanic classes. In the TN Steep class, the median stressor-response value is near the 80th quantile of reference values. In the TP Flat-Moderate and TP Steep classes, the median stressor-resonse values are greater than or equal to the 90th quantile of reference. The confidence intervals for the reference 90th quantile values describe ranges that are also higher than the stressor-response medians. The CDF curves in the following sections place the reference 90th quantile values within the ranges of stressor-response thresholds.

Table 26. Candidate nutrient threshold values based on frequency distributions and ranges of endpoints by nutrient and site class.

		TN Flat	TN Moderate	TN Steep
TN	Reference 90th quantile	0.69 mg/L	0.42 mg/L	0.30 mg/L
	90% confidence interval	0.62 – 0.85	0.38 – 0.51	0.26 – 0.34
	Stressor-response median	0.52 mg/L	0.33 mg/L	0.26 mg/L
		TP High-Volcanic	TP Flat-Moderate	TP Steep
TP	Reference 90th quantile	0.105 mg/L	0.061 mg/L	0.030 mg/L
	90% confidence interval	0.089 – 0.114	0.051 – 0.069	0.016 – 0.053
	Stressor-response median	0.067 mg/L	0.066 mg/L	0.029 mg/L

For Delta DO values, the reference distribution 90th quantile values were similar in the High-Volcanic and TP Flat site classes at 4 – 5 mg/L DO. Stressor-response analyses were only possible in the TP Flat site class. The regression interpolation using nutrient thresholds were close and slightly lower than the 90th quantile value. Change-point analysis suggested lower thresholds for all macroinvertebrate metrics. Using nutrients in the change-point analysis, only the threshold derived from TN was greater than the reference distribution 90th quantile. Change-point values for all sites were similar to those derived in the TP Flat site class and were generally in the range described by the reference distribution in the TP Steep sites.

Table 27. Threshold ranges for Delta DO derived from reference distributions (Ref Dist 90th), the reference distribution 90% confidence interval (Ref Dist CI90), regression interpolation range (Reg Int range), change-point analysis (CPA) median, and CPA ranges associated with benthic macroinvertebrates (BMI), and nutrients.

	TP High-Volcanic	TP Flat-Moderate	TP Steep	All Classes
Ref Dist 90th	5.02	4.08	1.79	4.16
Ref Dist CI90	3.13 - 7.24	3.52 - 7.27	1.40 - 2.37	3.27-7.13
Reg Int range	NA	3.34 - 4.06	NA	NA
CPA median	NA	2.42	NA	2.30
CPA BMI range	NA	1.88 – 2.44	NA	1.56 – 2.46

CPA nutrient range	NA	2.06 – 5.73	NA	2.03 – 5.77

Results for Pmax4hr thresholds had similar patterns as the Delta DO thresholds, due to the high correlation between the two measures. The reference distribution 90th quantile Pmax4hr values are similar in the High-Volcanic and TP Flat site classes at about 0.65 mg/L DO. Stressor-response analyses were only possible in the TP Flat site class. The regression interpolation using nutrient thresholds were slightly lower than the 90th quantile value. Change-point analysis suggested lower thresholds for all macroinvertebrate metrics. Using nutrients in the change-point analysis, only the threshold derived from TN was greater than the reference distribution 90th quantile. Change-point values for all sites were similar to those derived in the TP Flat site class and were generally in the range described by the reference distribution in the TP Steep sites.

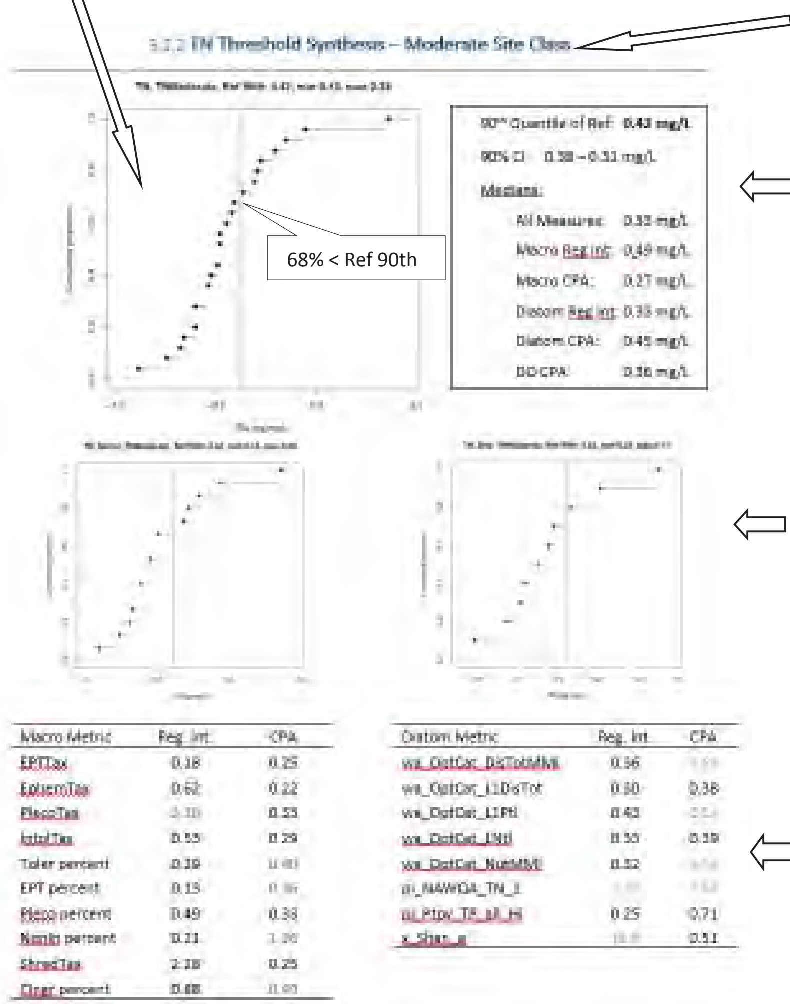
Table 28. Threshold ranges for Pmax4hr derived from reference distributions (Ref Dist 90th), the reference distribution 90% confidence interval (Ref Dist CI90), regression interpolation range (Reg Int range), change-point analysis (CPA) median, and CPA ranges associated with benthic macroinvertebrates (BMI), and nutrients.

	TP High-Volcanic	TP Flat-Moderate	TP Steep	All Classes
Ref Dist 90th	0.635	0.682	0.284	0.659
Ref Dist CI90	0.460 – 0.720	0.493 – 1.200	0.126 – 0.490	0.511-0.688
Reg Int range	NA	0.47 – 0.56	NA	NA
CPA median	NA	0.254	NA	0.290
CPA BMI range	NA	0.214 – 0.439	NA	0.145 – 0.474
CPA nutrient range	NA	0.351 – 0.679	NA	0.269 – 0.679

Candidate Threshold Summary Legend

CDF diagram with all thresholds including 90th quantile of the reference distributions (vertical line with dashed vertical confidence interval) and change-point analysis and regression interpolation from both assemblages. X-axis is log mg/L. Y-axis is proportion of candidate thresholds less than X. The percentage of valid biological thresholds less than the reference 90th quantile is emphasized.

Title, with nutrient and site class



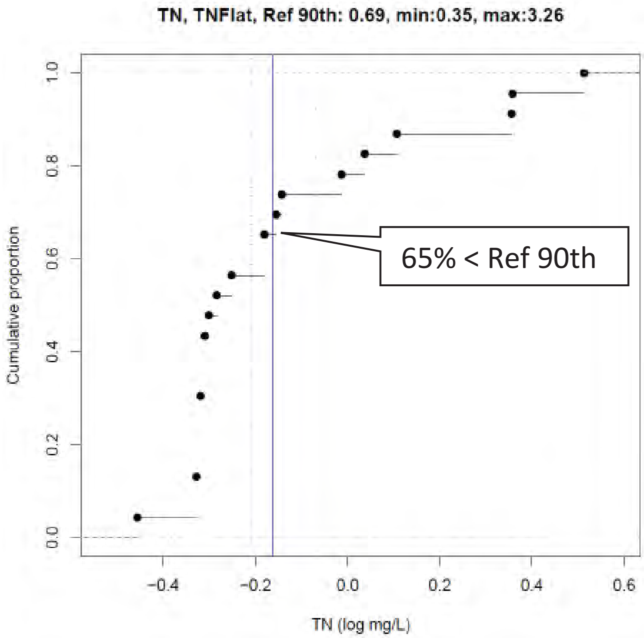
Summary statistics, with candidate threshold, confidence interval and medians of candidate thresholds by assemblage and method.

CDF diagrams for diatoms and macroinvertebrates, including both methods. Nutrients are shown on a log scale on the axes and are back-transformed in the text.

Threshold values from macroinvertebrate and diatom assemblages and from regression interpolation (Reg. Int.) and change-point analysis (CPA). Gray-shaded values are not valid and were not used in the CDF or summary statistics.

NMED EXHIBIT 25

5.2.1 TN Threshold Synthesis – Flat Site Class

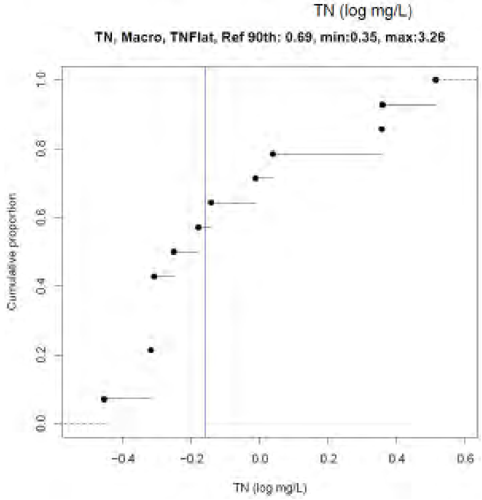


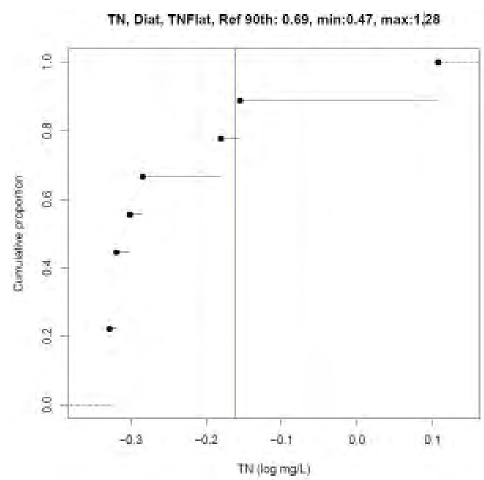
90[th] Quantile of Ref: **0.69 mg/L**

90% CI: 0.62 – 0.85 mg/L

Medians:

All Measures:	0.52 mg/L
Macro Reg Int:	2.28 mg/L
Macro CPA:	0.53 mg/L
Diatom Reg Int:	1.28 mg/L
Diatom CPA:	0.49 mg/L
DO CPA:	NA

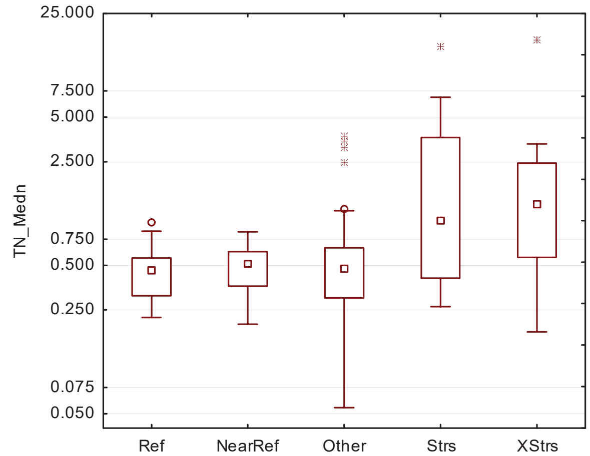




Macro Metric	Reg.Int.	CPA
EPTTax	3.70	0.49
EphemTax	2.27	0.49
PlecoTax	3.26	0.56
IntolTax	3.48	0.48
Toler percent	500.8	0.66
EPT percent	398.7	0.97
Pleco percent	0.49	0.35
NonIn percent	28.3	0.72
ShredTax	2.28	0.48
Clngr percent	108.6	1.09

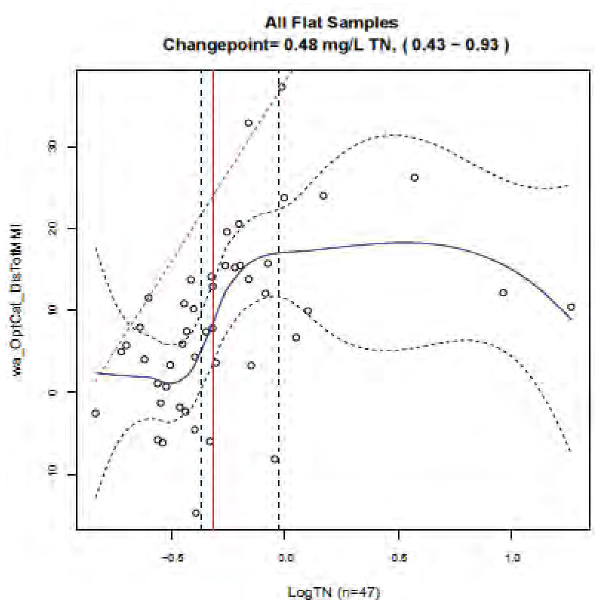
Diatom Metric	Reg.Int.	CPA
wa_OptCat_DisTotMMI	10.4	0.48
wa_OptCat_L1DisTot	18.3	0.50
wa_OptCat_L1Ptl	7.45	0.48
wa_OptCat_LNtl	10.5	0.47
wa_OptCat_NutMMI	9.26	0.47
pi_NAWQA_TN_1	1.28	0.66
pi_Ptpv_TP_all_Hi	7.98	0.52
x_Shan_e	2.26	0.70

TN Threshold Synthesis – Flat Site Class (continued)



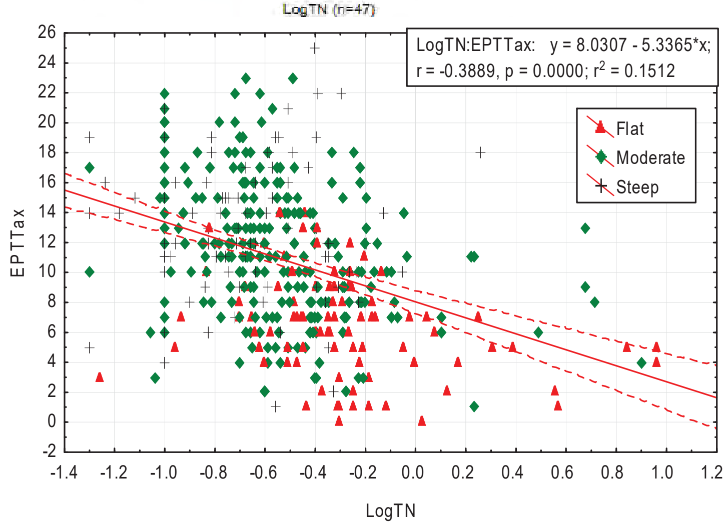
TN values were lowest in reference sites in the TN Flat site class and increased most in the stressed and extremely stressed sites (Figure 45). More than half of the stressed and extremely stressed sites were greater than the 90th quantile value (0.69 mg/L TN). Also see Section 4.2.

Figure 45. Site median TN value distributions along the disturbance gradient for sites in the TN Flat site class.



Several change-points were identified near 0.50 mg/L for both diatoms and macroinvertebrate metrics (e.g., Figure 46). Also see Section 4.5 and Appendix L.

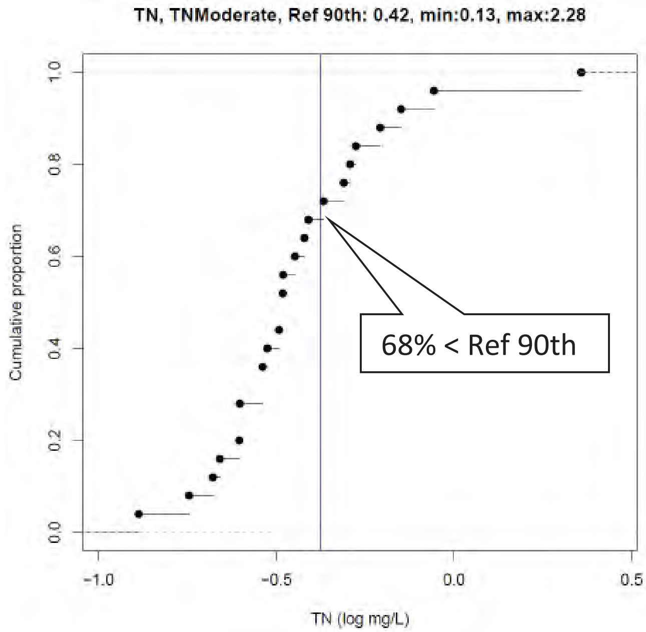
Figure 46. Change-point plot for TN and the weighted average disturbance index diatom metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).



While all but one metric had a significant overall regression equation (e.g., Figure 47), the reference quartiles of the metrics in the TN Flat sites were substantially different than those in the other site classes. This resulted in high interpolated values for TN. Also see Section 4.4 and Appendix K.

Figure 47. Regression plot for TN and EPT taxa. In the TN Flat site class, the reference quartile for EPT taxa was 5 taxa, which translates to 3.7 mg/L TN.

5.2.2 TN Threshold Synthesis – Moderate Site Class

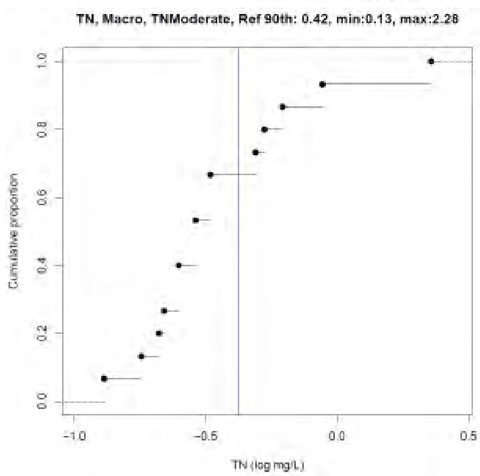


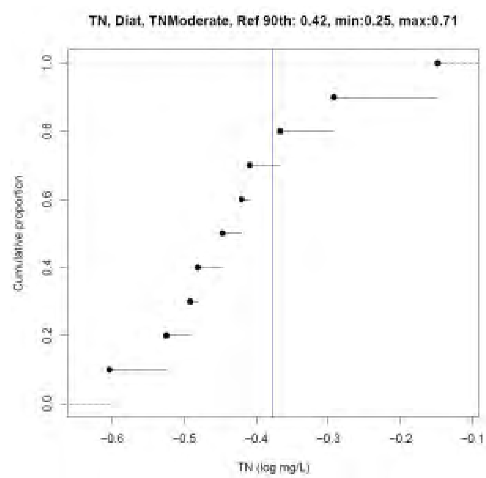
90th Quantile of Ref: **0.42 mg/L**

90% CI: 0.38 – 0.51 mg/L

Medians:

All Measures:	0.33 mg/L
Macro Reg Int:	0.49 mg/L
Macro CPA:	0.27 mg/L
Diatom Reg Int:	0.33 mg/L
Diatom CPA:	0.45 mg/L
DO CPA:	0.36 mg/L

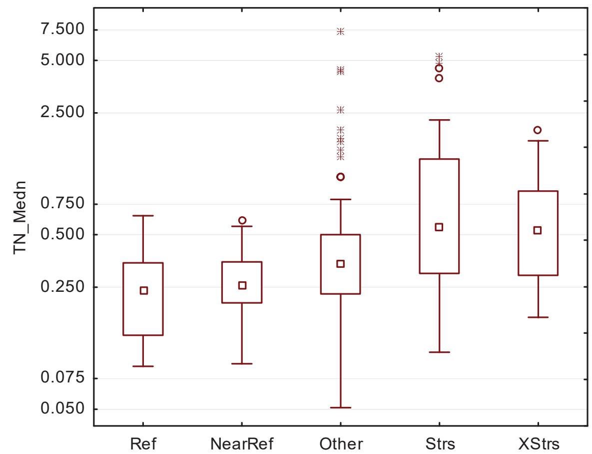




Macro Metric	Reg. Int.	CPA
EPTTax	0.18	0.25
EphemTax	0.62	0.22
PlecoTax	3.26	0.33
IntolTax	0.53	0.29
Toler percent	0.29	0.40
EPT percent	0.13	0.36
Pleco percent	0.49	0.33
NonIn percent	0.21	1.26
ShredTax	2.28	0.25
Clngr percent	0.88	0.49

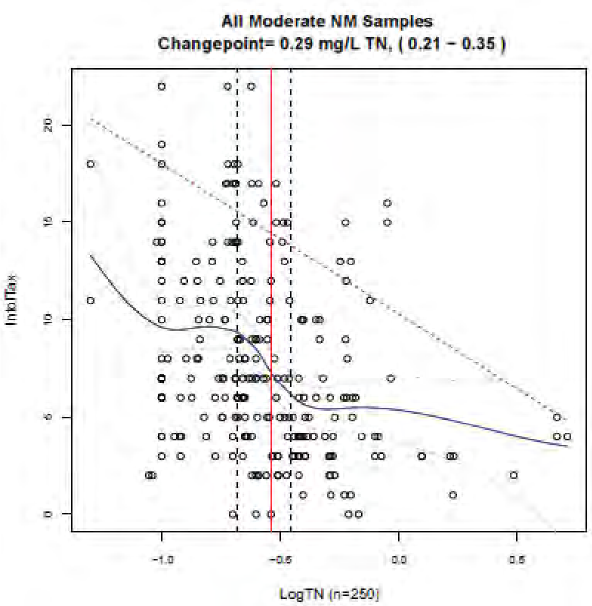
Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.36	0.52
wa_OptCat_L1DisTot	0.30	0.38
wa_OptCat_L1Ptl	0.43	0.52
wa_OptCat_LNtl	0.33	0.39
wa_OptCat_NutMMI	0.32	0.52
pi_NAWQA_TN_1	4.36	0.67
pi_Ptpv_TP_all_Hi	0.25	0.71
x_Shan_e	16.6	0.51

TN Threshold Synthesis – Moderate Site Class (continued)



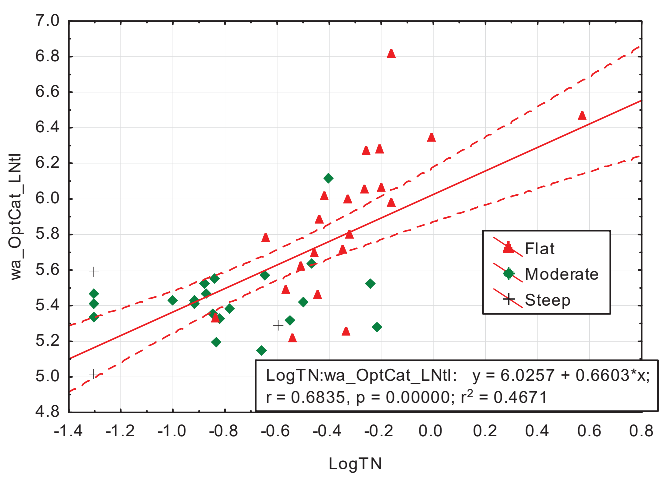
TN values were lowest in reference sites in the TN Moderate site class and increased most in the stressed and extremely stressed sites (Figure 48). More than half of the stressed and extremely stressed sites were greater than the 90th quantile value (0.42 mg/L TN). Also see Section 4.2.

Figure 48. Site median TN value distributions along the disturbance gradient for sites in the TN Moderate site class.



Most change-points were identified at TN values slightly less than the 90th quantile of reference sites (e.g., Figure 49). Also see Section 4.5 and Appendix L.

Figure 49. Change-point plot for TN and the intolerant taxa macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).

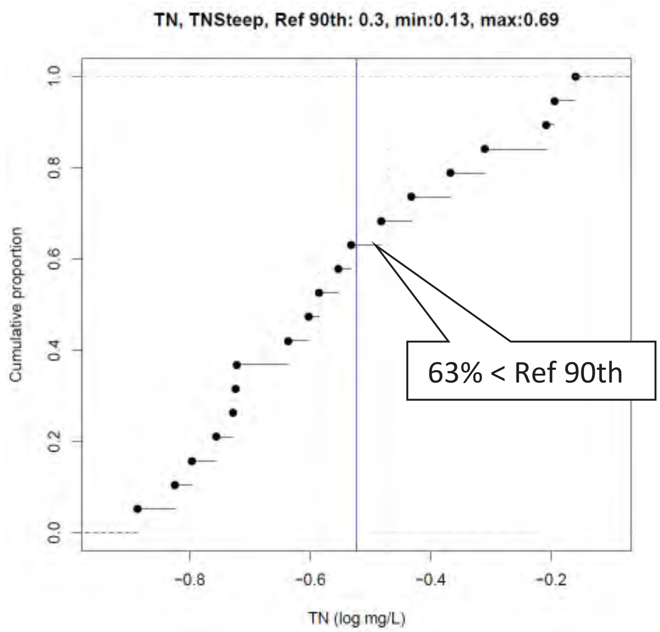


All but one metric had a significant overall regression equation (e.g., Figure 50). The reference quartiles of metrics in the TN Moderate sites were similar to those in the Steep site class. Also see Section 4.4 and Appendix K.

Figure 50. Regression plot for TN and weighted average diatom nitrogen sensitivity. In the TN Moderate site class, the reference quartile for the metric was 6.0, which translates to 0.33 mg/L TN.

NMED EXHIBIT 25

5.2.3 TN Threshold Synthesis – Steep Site Class

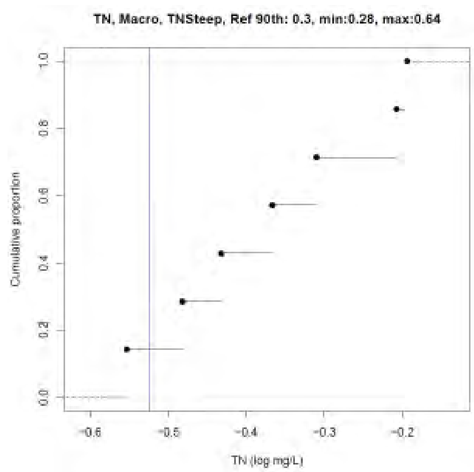


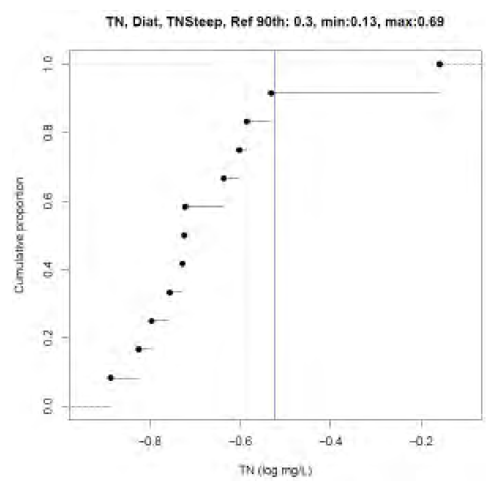
90th Quantile of Ref: **0.30 mg/L**

90% CI: 0.26 – 0.34 mg/L

<u>Medians:</u>

All Measures:	0.26 mg/L
Macro Reg Int:	0.46 mg/L
Macro CPA:	0.21 mg/L
Diatom Reg Int:	0.23 mg/L
Diatom CPA:	0.18 mg/L
DO CPA:	0.30 mg/L



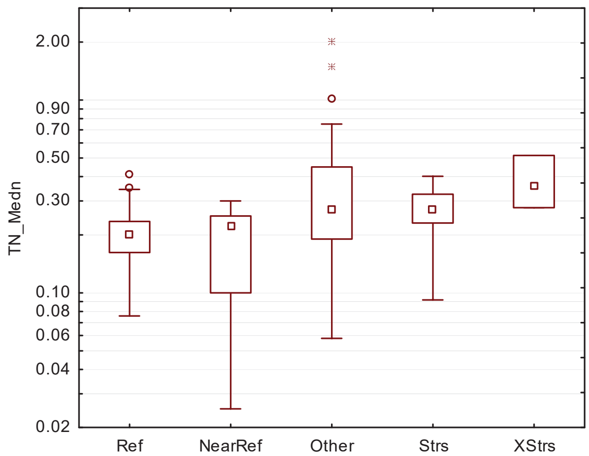


Macro Metric	Reg. Int.	CPA
EPTTax	0.43	0.42
EphemTax	0.62	0.28
PlecoTax	3.26	0.25
IntolTax	0.85	0.39
Toler percent	0.33	0.26
EPT percent	21.5	0.22
Pleco percent	0.49	0.14
NonIn percent	0.37	0.23
ShredTax	0.64	0.23
Clngr percent	2.44	0.28

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.19	0.16
wa_OptCat_L1DisTot	0.19	0.26
wa_OptCat_L1Ptl	0.29	0.13
wa_OptCat_LNtl	0.18	0.19
wa_OptCat_NutMMI	0.23	0.15
pi_NAWQA_TN_1	5.32	0.13
pi_Ptpv_TP_all_Hi	0.69	0.21
x_Shan_e	>10,000	0.25

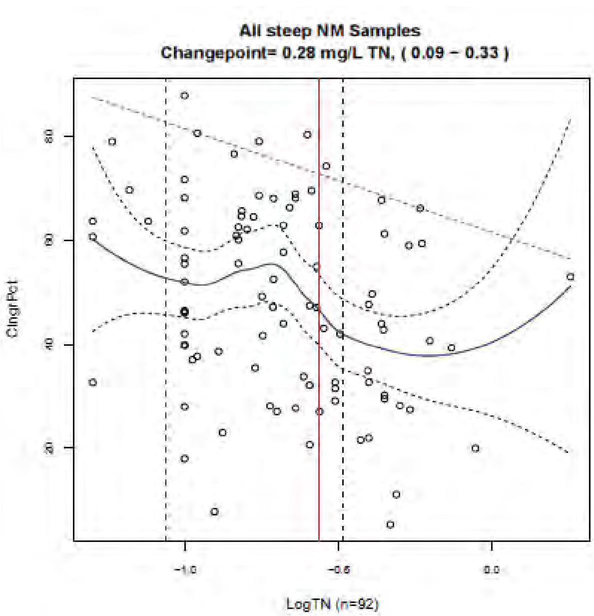
NMED EXHIBIT 25

TN Threshold Synthesis – Steep Site Class (continued)



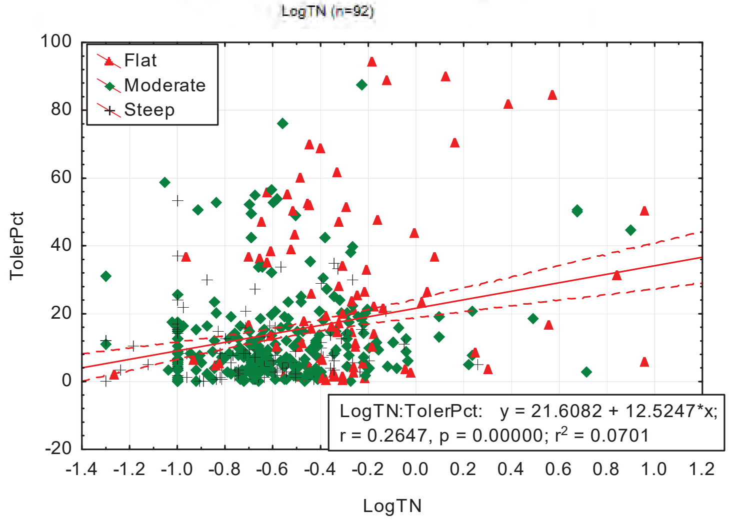
TN values were lowest in reference sites in the TN Steep site class and increased gradually with increasing stress (Figure 51). Approximately half of the stressed and extremely stressed sites were greater than the 90th quantile value (0.30 mg/L TN). Also see Section 4.2.

Figure 51. Site median TN value distributions along the disturbance gradient for sites in the TN Steep site class.



Most change-points were identified at TN values slightly less than the 90th quantile of reference sites. Only one macroinvertebrate metric gave acceptable change-point results (Figure 52). Also see Section 4.5 and Appendix L.

Figure 52. Change-point plot for TN and the percent clinger macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).

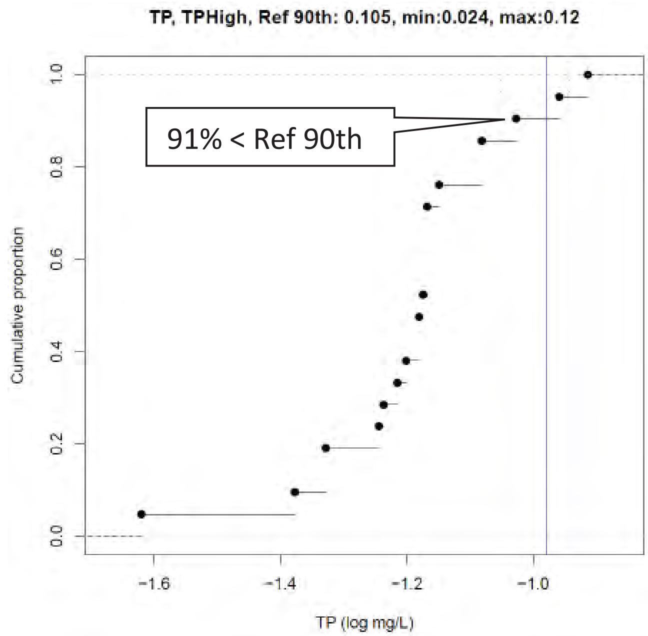


All but one metric had a significant overall regression equation (e.g., Figure 53). Interpolation results closest to the reference quantile value were for the macroinvertebrate percent tolerance metric. Also see Section 4.4 and Appendix K.

Figure 53. Regression plot for TN and macroinvertebrate percent tolerance. In the TN Steep site class, the reference quartile for the metric was 15.5%, which translates to 0.33 mg/L TN.

NMED EXHIBIT 25

5.2.4 TP Threshold Synthesis – High-Volcanic Site Class

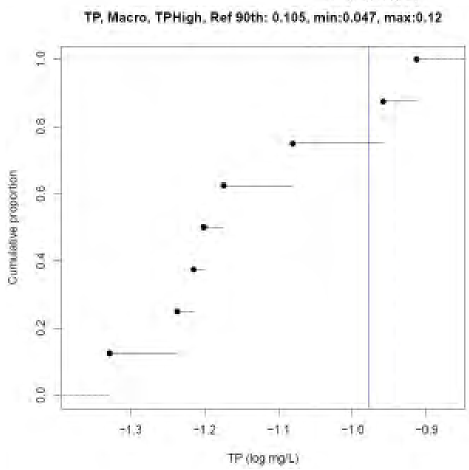


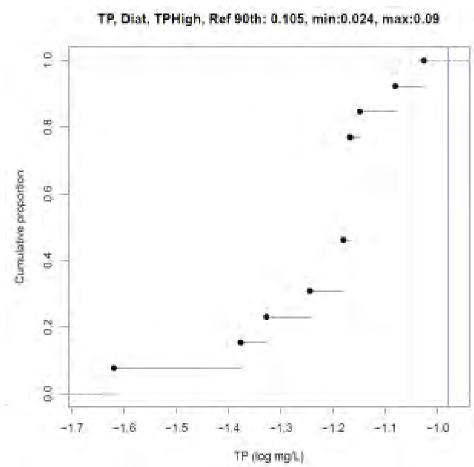
90[th] Quantile of Ref: **0.105 mg/L**

90% CI: 0.89 – 0.114 mg/L

Medians:

All Measures:	0.067 mg/L
Macro Reg Int:	0.110 mg/L
Macro CPA:	0.063 mg/L
Diatom Reg Int:	0.052 mg/L
Diatom CPA:	0.068 mg/L
DO CPA:	0.059 mg/L

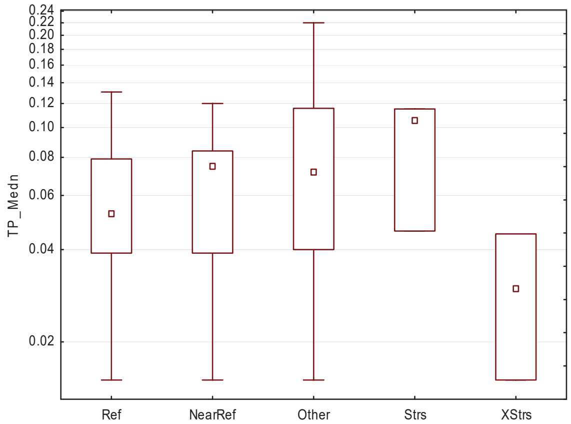




Macro Metric	Reg. Int.	CPA
EPTTax	0.11	0.067
EphemTax	1.00	0.058
PlecoTax	1.61	0.063
IntolTax	0.88	0.061
Toler percent	0.22	0.083
EPT percent	59,102	0.047
Pleco percent	1.74	0.114
NonIn percent	1.46	0.083
ShredTax	56.47	0.047
Clngr percent	13.22	0.122

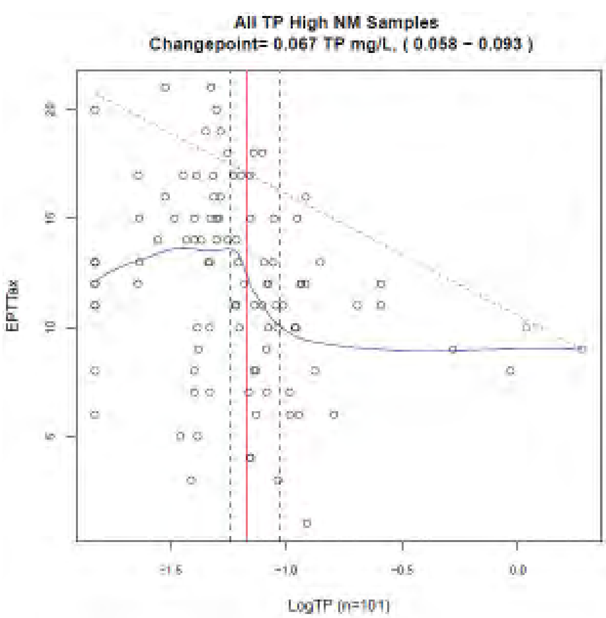
Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.042	0.068
wa_OptCat_L1DisTot	0.024	0.068
wa_OptCat_L1Ptl	0.068	0.066
wa_OptCat_LNtl	0.057	0.068
wa_OptCat_NutMMI	0.047	0.066
pi_NAWQA_TN_1	0.457	0.084
pi_Ptpv_TP_all_Hi	0.083	0.094
x_Shan_e	9.272	0.071

TP Threshold Synthesis – High-Volcanic Site Class (continued)



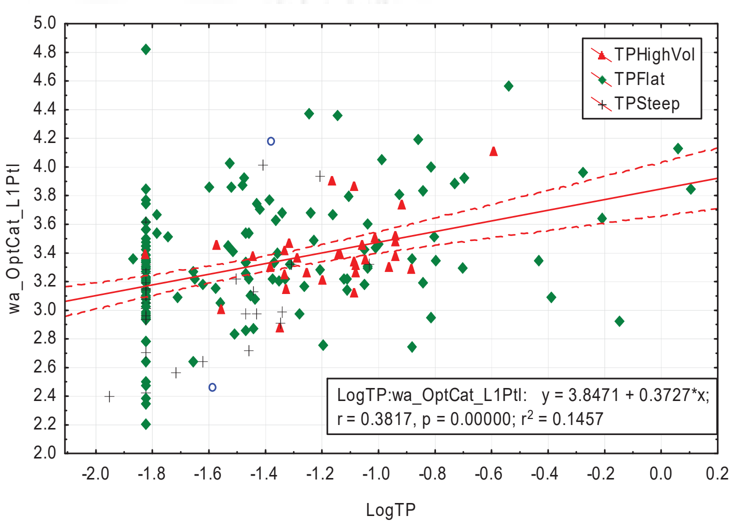
Median TP values in reference sites of the TP High-Volcanic site class were lower than those in the stressed sites and higher than those in the few extremely stressed sites (Figure 54). Most of the sites that were greater than the 90th quantile value (1.05 mg/L TP) were in the Other category. Also see Section 4.2.

Figure 54. Site median TP value distributions along the disturbance gradient for sites in the TP High-Volcanic site class.



Most change-points were identified at TP values less than the 90th quantile of reference sites, like the EPT taxa response (Figure 55). Only the percent clinger macroinvertebrate metric had a higher change-point. Also see Section 4.5 and Appendix L.

Figure 55. Change-point plot for TP and the EPT taxa macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).

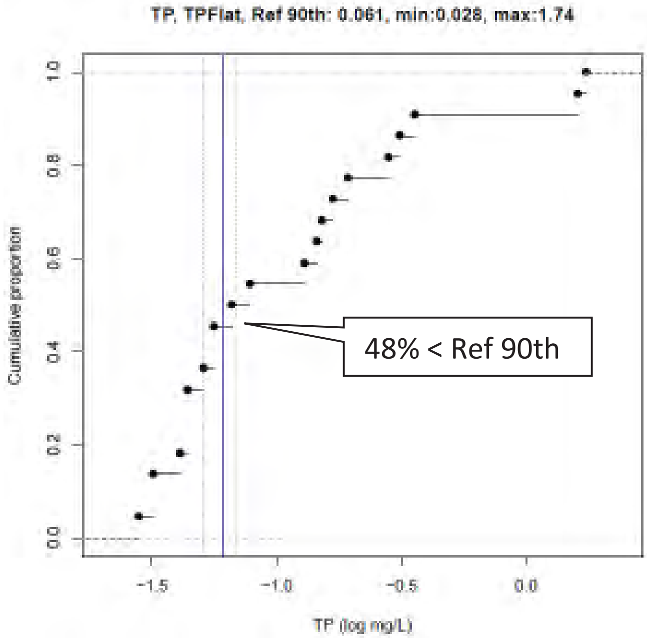


All but one diatom metric had interpolated TP values less than the reference 90th quantile, such as the weighted average phosphorus diatom metric (Figure 56). Also see Section 4.4 and Appendix K.

Figure 56. Regression plot for TP and weighted average diatom phosphorus sensitivity. In the TP High Volcanic sites, the metric upper reference quartile was 3.4, which translates to 0.068 mg/L TP.

NMED EXHIBIT 25

5.2.5 TP Threshold Synthesis – Flat-Moderate Site Class

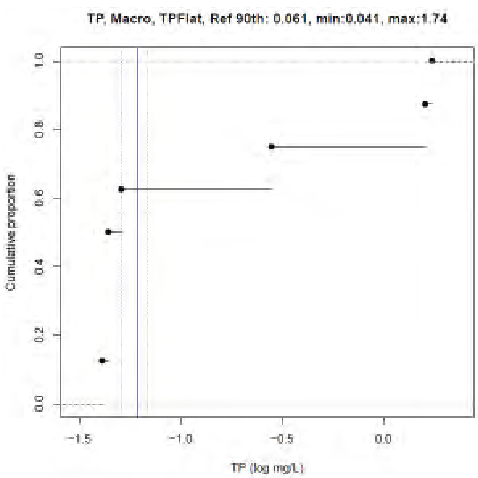


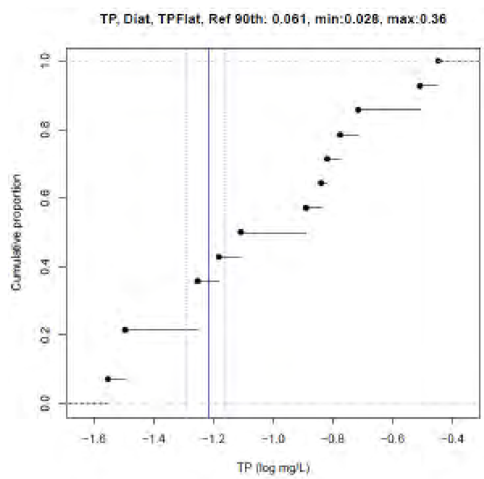
90th Quantile of Ref: **0.061 mg/L**

90% CI: 0.051 – 0.069 mg/L

Medians:

- All Measures: 0.066 mg/L
- Macro Reg Int: 1.675 mg/L
- Macro CPA: 0.044 mg/L
- Diatom Reg Int: 0.168 mg/L
- Diatom CPA: 0.056 mg/L
- DO CPA: 0.099 mg/L

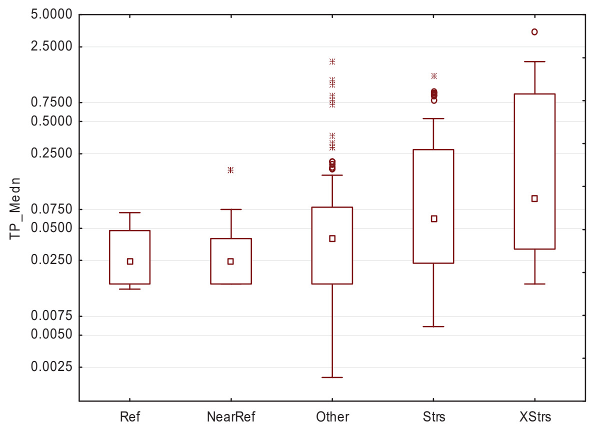




Macro Metric	Reg. Int.	CPA
EPTTax	3.39	0.044
EphemTax	211	0.044
PlecoTax	1.61	0.041
IntolTax	6.22	0.051
Toler percent	3.11	0.052
EPT percent	31.91	0.014
Pleco percent	1.74	0.044
NonIn percent	0.281	0.014
ShredTax	56.47	0.151
Clngr percent	5.01	0.051

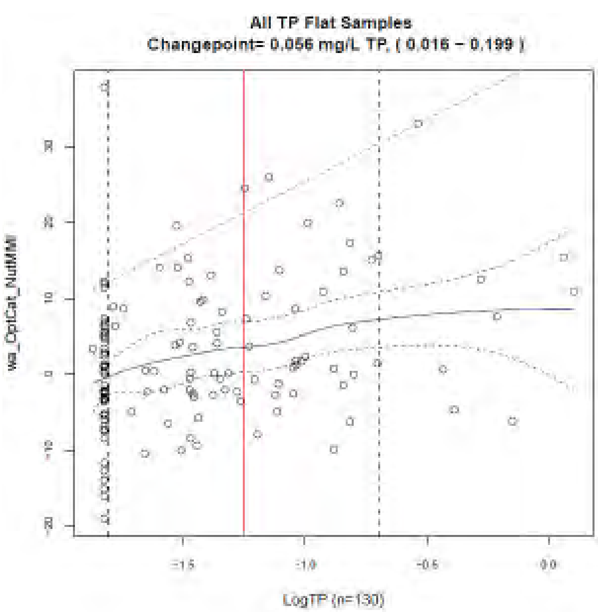
Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.168	0.056
wa_OptCat_L1DisTot	0.358	0.066
wa_OptCat_L1Ptl	0.145	0.032
wa_OptCat_LNtl	0.311	0.078
wa_OptCat_NutMMI	0.193	0.056
pi_NAWQA_TN_1	0.129	0.028
pi_Ptpv_TP_all_Hi	0.152	0.032
x_Shan_e	7.272	0.034

TP Threshold Synthesis – Flat-Moderate Site Class (continued)



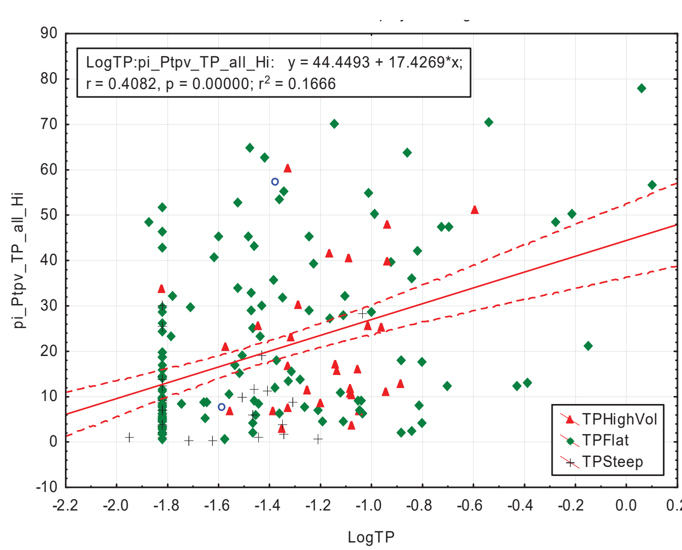
TP values were lowest in reference sites in the TP Flat-Moderate site class and increased gradually with increasing stress (Figure 57). More than half of the stressed and extremely stressed sites were greater than the 90th quantile (0.071 mg/L TP). Also see Section 4.2.

Figure 57. Site median TN value distributions along the disturbance gradient for sites in the TP Flat-Moderate site class.



Change-points for macroinvertebrates were lower than the 90th quantile of reference sites. For diatoms, valid change-points bracketed the 90th quantile. The weighted average nutrient index diatom metric had a change-point close to the reference 90th quantile (Figure 58). Also see Section 4.5 and Appendix L.

Figure 58. Change-point plot for TP and the weighted average nutrient index diatom metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).

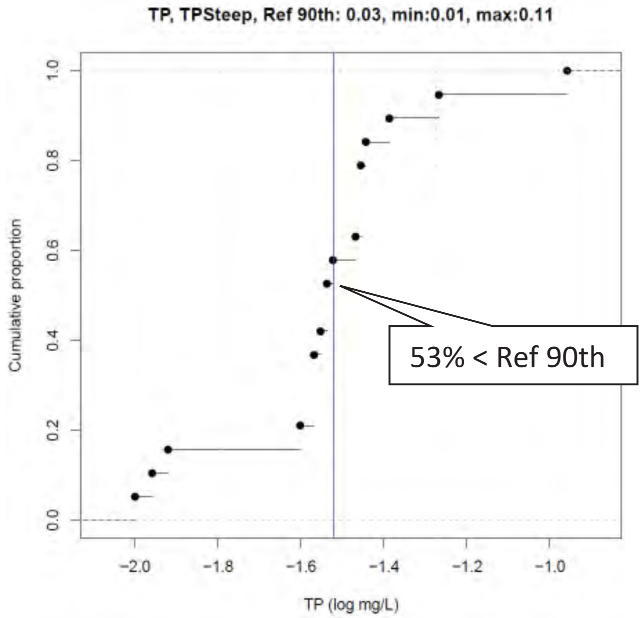


Most regression interpolations for macroinvertebrate metrics were unreasonably high. Diatom results were also higher than the 90th quantile of reference sites (e.g., Figure 59). Also see Section 4.4 and Appendix K.

Figure 59. Regression plot for TP and percent TP tolerant diatom metric. In the TP Flat-Moderate site class, the upper reference quartile for the metric was 30.2, which translates to 0.152 mg/L TP.

NMED EXHIBIT 25

5.2.6 TP Threshold Synthesis – Steep Site Class

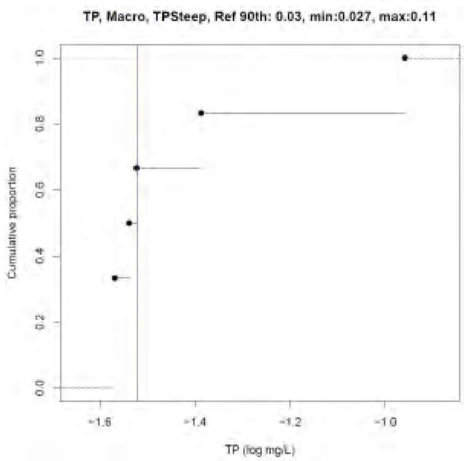


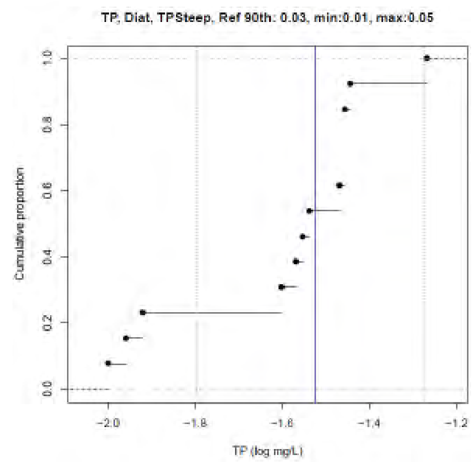
90th Quantile of Ref: **0.030 mg/L**

90% CI: 0.016 – 0.053 mg/L

Medians:

All Measures:	0.029 mg/L
Macro Reg Int:	0.110 mg/L
Macro CPA:	0.029 mg/L
Diatom Reg Int:	0.026 mg/L
Diatom CPA:	0.035 mg/L
DO CPA:	0.035 mg/L



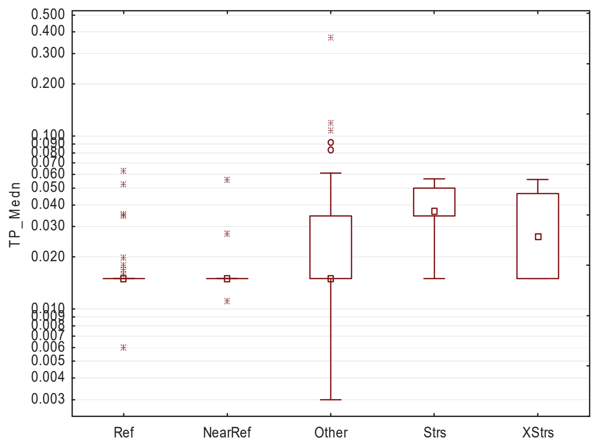


Macro Metric	Reg. Int.	CPA
EPTTax	0.11	0.030
EphemTax	1.00	0.030
PlecoTax	0.15	0.027
IntolTax	0.33	0.029
Toler percent	0.017	0.041
EPT percent	491758	0.029
Pleco percent	0.80	0.027
NonIn percent	0.003	0.018
ShredTax	0.60	0.017
Clngr percent	0.50	0.022

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.028	0.035
wa_OptCat_L1DisTot	0.027	0.034
wa_OptCat_L1Ptl	0.029	0.036
wa_OptCat_LNtl	0.054	0.035
wa_OptCat_NutMMI	0.025	0.035
pi_NAWQA_TN_1	0.010	0.019
pi_Ptpv_TP_all_Hi	0.011	0.029
x_Shan_e	0.012	0.027

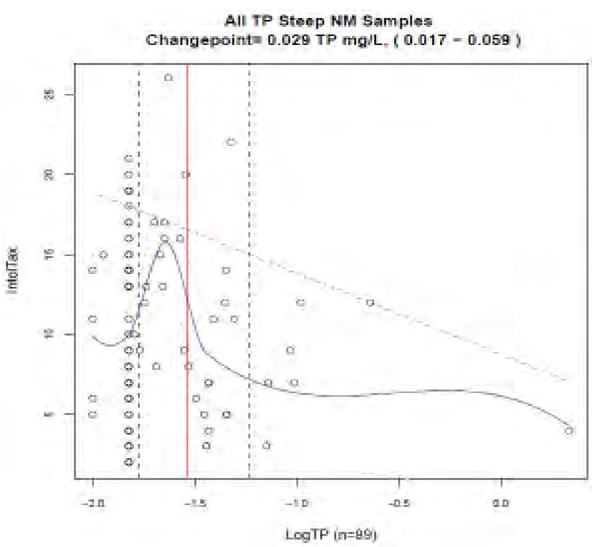
NMED EXHIBIT 25

TP Threshold Synthesis – Steep Site Class (continued)



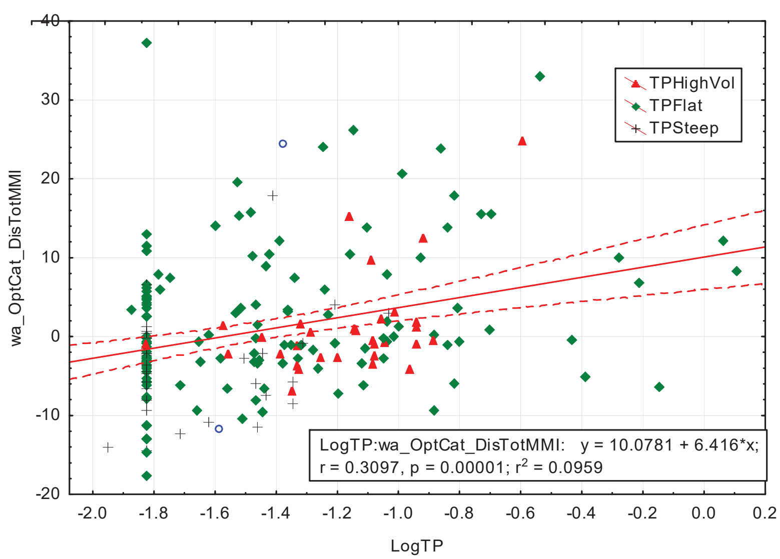
TP values were lowest in reference sites in the TP Steep site class and median values were highest in the stressed and extremely stressed sites (Figure 60). The 90th quantile value (0.054 mg/L TP) is exceeded most often in sites in the Other category. Also see Section 4.2.

Figure 60. Site median TP value distributions along the disturbance gradient for sites in the TP Steep site class.



Relatively few change-points were valid, but those that were fell near the 90th quantile of reference sites (e.g., Figure 61). Also see Section 4.5 and Appendix L.

Figure 61. Change-point plot for TP and the intolerant taxa macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).



Most regression interpolations for macroinvertebrate metrics were high. Diatom results were closer to the 90th quantile (e.g., Figure 62). Also see Section 4.4 and Appendix K.

Figure 62. Regression plot for TP and weighted average disturbance index metric. In the TP Steep site class, the reference quartile for the metric was 1.1, which translates to 0.028 mg/L TP.

6.0 Discussion

The goals of this report were to describe the intent, methods, and results of nutrient threshold development for perennial wadeable streams in New Mexico. The basis of the threshold development process was the Empirical Approaches for Nutrient Criteria Derivation (USEPA 2009). This approach includes five steps, (1) Selecting and Evaluating Data; (2) Assessing the Strength of the Cause-Effect Relationship; (3) Analyzing Data; (4) Evaluating Estimated Stressor-Response relationship; and (5) Evaluating Candidate Stressor-Response Criteria. Quantitative nutrient translator values that were derived using reference conditions and stressor-response analyses will be used to apply the existing narrative nutrient criterion. The narrative criterion is to protect against plant nutrient levels associated with "undesirable aquatic life" and "dominance of nuisance species". Through the conceptual model and analyses of select linkages within it, this report suggested ranges of numeric thresholds for TP and TN that could be associated with reference sites and protection of aquatic life. Using the nutrient threshold ranges and other evidence, NMED SWQB can select and incorporate revised numeric thresholds for TN and TP into their assessment protocols and refine thresholds for other water quality variables.

Nutrient thresholds ranges were derived within site classes with relatively homogenous expectations for natural nutrient conditions. The least disturbed reference sites throughout the state had variable nutrient concentrations. The variation was associated with land slope in the catchment of each site. For TP geologic regions as well as land slope was used to identify site classes and areas with high natural phosphorus that can be associated with volcanic geology. Three nutrient-specific site classes were identified for TP and TN. While residual variability in nutrient concentrations was evident after site classification, the site classes sufficiently reduced the overall statewide variability for threshold derivation. The site classes and ranges of associated nutrient thresholds are summarized in Tables 11 and 26.

The TN and TP site classes are not directly comparable to the ecoregional classes used in previous nutrient threshold development efforts in NM. However, the thresholds derived for the new site classes using distribution statistics and stressor response analysis (Table 26) are generally higher than those currently used (Table 3). For TN, the range of thresholds derived in this report is from 0.26 to 0.69 mg/L. This compares to a range of 0.25 to 0.53 mg/L TN currently used. For TP, the derived thresholds are from 0.029 to 0.105 mg/L compared to the currently used thresholds of 0.020 to 0.090 mg/L TP.

The synthesis of threshold ranges (Section 5.0) compared the reference frequency distribution values and confidence limits with the ranges and central tendencies of the stressor-response values. NMED SWQB can select nutrient thresholds that are both representative of most reference sites in a site class and that are protective of meaningful biological conditions. The selection should weigh the merits of each of the analytical methods for threshold derivation, the endpoints (reference conditions, aquatic assemblage, or DO measure), and the ranges of valid thresholds.

The thresholds derived from the 90th quantile of reference nutrient concentrations in each site class are primary thresholds under consideration. The emphasis is based on high confidence in the reference site designations. Reliance on the 90th quantile of the reference distribution is justified if the reference sites are correctly identified. NMED is relatively certain that the reference sites are identified correctly because of the rigorous technical analysis of disturbance variables and the qualitative review process. With less confidence, a lower quantile of the distribution (e.g., 75th) would be selected. The 75th quantile values for TN and TP in each site class were consistently near but lower than the lower confidence intervals for the 90th quantile values (Table 12). NMED should select appropriate quantiles to use for each site class based on comparison of the confidence intervals and range of candidate thresholds as summarized in the cumulative frequency distributions, as well as the merits of each of the analytical methods.

The medians of the valid stressor-response nutrient thresholds were within the 90% confidence interval of the reference-derived 90th quantile thresholds in the Steep site classes for both TN and TP and in the Flat-Moderate site class for TP (Table 26). In the TN Flat, TN Moderate, and the TP High-Volcanic classes, the medians of the stressor-response thresholds were lower than the lower confidence limit for the reference derived thresholds. In the TN Flat and TN Moderate classes, about 70% of the valid stressor-response thresholds were less than the reference derived thresholds (See CDFs in Section 5.2). In the TP High-Volcanic site class, about 90% of the stressor-response thresholds for both macroinvertebrates and diatoms were less than the reference derived threshold. The aquatic assemblages are apparently responsive to increases in nutrients even when those increases might not be associated with identifiable human disturbance in the landscape. In this case, NMED might weigh the feasibility of reducing nutrients to protect biotic assemblage metrics (using a lower threshold) in an environment with ample nutrients as a natural condition (suggested by the higher reference-derived threshold).

Limitations of analytical methods

Regressions are used to estimate a relationship between any pair of variables. When used for threshold derivation, it is important to consider the theoretical assumptions underlying regression inferences. More specifically, one must assess: (1) whether the assumed linear functional form is sufficiently representative of the actual relationship, (2) whether the sampling variability in the dependent variable is distributed as assumed, (3) whether the magnitude of the sampling variability in the dependent variable changes across the range of predictions, and (4) whether the samples used to fit the model are independent of one another. In the regression interpolation analysis, these assumptions were based on regression statistics and examination of the scatter plots. To address representativeness, the regression was required to have significant p-value (<0.05). Flat slopes (low r^2) did not automatically disqualify a regression relationship from being used for derivation of thresholds. Variability around the regression line was not formally assess, but scatter plots were reviewed and typically showed a wedge-shaped plot with higher variability in response variables at lower stressor values compared to higher stressor values. This is assumed to be related to unmeasured stressors that do not appear in the x-axis, but still limit the response. The samples were assumed to be independent of each other because they were from unique sites and times.

The regression interpolation analyses resulted in valid thresholds for TN in the Moderate and Steep site classes. In the TN Flat class, regression interpolation results were high or outside of the acceptable range of TP values for both macroinvertebrates and diatoms. For TP, regression interpolation resulted in valid thresholds when derived from diatom metrics, but not for most macroinvertebrate metrics. The unacceptably high nutrient thresholds derived from the regression interpolation method may be attributed to several factors, including the wedge shape of the stressor-response relationships, the high variability observed in the modifying factors (Section 4.3), and the uncertainty in defining critical response levels based on reference quartiles. Potential thresholds were considered valid if they were within the general observed range of values in each site class. The high ends of potential threshold ranges were usually attributed to a result from the regression interpolation method.

The change-point analysis identifies nutrient concentrations that are associated with high degrees of change in the response variable. The change-points typically fall in the middle of the steepest parts of the LOWESS regression curves. Nutrient stressor-response effects might be occurring at the first inflection of the curve instead of at its steepest point. Therefore, the change-point might be more indicative of more severe effects instead of the earliest minimal effects. The change-point analysis was mostly invalid for deriving TN thresholds based on macroinvertebrates in the TN Steep class. In other classes and for all classes using diatoms, valid thresholds were derived from at least half of the metrics.

Conceptual relationships supported by the analyses

TP and benthic chl-a were positively correlated in all sites and in the TP High-Volcanic site class, supporting the conceptual linkage between higher nutrients and higher chl-a levels. TN and benthic chl-a were not significantly correlated in any of the data subsets, suggesting that TP is the limiting nutrient in most cases. Nutrient and chl-a correlations were never significant in the Steep site classes, in which nutrient concentrations were relatively low. Besides having a short stressor gradient, steep streams might also have scouring flows and closed canopies that are not optimal conditions for chl-a growth. Benthic chl-a was also related to conductivity, elevation, drainage area, latitude, longitude, and pH, though these were not successfully used to reduce variability and increase the correlations between nutreints and chl-a.

Sestonic chl-a was significantly related to both TN and TP in the NRSA sites, except in the steep sites. In slow, broad streams and small rivers, the chl-a in the water column might actually be planktonic. However, it is also likely that much of the sestonic chl-a is of benthic origin, having sluffed off due to overgrowth, grazing, or scouring. For sestonic chl-a, correlations with TN were stronger than those with TP. Sestonic chl-a was also related to elevation, conductivity, turbidity, and drainage area.

The conceptual model included a relationship between chl-a and DO dynamics, in which increased chl-a was related to lower minimum DO and greater DO flux over the course of a day.

While benthic chl-a was correlated with changes in DO (DeltaDO, Pmax4hr, Rmax4hr, and ER), it was not correlated to minimum DO. This might be due to production and respiration of the living algal biomass, whereas the concept was that excessive chl-a would also result in high respiration and low DO caused by dead biomass and high organic content in the sediments. The lack of low minimum DO in relation to high chl-a and the association of high sestonic chl-a with high nutrients suggests that algae that overgrows and sluffs does not end up in the sediments, but is transported downstream. High nutrients were related to low minimum DO, confirming an indirect relationship that does not depend on chl-a.

The diatom assemblage was expected to change in response to increases in nutrients. As expected, several diatom metrics were correlated with TN and TP. TN was positively correlated with conductivity, which was also commonly correlated with metric values. Based on numbers of significant correlations, diatoms appear to be more sensitive to TP than to TN. When other variables were allowed in multiple regression models, conductivity often became the dominant predictor. Conductivity (nor other modifying factors) was not factored out in the analysis of nutrient-diatom relationships. Eight diatom metrics were selected to characterize responses to nutrients.

The expectation in the conceptual model was that benthic macroinvertebrates would respond to increased nutrients because of the effects of increase algal biomass (chl-a) and decreased DO. There were 14-16 macroinvertebrate metrics that were significantly correlated with chl-a and diel DO measures, including minimum DO and Pmax4hr. However, though the relationship between nutrients and macroinvertebrates is conceptually indirect, more macroinvertebrate metrics were significantly correlated to TN and TP than to chl-a or DO measures. Ten macroinvertebrate metrics were selected to characterize responses to nutrients.

Dissolved Oxygen

DO was addressed as part of the conceptual model pathway between nutrients and macroinvertebrates. NMED has numeric criteria for minimum DO and pH in streams (5-6 mg/L DO, depending on the use; pH in the range of 6.6 – 9.0). This report examined DO and pH in correlation analyses and used DO in deriving TN and TP thresholds. pH was found to be positively correlated with both nutrients, more strongly with TN than with TP (see Table 15).

With increased nutrients there was greater daily fluctuations in DO and lower minimum DO (see Table 19). Minimum DO was negatively correlated to both TN and TP. Daily fluctuations (DeltaDO, Pmax4hr, and GPP) were positively and more strongly correlated to TP than to TN. DeltaDO, Pmax4hr, and Rmax4hr were highly correlated to each other.

In correlation analyses with macroinvertebrates, the diel DO metrics with the most significant correlations were minimum DO, Pmax4hr, and DeltaDO. Of these three metrics, Pmax4hr had the second greatest number of significant correlation in all sites and had the most significant correlation in each of the site classes. In the TP Flat-moderate site class, GPP had more significant correlations with macroinvertebrate metrics than other diel DO measure, though it was not highly correlated in all sites or in other site classes. NMED could continue to use minimum DO in assessments because it is correlated with both nutrients and macroinvertebrate metrics and is an important linkage in the conceptual model. Either Pmax4hr or DeltaDO could also be used for assessments because they are highly correlated with each other and with macroinvertebrate metrics. These DO metrics are correlated to TP more than they are to TN.

When minimum DO and Pmax4hr were used in change-point analysis to find nutrient thresholds, the identified thresholds were similar to the reference 90^{th} quantile values. This corroboration of nutrient thresholds and macroinvertebrate responses suggests that the DO metrics are appropriate indicators for NMED assessment protocols. Change-point analysis to find DO metric thresholds from macroinvertebrate metrics and nutrient concentrations resulted in median minimum DO thresholds of 2.3 mg/L, lower than the 5-6 mg/L currently in NMED standards. Only change-points identified from TN were in the 5-6 mg/L range.

Application Issues

The NMED SWQB might decide to select interim nutrient thresholds based on these analyses and ranges of threshold values. Selection of interim thresholds should be based on the ranges of potential thresholds derived from reference distributions and stressor-response analyses. In general, the thresholds derived from the 90^{th} quantile of reference distributions are higher than the median of those derived through stressor-response analyses. Selection of an interim threshold should weigh the merits of each analytical technique and the levels of protection they afford. The reference distribution approach emphasizes observed best conditions. Stressor-response approaches emphasize changes in macroinvertebrate and diatom metrics. NMED should establish the final thresholds using an adaptive management framework in which after testing preliminary thresholds with new data and scrutinized them in the context of appropriate policies and applications.

The thresholds derived in this report are based on data from perennial wadeable streams as defined by NMED. Any interim thresholds should only be applied in similar streams types.

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NMED EXHIBIT 25

Appendix A: Historic Nutrient Thresholds

The analysis conducted by SWQB to produce nutrient threshold values for streams was based on ecoregion and designated aquatic life use. For this analysis, TP, total Kjeldahl nitrogen (TKN), and nitrate plus nitrite (N+N) data from the National Nutrient Dataset (1990-1997) was combined with Archival STORET data from 1998 and 1999-2006 data from the SWQB in-house database. SWQB recognized site classes based on Level 3 ecoregions and cold, warm, and transitional temperature regimes as applied for designated Aquatic Life Uses. The threshold values (Table 3 in the main report) were derived from median values for all the data in each classification.

The query tool was used to acquire nutrient data from rivers and streams in the National Nutrient Dataset. There were 3230 total phosphorus, 3450 total Kjeldahl nitrogen, and 3250 nitrate plus nitrite stream data points generated with this query. The site information associated with the nutrient data such as the latitude and longitude, sample date, and water body name were include in the query. The query also contained a "Standard Value" which had one half of the "Reported Value" for those data points that were below the detection limit.

Data from 1998 was acquired from Archival STORET using the Advance Query Tool, and downloading all of the surface water data between 01-01-1998 and 12-30-1998 for parameter codes 00665 (Total Phosphorus), 00625 (Total Kjeldahl Nitrogen), and 00630 (Nitrate plus Nitrite). Unfortunately, the entire state could not be queried for specific dates and parameters so the data had to be downloaded by each county separately. Data for rivers, lakes, and reservoirs as well as playas was removed from this dataset. This query generated 483 total phosphorus, 489 total Kjeldahl nitrogen, and 662 nitrate plus nitrite data points. The "Standard Value" was calculated and these data were appended to the pre-1998 data.

Data from 1999 to 2006 were acquired from the SWQB in-house database. A query was run to compile total phosphorus, total Kjeldahl nitrogen, and nitrate plus nitrite data from streams as well as sample date and site location information. This query generated 3125 total phosphorus, 3216 total Kjeldahl nitrogen, and 3223 Nitrate plus Nitrite data points. The "Standard Value" was calculated and these data were appended to the pre-1999 data. All of the "Units" and "Standard Units" were converted to mg/L and designations for below the detection limit were standardized between the datasets from the different sources.

Once the dataset was compiled, the data were divided by waterbody type, removing all rivers, reservoirs, lakes, wastewater treatment effluent, and playas. For this project "rivers" were defined as systems that cannot be monitored effectively with methods developed for wadeable streams and generally have drainage areas greater than 2,300 square miles. The systems included in the "rivers" waterbody type are: 1) the San Juan River from below Navajo Reservoir to the Colorado border near Four Corners, 2) the Rio Grande in New Mexico, 3) the Pecos River from below Sumner Reservoir to the Texas border, 4) the Rio Chama from below El Vado Reservoir to the Rio Grande, 5) the Canadian River below the Cimarron River , 6) Rio Puerco below the confluence with the Rio San Jose, and 7) the Gila River below Mogollon. GIS was used to identify data from river sites as defined above.

Level III and IV Omernik ecoregions (Omernik 2006) as well as the designated aquatic life use were assigned to all stream sites using GIS coverages and the station's latitude and longitude. New Mexico has 7 aquatic life uses: high quality coldwater, coldwater, marginal coldwater, warmwater, marginal warmwater, aquatic life, and limited aquatic life. Aquatic life and limited aquatic life sites were not used in this analysis as they generally represent waters with ephemeral or intermittent flow, naturally occurring rapid environmental changes, high turbidity, fluctuating temperatures, low dissolved oxygen content or unique chemical characteristics. Data from sites that had aquatic life designations of "aquatic life use" or "limited aquatic life use" were removed from the dataset. The 5 other aquatic life uses were divided into 3 groups:

1. Coldwater (CW) – those segments having only coldwater uses (high quality coldwater or coldwater)
2. Transitional (T)– waterbodies with marginal coldwater or both cold and warmwater uses
3. Warmwater (WW) - waterbodies having only warmwater uses (warmwater or marginal warmwater)

Because of the limited area and number of sites in the Madrean Archipelago (79), Western High Plains (25), and Colorado Plateau (20) ecoregions, these data where grouped with the most similar ecoregions; the Madrean Archipelago with the Chihahuan Desert and the Colorado Plateau with the Arizona New Mexico Plateau. The Western High Plains had no stream data as the only surface waters are playas, therefore this ecoregion was not included in the analysis.

The stream data were divided first by ecoregion then by aquatic life use. In ecoregion 26 on the Gallinas River below San Augustin, there was a period of 3 days when 4 to 15 samples were collected. For these data, daily averages were calculated. When there were less than 60 data points in the warmwater group, these data were combined with the transitional group to form the Trans/WW group. The 50th percentiles (medians) were calculated for each parameter and ecoregion/aquatic life use group using Excel. The total nitrogen value was then calculated by adding the percentile for total Kjeldahl nitrogen with the percentile for nitrate plus nitrite.

There was no difference in the TP threshold values for the coldwater and trans/ww groups in ecoregion 21. However, when examining the different level IV ecoregions there was a significant difference in the TP data from the volcanic and the other groups. This lead to the development of a separate threshold value for the ecoregion 21 volcanic group. The threshold value was calculating by determining the median of the data from ecoregions 21g and 21h as well as 21j in the Jemez Mountains. The Grassland Parks (21j) of the Jemez Mountains were included in this group as they are of volcanic origin and have the characteristic higher background TP.

Appendix B: Geospatial Analysis

Geospatial data were generated for stream sites in New Mexico. The sites were prioritized for analysis because the effort would be too high to delineate and analyze all sites with nutrient data. Prioritization was based on data completeness (having more than nutrient data alone), reference status (being considered as a possible reference site), and high nutrient values (to be certain we had representation from the stressed end of the disturbance gradient. We also identified identical site locations with different Station IDs. We prioritized 662 unique sites for analysis, including NMED, NRSA, and WSA sites (Table B-3). The geospatial data were used for the classification analyses and to screen sites for disturbance.

We used Geographic Information System software (ArcGIS 10.0) to spatially join the sampling sites with National Hydrography Dataset Plus Version 2 flowlines (NHDPlusV2) (http://www.horizon-systems.com/NHDPlus/NHDPlusV2_home.php). Then we used ArcHydro custom watershed delineation to delineate exact watersheds for all of the sites. Tetra Tech performed quality assurance and quality control procedures to screen for errors in the geospatial data. We were unable to check all of the stream data due to the large number of sites. We reviewed site delineations using desktop display in Google Earth; plotting drainage area vs. stream width and looking for outliers; and communicating with NMED staff to verify data that appeared questionable.

Land use statistics were used for disturbance screening. Table B-1 contains a list of the land use parameters that were generated for each site. The source of these data was the 2011 National Land Cover Database (NLCD) dataset (http://www.mrlc.gov/nlcd2011.php) (Jin et al. 2013).

Table B-1. Land use data that were generated for streams in New Mexico. Source: 2011 National Land Cover Database (NLCD) dataset.

Code	Description
	% Impervious cover
PNLCD_11	% Open Water
PNLCD_21	% Developed, Open Space
PNLCD_22	% Developed, Low Intensity
PNLCD_23	% Developed, Medium Intensity
PNLCD_24	% Developed, High Intensity
PNLCD_31	% Barren
PNLCD_41	% Deciduous Forest
PNLCD_42	% Evergreen Forest
PNLCD_43	% Mixed Forest
PNLCD_52	% Shrub/Scrub
PNLCD_71	% Grassland/Herbaceous
PNLCD_81	% Pasture/Hay
PNLCD_82	% Cultivated Crops
PNLCD_90	% Woody Wetlands
PNLCD_95	% Emergent Herbaceous Wetlands

Some of the land use categories were combined to generate land use indices. Examples include:

- % Agriculture = % Cultivated Crops (code 82) + % Pasture/Hay (code 81)
- % Urban = % Developed, Low Intensity (code 22) + % Developed, Medium Intensity (code 23) + % Developed, High Intensity (code 24)

Table B-2. Non-land use geospatial data generated by Tetra Tech.

Variable Code	Description and Source	Specific Measurement
SiteID	Site ID	Label
DrAreaMi2	Drainage Area Size	sq miles
Latitude	Latitude	
Longitude	Longitude	
Elev_m	Elevation from 30m DEM	meters
StrmOrdr	Stream Order NHDPlus V2 Data	modified Strahler
Slope_m_m	Stream Slope	m/m
Eco3Dom	Dominant Level 3 Ecoregion	Ecoregion code
GeolgDom	Dominant Geology "RockType1"	Rock type category
LndSlpMin%	Percent (Land) Slope (30-m resolution NED)	Min
LndSlpAvg%		Average
LndSlpMax%		Max
LndSlpSTD%		STD
PrecipMin30	PRISM climate data (1981-2010 "normals")	Monthly 30-year Average Precipitation (mm) - Minimum
PrecipAvg30		Monthly 30-year Average Precipitation (mm) - Average
PrecipMax30		Monthly 30-year Average Precipitation (mm) - Maximum
TempMin30		Monthly 30-year Average Minimum Temperature (deg C)
TempMax30		Monthly 30-year Average Maximum Temperature (deg C)
TempAvg30		Monthly 30-year (Calculated) Average Temperature (deg C)
RoadMiles	Roads (Census Streets, 2010)	Total Length of Roads (miles)
RoadDens		Road Density (length/area)
StrmMiles	Streams/Rivers (NHD Hi-Res)	Total Length of Streams (miles)
StrmDens		Stream Density (length/area)
RdXStrmCnt	Road/Stream Crossings	Total Count (#)
RdXStrmDens		Count/Area
DamsCnt	Dams and Diversions (NHDPlus V2)	Total Count (#)
DamsDens		Density (count/area)
DamDistMin		Distance to Drainage Outlet (Min)

Variable Code	Description and Source	Specific Measurement
DamDistAvg		Distance to Drainage Outlet (Avg)
DamDistMax		Distance to Drainage Outlet (Max)
NPDESCnt	NPDES Permits	Total Count (#)
NPDESDens		Density (count/area)
NPDdstMin		Distance to Drainage Outlet (Min)
NPDdstAvg		Distance to Drainage Outlet (Avg)
NPDdstMax		Distance to Drainage Outlet (Max)
SprFndCnt	Superfund Sites	Total Count (#)
SprFndDens		Density (count/area)
SFdistMin		Distance to Drainage Outlet (Min)
SFdistAvg		Distance to Drainage Outlet (Avg)
SFdistMax		Distance to Drainage Outlet (Max)
SFdst2strmMin		Distance to Closest NHDPLus HiRes Stream/River (Min)
SFdst2strmAvg		Distance to Closest NHDPLus HiRes Stream/River (Avg)
SFdst2strmMax		Distance to Closest NHDPLus HiRes Stream/River (Max)
MinesCnt	Mines (MRDS, Producers and Past Producers)	Total Count (#)
MinesDens		Density (count/area)
MineDstMin		Distance to Drainage Outlet (Min)
MineDstAvg		Distance to Drainage Outlet (Avg)
MineDstMax		Distance to Drainage Outlet (Max)
MnDst2strmMin		Distance to Closest NHDPLus HiRes Stream/River (Min)
MnDst2strmAvg		Distance to Closest NHDPLus HiRes Stream/River (Avg)
MnDst2strmMax		Distance to Closest NHDPLus HiRes Stream/River (Max)

Table B-3. Sites delineated and analyzed for geospatial attributes. Ordered by Site ID.

Site ID	Latitude	Longitude	Site Name
02Carriz002.7	36.8898	-103.0084	Carrizozo Creek near NM406 (DCR 12)
02DryCim003.2	36.9175	-103.0272	Dry Cimarron River at Wiggins Road (DCR 11)
02DryCim047.2	36.9931	-103.4086	Dry Cimarron R. at Jesus Mesa Rd (DCR 09) (ds gage)
02DryCim074.5	36.9367	-103.565	Dry Cimarron River abv Long Canyon (DCR 05)
02DryCim108.2	36.8728	-103.8808	Dry Cimarron R. at Folsom Falls abv Oak Crk
02DryCim122.7	36.8679	-103.9804	Dry Cimarron at Rainbow Ranch
02LongCa004.1	36.945	-103.5944	Long Canyon about 2 miles abv NM 456 (DCR 06)
02OakCre000.1	36.8999	-103.8588	Oak Creek abv Dry Cimarron River (DCR 03)
04Canadi352.7	36.3289	-104.4976	Canadian River abv Cimarron River at NM 56
04Canadi402.9	36.6521	-104.4883	Canadian River @ Tinaja - 04Canadi402.9
04Chicor010.9	36.77	-104.3958	Chicorica Creek below Una de Gato Creek
04Chicor034.4	36.9586	-104.3859	Chicorica Creek abv Lake Alice - 04Chicor034.4
04Dogget002.3	36.8708	-104.4258	Doggett Creek abv Raton WWTP
04RatonC007.8	36.8511	-104.4054	Raton Creek 5 miles abv Chicorica Cr
04RatonC010.9	36.8686	-104.4256	Raton Creek Below Raton Wwtf Discharge
04RatonC013.8	36.8879	-104.4439	Raton Creek Below Public Service Co.
04UnaGat000.1	36.7722	-104.395	Una De Gato Creek Upstream Of Chicorica Cr
04UnaGat020.9	36.8208	-104.2281	UNA DE GATO AT BRIDGE BELOW T O DAM
04Vermej080.2	36.859	-104.9501	Vermejo River at Juan Baca Canyon
04YorkCa000.1	36.8228	-104.9061	YORK CANYON CR. abv THE VERMEJO RIVER
05Cieneg006.3	36.4754	-105.2643	Cieneguilla Creek abv Eagle Nest Lake at USGS gage
05Cieneg016.5	36.4108	-105.2839	Cieneguilla Creek at County Road B-25
05Cieneg019.3	36.3844	-105.2836	Cieneguilla Creek at Angel Fire Road
05Cieneg021.9	36.3633	-105.2858	Cieneguilla Creek below Crooked Creek
05Cimarr013.4	36.3603	-104.5978	Cimarron River at USGS gauge in Springer
05Cimarr041.2	36.472	-104.8011	Cimarron River At CS Ranch HQ - 05Cimarr041.2
05Cimarr050.8	36.5197	-104.9783	Cimarron River abv Cimarron Village at USGS gage
05Cimarr077.2	36.538	-105.2233	Cimarron R. blw Eagle Nest Dam at Tolby Campgrnd
05Moreno003.7	36.5532	-105.2678	Moreno Creek on NM 64 at USGS gage
05MPonil000.1	36.6224	-105.04	Middle Ponil Creek abv South Ponil Creek
05MPonil016.2	36.7013	-105.1703	Middle Ponil Creek abv Greenwood Creek
05MPonil027.2	36.7764	-105.2136	Upper Middle Ponil Creek
05NPonil000.1	36.5881	-104.9656	North Ponil Creek abv South Ponil
05NPonil023.2	36.7482	-105.0715	North Ponil Cr abv Seally Cr - 05NPonil023.2

Site ID	Latitude	Longitude	Site Name
05NPonil027.5	36.7756	-105.0983	North Ponil Creek at FR 1950
05PonilC000.1	36.4714	-104.787	Ponil Creek abv Cimarron River - 05PonilC000.1
05PonilC002.2	36.4792	-104.7936	Ponil Creek at NM 58 - 05PonilC002.2
05PonilC014.9	36.5218	-104.8972	Ponil Creek abv NM 64 - 05PonilC014.9
05PonilC023.8	36.5733	-104.9464	Ponil Creek at USGS Gage
05Rayado001.8	36.3942	-104.7093	Rayado Creek abv Cimarron River
05Rayado033.8	36.3682	-104.9298	Rayado Creek on NM 21 - 05Rayado033.8
05Sixmil001.4	36.5183	-105.2745	Sixmile Creek abv US 64 near USGS gauge
05UteCre000.6	36.5608	-105.102	Ute Creek abv US 64 at Ute Park
06Canadi232.6	35.6559	-104.3762	Canadian River at NM 419 near Sanchez
06Canadi305.0	36.0669	-104.3722	Canadian River @ Mills Canyon - 06Canadi305.0
06Canadi348.3	36.2969	-104.4933	Canadian Riv.Near Taylor Springs Near USGS Gage
06OcateC025.1	36.2114	-104.6596	Ocate creek @ I-25 - 06OcateC025.1
07Coyote001.7	35.9039	-105.1528	Coyote Creek 1 Mile Abv Mora R. At Thal Ranch
07Maesta000.4	35.8532	-105.4594	Maestas Cr. abv Manuelitas Cr. - 07Maesta000.4
07Manuel020.9	35.855	-105.4556	Manuelitas Cr. abv Maestas Cr. - 07Manuel020.9
07MoraRi000.8	35.7321	-104.3914	Mora River 0.5 mile abv Canadian River
07MoraRi139.9	35.9408	-105.2497	MORA RIVER AT LA CUEVA USGS GAGE
07MoraRi146.6	35.9661	-105.3018	Mora River below Mora WWTP lagoons
07MoraRi147.1	35.9698	-105.3052	Mora River abv Mora WWTP lagoons
07MoraRi147.2	35.9692	-105.3061	Mora River abv Hatchery - 07MoraRi147.2
07MoraRi170.9	36.1161	-105.3753	MORA RIVER AT CHACON .6 MILES abv GAGE
07RioLaC006.2	35.9803	-105.4143	Rio de la Casa 4 miles abv Mora River
07RitoCe004.6	35.8736	-105.2508	Rito Cebolla abv hwy 518 - 07RitoCe004.6
07RSanJo000.5	35.8363	-105.4152	Rito San Jose abv Manuelitas Cr. - 07RSanJo000.5
07Sapell044.4	35.7703	-105.2519	Sapello R. at Hwy 518 - 07Sapell044.4
07Sapell069.8	35.8197	-105.4653	Sapello river 1/4 mi. inside Mosimann ranch gate
07WolfCr000.6	35.8123	-104.9231	Wolf Cr. abv Mora R. - 07WolfCr000.6
08Concha025.1	35.4028	-104.4431	Conchas River at USGS gage on NM 104
09Canadi001.2	35.3951	-103.0422	Canadian River abv NM/TX State Line
09Canadi062.4	35.3569	-103.4175	Canadian R 1 Mi Bl Ute Dam, at 54 nr USGS Gage
09Canadi144.5	35.3235	-103.981	Canadian River at NM 104 at milemarker 88
09Canadi204.1	35.4089	-104.1695	Canadian River immediately bl Conchas Dam
09Pajari001.0	35.3125	-103.7	PAJARITO CR abv THE CANADIAN RIVER
09Pajari020.0	35.2112	-103.743	Pajarito Creek at NM 104 - 09Pajari020.0

Site ID	Latitude	Longitude	Site Name
10UteCre104.3	35.9509	-103.6966	Ute Creek abv Highway 102 near Bueyeros
10UteCre150.7	36.2215	-103.8506	Ute Creek at Hwy 120 - 10UteCre150.7
16Corrum051.1	36.7026	-103.3049	Corrumpa Creek at Hwy 370 - 16Corrum051.1
16Seneca043.0	36.5884	-103.3156	Seneca Creek abv Clayton Lake - 16Seneca043.0
27CTGran000.7	36.8567	-106.1513	Canada Tio Grande abv Rio San Antonio
27RPinos002.6	36.9822	-106.0736	Rio de los Pinos at USGS gage - 27RPinos002.6
27RPinos007.3	36.9572	-106.0995	Rio de los Pinos near Ortiz - 27RPinos007.3
27RPinos011.3	36.9565	-106.1461	Rio de los Pinos abv NMDGF area at FS bridge
27RSanAn000.4	36.9936	-106.0383	Rio San Antonio at NM-CO border in Ortiz
27RSanAn025.3	36.8579	-106.1296	Rio San Antonio at FR 87 bridge - 27RSanAn025.3
28BigTes013.2	35.7784	-105.8	Big Tesuque Creek, abv Aspen Vista FR
28Bitter003.0	36.7194	-105.3797	Bitter Creek abv town of Red River - 28Bitter003.0
28Cabres005.4	36.7306	-105.5533	CABRESTO CREEK AT USGS GAGE 08266000
28Casias000.6	36.9135	-105.261	Casias Creek abv Costilla Reservoir - 28Casias000.6
28Chamis003.0	36.1709	-105.737	Chamisal Creek below Village of Chamisal
28Columb000.1	36.6806	-105.5147	Columbine Creek abv Red River
28Comanc000.1	36.8319	-105.3186	Comanche Creek abv Costilla Creek - 28Comanc000.1
28Comanc007.7	36.7792	-105.2753	Comanche below upper exclosure - 28Comanc007.7
28Cordov001.5	36.895	-105.4378	Cordova Creek abv Costilla Creek abv Hwy 196
28Cordov006.2	36.863	-105.4514	Cordova Creek 300m upstream from Day Lodge
28Embudo000.8	36.2108	-105.9131	Embudo Creek at Hwy 68 nr Dixon at USGS gage
28Embudo010.1	36.179	-105.8306	Embudo Creek abv Canoncito - 28Embudo010.1
28Embudo020.5	36.1969	-105.735	Embudo Creek blw Santa Barbara/Pueblo confluence
28LosAla021.5	35.8858	-106.3589	Upper Los Alamos Canyon abv reservoir
28NFkTes000.6	35.7694	-105.8086	N.Fork Of Tesuque Cr Abv Hyde Park (475) Rd
28Pionee000.7	36.7042	-105.4147	Pioneer Creek about 400 yards abv the Red R.
28Pojoaq005.0	35.8909	-106.0715	Pojoaque River at State Road 84D - 28Pojoaq005.0
28Pueblo013.4	36.1685	-105.6028	Rio Pueblo .8 miles abv Hwy 518/75 at USGS gage
28RChiqB000.1	36.1789	-105.703	Rio Chiquito near mouth - 28RChiqB000.1
28RChupa014.3	35.7843	-105.8785	Rio Chupadero @ FR 102 - 28RChupa014.3
28RChupa015.2	35.7856	-105.8694	Rio Chupadero abv summer homes
28RCosti005.7	36.9667	-105.5075	Costilla Creek abv Costilla at Hwy 196 bridge
28RCosti032.2	36.8319	-105.3194	Costilla Creek below Comanche Creek
28RCosti032.5	36.8322	-105.3184	Costilla Cr abv Comanche Cr - 28RCosti032.5
28RCosti052.2	36.8356	-105.3446	Rio Costilla at Valle Vidal Boundary

Site ID	Latitude	Longitude	Site Name
28RedRiv005.3	36.6824	-105.6557	Red River below Fish Hatchery near USGS
28RedRiv005.9	36.6853	-105.6514	Red River abv Fish Hatchery and diversion
28RedRiv014.0	36.7032	-105.5688	Red River @ USGS gage (Questa) - 28RedRiv014.0
28RedRiv024.4	36.6979	-105.4759	Red River @ Molycorp boundary - 28RedRiv024.4
28RedRiv027.8	36.7078	-105.4372	Red River abv Molycorp, below WWTP
28RedRiv031.1	36.705	-105.4042	Red River below Bitter Creek
28RedRiv035.5	36.6736	-105.3792	Red River at Zwergle - 28RedRiv035.5
28RFerna000.3	36.3947	-105.6185	Rio Fernando de Taos abv Rio Pueblo de Taos
28RFerna031.7	36.4181	-105.3427	Rio Fernando de Taos at Hwy 64 bridge
28RGRanc000.2	36.3878	-105.6314	Rio Grande del Rancho abv Rio Pueblo de Taos
28RGRanc013.1	36.2978	-105.5819	Rio Grande del Rancho @ gage near Talpa
28RGrand547.2	35.8747	-106.1417	Rio Grande at Otowi Bridge -- USGS 08313000
28RGrand550.8	35.9011	-106.1257	Rio Grande blw Rio Pojoaque - 28RGrand550.8
28RGrand650.8	36.3386	-105.7294	Rio Grande below Rio Pueblo de Taos
28RGrand725.5	36.9313	-105.7358	Rio Grande below Rio Costilla @ Ute
28RHondo000.1	36.5344	-105.708	Rio Hondo at Rio Grande confluence
28RHondo003.9	36.5353	-105.6667	Rio Hondo at HWY 3 Bridge
28RHondo012.1	36.5328	-105.5833	RIO HONDO AT VALDEZ BRIDGE
28RHondo014.8	36.5417	-105.5564	Rio Hondo 1.5 miles abv Valdez at USGS gage
28RHondo022.4	36.5883	-105.4918	RIO HONDO 2.4 MILES BLW STP
28RHondo026.7	36.5957	-105.459	RIO HONDO 300 YDS BLW STP - 28RHondo026.7
28RHondo026.9	36.5961	-105.454	Rio Hondo 50 feet abv WWTP - 28RHondo026.9
28RHondo027.3	36.596	-105.449	Rio Hondo abv Lake Fork at Taos Ski Valley Parking t
28RiOlla000.8	36.2762	-105.5764	Rito de la Olla at bridge on Hwy 518 - 28RiOlla000.8
28RLucer013.0	36.5083	-105.5302	Rio Lucero at USGS Gage on Taos Pueblo
28RMedio007.2	35.8206	-105.8903	Rio en Medio at USFS boundary - 28RMedio007.2
28RMedio013.3	35.8033	-105.8333	Rio en Medio at Aspen Ranch
28RMedio016.9	35.7934	-105.7994	Rio en Medio 200 m below ski area parking lot
28RMedio017.5	35.7915	-105.7936	Rio en Medio abv ski area
28RNambe005.1	35.8494	-105.8964	Rio Nambe abv Nambe Reservoir - 28RNambe005.1
28RPuebl000.3	36.1986	-105.7314	Rio Pueblo at HWY 75 abv Rio Santa Barbara
28RPuebl012.4	36.1715	-105.6123	Rio del Pueblo at 75/518 junction
28RPuebl019.0	36.1545	-105.551	Rio Pueblo below Flechado campground, abv Sipapu
28RPuebT000.1	36.3392	-105.7305	Rio Pueblo de Taos abv Rio Grande
28RPuebT008.1	36.3792	-105.6679	Rio Pueblo de Taos 20m below Taos effluent channel

Site ID	Latitude	Longitude	Site Name
28RPuebT008.3	36.3801	-105.6636	Rio Pueblo de Taos 20m below Taos effluent channel
28RPuebT013.2	36.3899	-105.6305	Rio Pueblo de Taos abv R. Gr. d Rancho, nr L. Cordovas
28RQuema003.1	36.0012	-105.9022	Rio Quemado near Chimayo - 28RQuema003.1
28RSanBa000.1	36.1972	-105.7342	Rio Santa Barbara at mouth - 28RSanBa000.1
28RSanBa002.0	36.1882	-105.7168	Rio Santa Barbara at Roybal Road - 28RSanBa002.0
28RSanBa013.2	36.1153	-105.6386	Rio Santa Barbara at Hodges Campground
28RSanBa017.9	36.0853	-105.6081	Rio Santa Barbara at Santa Barbara Campground
28SanCru004.2	35.9843	-106.0288	Santa Cruz River at town of Quarteles
28SanCru012.1	35.9996	-105.9505	Santa Cruz River abv County Rd 93 Bridge
28Tesuqu023.4	35.7389	-105.9056	Tesuque Creek at gage 08302500 near Santa Fe
29Abiqui001.8	36.2092	-106.3207	Abiquiu Creek at US 84 bridge - 29Abiqui001.8
29Abiqui002.3	36.1978	-106.3231	Abiquiu Creek
29Canjil006.2	36.3219	-106.494	Canjilon Creek abv Abiquiu Reservoir at US 84
29Canjil039.5	36.5066	-106.4028	Canjilon Creek abv Canjilon
29Canone001.7	36.222	-106.451	Canones Creek at hwy 96 - 29Canone001.7
29Canone002.4	36.8094	-106.5672	Cañones Creek abv HWY 84 (near Chama)
29Canone004.6	36.1992	-106.4508	Canones Creek @ FR 167 below Canones
29Cecili000.1	36.2006	-106.8	Cecilia Canyon Creek at FR 171 * 29Cecili000.1
29Chihua000.1	36.1328	-106.461	Chihuahuenos Creek abv Canones
29ClearC000.1	36.2027	-106.856	Clear Creek at FR 76 - 29ClearC000.1
29Coyote005.6	36.1319	-106.6172	Coyote Creek at FR 316 at Coyote Creek Campground
29Coyote017.5	36.0489	-106.6019	Coyote Creek at 0.5 mi abv FR 100 (near Coyote)
29ElRito035.9	36.44	-106.2728	El Rito (lower) on Oso Ranch
29ElRito050.2	36.5561	-106.29	El Rito (upper) near Canyon de Chacon
29LitTus003.4	36.7464	-106.1475	Little Tusas at FR 133
29NaborC000.1	36.9592	-106.6344	Nabor Creek 5 yards upstream of Rio Chamita
29PoleoC009.5	36.1242	-106.7122	Poleo Creek at FR 103 - 29PoleoC009.5
29Polvad008.8	36.1847	-106.4314	Polvadera Creek @ FR 27 (CR 95) - 29Polvad008.8
29RBrazo001.6	36.7469	-106.5664	RIO BRAZOS abv U.S. HIGHWAY 84 BRIDGE
29RBrazo010.1	36.7372	-106.4261	RIO BRAZOS I MILE abv CORKINS LODGE
29RChama079.5	36.3272	-106.6183	Rio Chama abv Abiquiu Reservoir at USGS gage
29RChama082.8	36.3424	-106.6516	Rio Chama 3 miles below Rio Gallina
29RChama143.8	36.6658	-106.6597	Rio Chama 2 Miles Downstream of La Puente Gage
29RChama147.1	36.7827	-106.5662	Chama River 4 km below Chama WWTP (G&F Area)
29RChama161.1	36.8784	-106.5829	Chama River at U.S. HWY 84 bridge below Chama

NMED EXHIBIT 25

Site ID	Latitude	Longitude	Site Name
29RChama174.0	36.8442	-106.5786	Rio Chama Below Chama Town
29RChama183.4	36.9125	-106.5731	Rio Chama at NM 17
29RChami002.7	36.877	-106.587	Rio Chamita below Chama WWTP outfall
29RChami002.8	36.8803	-106.5873	Rio Chamita abv Chama WWTP outfall
29REncin009.7	36.1464	-106.5222	Rito Encino at FR 100Z - 29REncin009.7
29RGalli000.5	36.3706	-106.6847	Rio Gallina at confluence with Rio Chama
29RGalli005.5	36.4044	-106.7256	Rio Gallina abv Chama River and Skull Ranch
29RGalli045.1	36.1942	-106.8442	Rio Gallina at FR 76 - 29RGalli045.1
29RioOso001.9	36.1018	-106.165	Rio del Oso upstream from Canoncito
29RioOso004.7	36.0919	-106.1861	Rio del Oso abv Rio Chama - 29RioOso004.7
29RMedio002.7	36.5483	-106.4469	Rio del Medio abv FR 125 near Cebolla
29RNutri005.4	36.5659	-106.6751	Rio Nutrias abv Rio Chama - 29RNutri005.4
29RNutri028.4	36.5769	-106.5128	Rio Nutrias at US 84 - 29RNutri028.4
29ROjoCa005.1	36.1383	-106.1039	Rio Ojo Caliente 3.4 miles abv confl with Rio Chama
29RPuerc011.0	36.2047	-106.5825	Rio Puerco de Chama at CR 211 - 29RPuerc011.0
29RPuerc037.5	36.1002	-106.7269	Rio Puerco de Chama at FR 103 - 29RPuerc037.5
29RResum001.9	36.1081	-106.7478	Rito Resumidero below Resumidero Spring
29RResum002.5	36.1136	-106.7464	Rito Resumidero at FR 93 * 29RResum002.5
29RTierr026.1	36.6475	-106.4225	Rito Tierra Amarilla at Hwy 64 - 29RTierr026.1
29RTusas000.1	36.3836	-106.0361	Rio Tusas abv Rio Vallecitos * 29RTusas000.1
29RTusas000.2	36.3836	-106.0361	Rio Tusas @ FR 712 abv Madera - 29RTusas000.2
29RTusas028.5	36.5786	-106.0386	Rio Tusas abv Las Tablas
29RValle007.9	36.4367	-106.0633	Rio Vallecitos 3.9 miles abv La Madera @ bridge
29RValle037.8	36.6364	-106.2133	Rio Vallecito abv NF boundary at Vallecitos Ranch
29Willow000.1	36.732	-106.63	Willow Creek abv Heron Lake - 29Willow000.1
30Bulldo000.1	35.8572	-106.3342	Bulldog Gulch abv junction with Pajarito Canyon
30CanVal003.7	35.8508	-106.33	Canyon de Valle 2.6 miles abv Water Canyon
30CValle003.9	35.8501	-106.333	Canon de Valle DS end of perennial reach (E256)
30Galist030.9	35.4337	-106.1215	Galisteo Creek at Hwy 14 near Cerrillos
30Galist050.4	35.3953	-105.9434	Galisteo Creek in Galisteo - 30Galist050.4
30LHuert010.0	35.3259	-106.4216	Las Huertas Creek @ Tres Amigos Rd
30LHuert019.0	35.2561	-106.4068	Las Huertas Creek blw Caves - 30LHuert019.0
30Pajari012.6	35.8536	-106.2958	Pajarito Canyon below Twomile Canyon
30Pajari015.2	35.8572	-106.332	Pajarito Canyon downstream end of perennial reach
30Pajari016.1	35.8592	-106.3358	Pajarito Canyon below Starmer Gulch

Site ID	Latitude	Longitude	Site Name
30Pajari018.5	35.8694	-106.3575	Pajarito Creek 0.3 miles abv HWY 501
30RFrijo000.7	35.7572	-106.2584	Rito de los Frijoles 0.5 mile abv Rio Grande
30RGrand541.7	35.8359	-106.1607	Rio Grande at Buckman Road - 30RGrand541.7
30SanCri000.5	35.3855	-105.9447	San Cristobal Creek at Hwy 41 south of Galisteo
30Sandia009.0	35.8678	-106.2758	Sandia Canyon downstream end of perennial reach
30SanPed011.1	35.2333	-106.3012	San Pedro Creek @ Conservation Easement
30SantaF012.9	35.5473	-106.2292	SANTA FE RIVER abv Cochiti AT USGS GAGE
30SantaF015.3	35.5515	-106.2	Santa Fe River 0.5 mi upstream Lonestar Mine
30SantaF028.4	35.6028	-106.1213	Santa Fe River abv CRd 56 d/s of river preserve
30SantaF030.5	35.6184	-106.1118	Lower Santa Fe River Preserve
30SantaF057.4	35.6886	-105.8222	Santa Fe River abv McClure reservoirs
30SantaF061.2	35.7167	-105.8017	Santa Fe River at lower wilderness boundary
31Calave001.1	35.9319	-106.7091	Calaveras Creek Abv Rio Cebolla On Nm 126
31ClearC002.3	35.9959	-106.8255	CLEAR CREEK AT NM 126 - 31ClearC002.3
31ClearC009.2	36.041	-106.845	Clear Creek abv San Gregorio Lake - 31ClearC009.2
31EFkJem000.1	35.8276	-106.6436	East Fork Jemez abv confluence with San Antonio Crk
31EFkJem015.2	35.8147	-106.5258	East Fork Jemez River below Las Conchas day use
31EFkJem020.7	35.8486	-106.4898	East Fork Jemez below La Jara Creek
31EFkJem026.1	35.8716	-106.4438	East Fork Jemez abv Jaramillo Creek
31Jarami008.0	35.9044	-106.4862	Jaramillo abv Cerro Pinon at Rd B - 31Jarami008.0
31JemezR046.6	35.6539	-106.7369	Jemez River Near Canon, Below Municipal School
31JemezR048.7	35.6686	-106.7434	Jemez River below Rio Guadalupe - 31JemezR048.7
31JemezR049.2	35.67	-106.7435	Jemez River abv Rio Guadalupe - 31JemezR049.2
31JemezR058.6	35.7395	-106.7128	Jemez R. abv. Jemez Springs WWTP
31JemezR064.9	35.7921	-106.686	Jemez River abv Soda Dam - 31JemezR064.9
31RCebol000.1	35.8196	-106.788	Rio Cebolla abv the Rio de las Vacas
31RCebol011.4	35.8918	-106.7192	Rio Cebolla ~0.5 mile abv Fenton Lake
31RCebol017.9	35.9344	-106.6845	Rio Cebolla at campground abv 7 Springs hatchery
31Redond001.2	35.8727	-106.6215	Redondo Creek abv VCNP boundary
31RGuada000.1	35.6718	-106.7446	Rio Guadalupe abv Jemez River - 31RGuada000.1
31RIndio000.2	35.9649	-106.4868	Rito de los Indios abv San Antonio Creek
31RPalom000.1	35.9925	-106.7944	Rito de las Palomas at NM Hwy 126 - 31RPalom000.1
31RPNegr000.1	35.966	-106.787	Rito Penas Negras at NM Hwy 126 - 31RPNegr000.1
31RVacas000.1	35.8196	-106.7881	Rio de Las Vacas abv the Rio Cebolla
31RVacas011.1	35.9078	-106.8017	Rio de Las Vacas abv Girl Scout Camp

Site ID	Latitude	Longitude	Site Name
31RVacas023.7	35.9974	-106.8072	Rio de Las Vacas at SR 126 - 31RVacas023.7
31RVacas026.5	36.0195	-106.8232	Rio de las Vacas abv FR 70 - 31RVacas026.5
31RValle012.2	35.6866	-106.6536	Vallecitos abv Ponderosa diversion
31RValle015.5	35.7038	-106.6284	Vallecito Creek at Paliza Campground
31SanAnt000.1	35.8286	-106.6437	San Antonio Creek abv East Fork Jemez R.
31SanAnt004.7	35.8642	-106.6375	San Antonio Creek below La Cueva - 31SanAnt004.7
31SanAnt008.4	35.8905	-106.6495	San Antonio Creek abv NM Hwy 126
31SanAnt025.7	35.9719	-106.5764	San Antonio Creek below warm springs
31Sulphu000.2	35.8761	-106.6315	Sulphur Creek abv Redondo Creek
31Vallec012.2	35.6866	-106.6536	Vallecitos abv Ponderosa diversion
32AboArr037.7	34.4357	-106.448	Abo Arroyo blw Hwy 60 - 32AboArr037.7
32RGrand258.0	33.6803	-106.9924	Rio Grande at USGS gage near San Marcial
32RGrand286.9	33.8757	-106.849	Rio Grande @ Bosque del Apache - 32RGrand286.9
32RGrand305.0	34.0272	-106.8654	NMW-05549-08
32RGrand326.4	34.2089	-106.8852	NMW05549-28
32RGrand346.1	34.3447	-106.8585	NMW-05549-12
32RGrand385.1	34.6493	-106.7375	NMW-05549-25
32RGrand392.1	34.7828	-106.729	NMW05549-29
32RGrand407.8	34.9064	-106.685	Rio Grande abv Isleta Diversion - 32RGrand407.8
32RGrand435.2	35.1206	-106.6915	Rio Grande @ Albuquerque Nature Center
32RGrand445.4	35.1969	-106.6415	Rio Grande abv Alameda Bridge - 32RGrand445.4
32Tijera021.0	35.0608	-106.4945	Tijeras Arroyo At Four Hills Brdg At Albq
32Tijera027.2	35.0667	-106.425	Tijeras Arroyo blw Deadmans Curve - 32Tijera027.2
33LaJara009.7	36.1277	-106.9043	La Jara Creek abv irrigation diversion - 33LaJara009.7
33NaciCr001.9	36.0025	-106.9076	Nacimiento Creek @ Eureka Rd.
33Nacimi003.4	36.0113	-106.9509	Nacimiento Creek at Hwy 126 - 33Nacimi003.4
33Nacimi008.0	36.0025	-106.9076	Nacimiento Creek at Eureka Rd. - 33Nacimi008.0
33RPuerc241.8	35.984	-106.9841	Rio Puerco blw WWTP at Sanchez Property
33RPuerc244.0	36.0024	-106.9809	Rio Puerco abv WWTP - 33RPuerc244.0
33RPuerc248.7	36.0245	-106.9583	Rio Puerco at Hwy 550 Bridge - 33RPuerc248.7
33RPuerc256.0	36.0413	-106.9162	Rio Puerco at CR13 Bridge - 33RPuerc256.0
33Senori008.8	35.9876	-106.8904	Senorito Creek abv Nacimiento Mine
36Bluewa003.5	35.2926	-108.027	Bluewater Creek at Mouth of Bluewater Canyon
36Bluewa016.7	35.2979	-108.1063	Bluewater Creek blw Dam - 36Bluewa016.7
36Bluewa018.9	35.2678	-108.1142	Bluewater Creek abv Bluewater Lake at USGS

Site ID	Latitude	Longitude	Site Name
36Bluewa023.2	35.2412	-108.1278	Bluewater Creek @ Forest Road 178
36RMoqui006.4	35.1709	-107.3759	Rito Moquino below Seboyetita Crk and Seboyeta Crk
38RSalad030.0	34.3391	-107.1233	Rio Salado 1 mile abv The Box - 38RSalad030.0
40Alamos058.5	33.5687	-107.5901	Alamosa Creek below USGS Gage 8360000
41LAnima029.3	33.0412	-107.5548	Las Animas Creek abv box - 41LAnima029.3
41LAnima038.3	33.0531	-107.6316	Las Animas Creek near Dunn - 41LAnima038.3
41Percha025.3	32.9179	-107.5289	Percha Creek at Percha Box - 41Percha025.3
41SPalom000.1	33.179	-107.5367	South Fork Palomas Creek abv North Fork
42RGrand001.1	31.9994	-106.6353	Rio Grande At Nm-225 Bridge Nr Anthony, Nm
42RGrand004.1	31.8028	-106.541	Rio Grande At Bridge Below Sunland Park
42RGrand030.8	31.9994	-106.635	Rio Grande At Nm-225 Bridge Nr Anthony, Nm
42RGrand038.7	32.2636	-106.8239	Rio Grande At Bridge Near La Mesilla
42RGrand044.2	32.31	-106.8261	Rio Grande At Picacho Ave In Las Cruces
42RGrand115.0	32.6544	-107.0758	Rio Grande Near Rincon At Nm
42RGrand160.3	32.8847	-107.292	Rio Grande Blw Caballo Dam,Nm
42RGrand171.9	32.8847	-107.292	Rio Grande Blw Caballo Dam,Nm
45Gallin021.5	32.8885	-107.8434	Gallinas Creek at Lower Gallinas Camground nr
45McKnig011.9	33.0149	-107.9407	McKnight Canyon Crk (EF of Mimbres) abv Mimbres.
45Mimbre062.7	32.587	-107.9211	Mimbres below Dwyer at Ranch del Rio
45Mimbre094.6	32.7908	-107.915	Mimbres R. at Hwy 90 bridge near San Lorenzo
45Mimbre104.8	32.8572	-107.9742	Mimbres River at Mimbres near USGS gage
45Mimbre112.2	32.9101	-108.0038	Mimbres River at upper Nature Conservency Property
45Mimbre127.4	33.0419	-107.9789	Mimbes River at Cooney Campgrnd (Forest Rd 150A)
45Mimbre127.8	33.0461	-107.9752	Mimbres River At Cooney Campground Crossing
45SanVic053.9	32.7621	-108.2698	San Vicente Arroyo at Ancheta Mill - 45SanVic053.9
45SanVic055.5	32.7726	-108.2752	San Vicente Arroyo at Big Ditch Park (@ 6th street)
48DogCan002.7	32.7495	-105.9124	Dog Canyon at Nature Trail - 48DogCan002.7
48FresCa001.0	32.9741	-105.9039	Fresnal Creek At Alamogordo Water Intake
48FresCa008.3	32.9547	-105.8751	Fresnal Creek abv Rio Salado - 48FresCa008.3
48KarrCa002.9	32.9289	-105.8167	Karr Canyon abv Raven Road - 48KarrCa002.9
48LaLuzC014.2	32.9847	-105.8297	La Luz Creek At County Road A-70 Crossing
48NogalC000.2	33.1581	-105.8645	NOGAL CREEK AT COUNTY ROAD B-17
48RTular030.0	33.145	-105.8972	Rio Tularosa At Usgs Gage - Old Hwy Crossing
48ThreeR022.8	33.4028	-105.8858	Three Rivers At Forest Service Campground
49Sacram014.6	32.7139	-105.7542	Sacramento River At Usgs Gage

Site ID	Latitude	Longitude	Site Name
50AHerma000.1	35.5947	-105.224	Arroyo Hermanos - 50AHerma000.1
50Beaver000.1	35.7615	-105.4484	Beaver Cr. abv El Porvenir Cr. - 50Beaver000.1
50CowCre011.5	35.471	-105.5537	Cow Creek at North San Ysidro - 50CowCre011.5
50CowCre023.7	35.538	-105.581	Cow Creek blw confluence w Bull Creek at Forest Rd
50CowCre023.8	35.5382	-105.581	Cow Creek abv confluence with Bull Creek
50Dalton000.1	35.6586	-105.6907	Dalton Canyon Creek 20 M West Of Hwy 63 Brdg
50ElPorv000.1	35.69	-105.3758	El Porvenir Creek at HWY 65 abv the Gallinas
50ElPorv004.8	35.7108	-105.4156	El Porvenir Creek at Christian Camp, USGS 08380075
50ElPorv012.6	35.76	-105.449	El Porvenir Cr. blw Beaver and Hollinger creeks
50ElRito000.2	34.9256	-104.6831	El Rito Creek Downstream of the Santa Rosa WWTF
50ElRito000.3	34.9261	-104.6811	El Rito Creek Upstream Of Santa Rosa WWTF
50Gallin075.0	35.4647	-105.1572	Gallinas River at San Augustin - 50Gallin075.0
50Gallin101.8	35.565	-105.212	Gallinas River 0.25 mile below Las Vegas WWTF
50Gallin102.1	35.5667	-105.2108	Gallinas River abv Las Vegas WWTP
50Gallin104.9	35.5882	-105.2181	Gallinas R. abv Independence Ave. - 50Gallin104.9
50Gallin114.6	35.6542	-105.275	Gallinas R. at Montezuma, blw College lagoons
50Gallin119.7	35.6519	-105.3183	Gallinas River at Montezuma, USGS Gage 08380500
50Gallin131.8	35.6991	-105.4162	Gallinas R. at National Forest boundary.
50Gallin140.8	35.7166	-105.4874	Gallinas R. blw Burro Cr. - 50Gallin140.8
50Gallin141.9	35.724	-105.5084	Gallinas River at end of FR 263 abv Burro Creek
50Glorie001.8	35.5398	-105.6826	Glorieta Creek abv confluence with Pecos River
50Glorie012.6	35.5779	-105.7589	Glorieta Creek at Cur Trail - 50Glorie012.6
50Glorie013.5	35.5842	-105.765	Glorieta Creek blw Glorieta Conference Cntr WWTP
50Holing000.1	35.7608	-105.4495	Hollinger Cr. abv El Porvenir Cr. - 50Holing000.1
50HolyGh000.1	35.7412	-105.679	Holy Ghost Cr 300m Upstrm Hwy63 Br Over Pecos R
50PecosR512.6	34.73	-104.5245	Pecos River at Puerta de Luna bridge
50PecosR529.1	34.9248	-104.683	Pecos River Below Confluece With El Rito Crk
50PecosR529.2	34.9253	-104.6842	PECOS RIVER UPSTREAM OF EL RITO CREEK
50PecosR540.8	34.8267	-104.6254	Pecos R at Puerto de Luna - 50PecosR540.8
50PecosR601.2	35.0914	-104.7998	Pecos River at gage near Colonias - 50PecosR601.2
50PecosR670.2	35.2387	-105.1634	Pecos River Below Confluence with Tecolote Crk
50PecosR670.3	35.2378	-105.163	Pecos River abv Confluence with Tecolote Crk
50PecosR678.5	35.2366	-105.2537	Pecos River at Comanchero - 50PecosR678.5
50PecosR696.0	35.268	-105.3343	PECOS RIVER AT VILLANUEVA STATE PARK
50PecosR700.3	35.2666	-105.366	Pecos River at Los Schiffmillers - 50PecosR700.3

Site ID	Latitude	Longitude	Site Name
50PecosR722.0	35.3972	-105.4703	PECOS RIVER AT SAN JOSE - 50PecosR722.0
50PecosR765.3	35.5352	-105.668	Pecos River at Pecos National Historical Park
50PecosR772.0	35.5828	-105.672	Pecos River at Adelo Property behind Catholic Church
50PecosR783.7	35.6063	-105.6771	Pecos River below Lisboa Springs fish hatchery
50PecosR784.1	35.6093	-105.677	Pecos River abv Lisboa Springs fish hatchery
50PecosR795.2	35.7448	-105.675	Pecos River below Terrero mine - 50PecosR795.2
50PecosR797.7	35.7629	-105.6701	Pecos River 400m abv Confluence W Willow Ck
50RioMor000.3	35.7772	-105.6575	Rio Mora At USGS GAGE abv Pecos campground
50Tecolo042.3	35.4575	-105.2776	TECOLOTE CREEK AT I-25 NEAR TECOLOTE
50Winsor000.2	35.8118	-105.6593	Winsor Creek at Pecos River - 50Winsor000.2
52PecosR305.0	33.5974	-104.3632	Pecos River at Bitter Lake NWR, North Unit
52PecosR430.0	34.3323	-104.1812	Pecos River at USGS gage blw Taiban Creek
52PecosR447.7	34.4444	-104.2342	Pecos R 100 Meters Below Ft Sumner Wwtp Disc
56PecosR169.0	32.841	-104.3239	Pecos River At U.S. 82 Bridge Near Artesia
56PecosR301.0	33.5722	-104.3695	Pecos R. at Bitter Lake Refuge At HWY 70/RR xing
57Carriz001.4	33.3203	-105.6675	CARRIZO CREEK abv GRINDSTONE CREEK
57NSprin000.6	33.4061	-104.492	North Spring River abv Rio Hondo
57NSprin002.0	33.4065	-104.5053	North Spring River at Loveless Park
57NSprin004.8	33.4001	-104.532	North Spring River 3 miles abv Rio Hondo
57RBonit027.7	33.5273	-105.4575	Rio Bonito at BLM Apple Orchard Site
57RBonit053.4	33.4479	-105.663	RIO BONITO AT ANGUS BRIDGE - 57RBonit053.4
57RBonit059.9	33.4529	-105.7277	Rio Bonito below Dam - 57RBonit059.9
57RBonit061.1	33.4558	-105.7511	Rio Bonito Abv Bonito Lk At Fr 107 Blw Bonito S.
57RHondo004.3	33.397	-104.4224	Rio Hondo at US 380 Bridge - 57RHondo004.3
57RHondo009.4	33.4119	-104.4591	Rio Hondo abv Hagerman Canal - 57RHondo009.4
57RHondo131.1	33.3817	-105.2703	RIO HONDO 100 YDS BELOW CONFLUENCE
57RRuido019.8	33.4103	-105.4449	Rio Ruidoso 7 Miles below Wwtp at Glencoe-Fr 443
57RRuido030.2	33.3663	-105.535	Rio Ruidoso blw WWTP, mile-marker 267.5, Hwy 70
57RRuido030.5	33.3626	-105.5393	Rio Ruidoso @ CR E002 - 57RRuido030.5
57RRuido031.5	33.3588	-105.5474	Rio Ruidoso abv Hwy 70 bridge - 57RRuido031.5
57RRuido045.3	33.325	-105.655	RIO RUIDOSO abv CARRIZO CREEK
57RRuido052.4	33.3363	-105.7229	Rio Ruidoso at Mescalero boundary at gauge
58RFelix002.1	33.1382	-104.3286	Rio Felix near Hagerman, NM - 58RFelix002.1
59AguaCh029.0	32.8017	-105.5456	Agua Chiquita between Weed and Sacramento
59RPenas108.4	32.8814	-105.1775	Rio Penasco At Nm Hwy 24 Bridge Near Dunken

Site ID	Latitude	Longitude	Site Name
59RPenas140.2	32.9217	-105.416	Rio Penasco on USFS (below Mayhill)
59RPenas170.4	32.8309	-105.7371	RIO PENASCO AT BLUFF SPRINGS
59RPenas176.0	32.8413	-105.7871	Rio Peñasco near FR 6563 - 59RPenas176.0
60BlackR005.7	32.2358	-104.0999	BLACK RIVER AT HIGBY HOLE - 60BlackR005.7
60BlackR019.8	32.2197	-104.2225	Black River @ Old Cavern Road Crossing
60BlackR023.7	32.2014	-104.2511	Black River at Black River Village - 60BlackR023.7
60BlackR052.0	32.0956	-104.4675	Black River abv Rattlesnake Spring - 60BlackR052.0
60BlackR055.4	32.0672	-104.4791	Black River @ headwater springs - 60BlackR055.4
60BlueSp002.0	32.1809	-104.2978	BLUE SPRING abv BOUNDS DIVERSION
60PecosR033.2	32.1891	-103.9784	Pecos River At Pierce Canyon Crossing, NM
60PecosR050.2	32.2409	-104.0474	Pecos River below Black River Harroun Crossing
60PecosR088.4	32.4006	-104.1712	Pecos River below Carlsbad WWTP near Otis
60Sittin000.1	32.2509	-104.6965	Sitting Bull Creek below recreation area
60Sittin000.3	32.2457	-104.6971	Sitting Bull Creek At The Base Of The Falls
60Sittin001.6	32.2385	-104.7026	Sitting Bull Creek Abv Sitting Bull Falls
62Delawa006.0	32.0231	-104.0547	Delaware River At Highway 285 Bridge
64Galleg000.4	36.6958	-108.1125	Gallegos Canyon at San Juan River - 64Galleg000.4
64Navajo022.1	36.9658	-106.9595	Navajo River upstream of Jicarilla Bnd
64Navajo023.3	36.9686	-107.0845	Navajo River DS from Barella Canyon and CO border
64PiedrAbvrNav	37.0486	-107.4118	Piedras River abv Navajo Lake - 64PiedrAbvrNav
64SanJua113.5	36.6941	-108.1034	San Juan River at McGee Park - 64SanJua113.5
64SanJua126.2	36.7	-107.9865	SAN JUAN RIVER AT BLOOMFIELD BRIDGE
64SanJua144.8	36.7246	-107.8129	SAN JUAN RIVER AT BRIDGE NEAR BLANCO
64SanJua162.8	36.8006	-107.6992	SAN JUAN RIVER BLW GAGE STATION
66Animas001.7	36.7198	-108.2063	ANIMAS R AT FARMINGTON - 66Animas001.7
66Animas018.0	36.7914	-108.0752	Animas River near Flora Vista - 66Animas018.0
66Animas027.8	36.8275	-107.9999	Animas R upstream of HWY 516 bridge in Aztec
66Animas043.0	36.9327	-107.894	Animas R upstream of HWY 550 bridge nr Cedar Hill
66Animas054.6	36.9812	-107.8719	ANIMAS RIVER @ COLORADO STATE LINE
66Animas055.8	36.9898	-107.8674	Animas River downstream of state line
66SanJua100.2	36.7217	-108.224	SAN JUAN RIVER AT BISTI BRIDGE - 66SanJua100.2
67LaPlat000.3	36.7375	-108.2497	LA PLATA R NR FARMINGTON - 67laplat000.3
67LaPlat024.8	36.9289	-108.1847	LA PLATA RIVER AT LA PLATA, NM
67LaPlat033.8	36.995	-108.1907	La Plata River At Nm-Colordo State Line

Site ID	Latitude	Longitude	Site Name
67SanJua082.6	36.7396	-108.4028	SAN JUAN RIVER NEAR KIRTLAND
67SanJua088.1	36.7208	-108.3276	San Juan River at Lions Park near Kirtland
75RNutri024.7	35.27	-108.5718	Rio Nutria @ Bridge to upper village - 75RNutri024.7
75RPesca012.8	35.1064	-108.5865	Rio Pescado @ Highway 53 bridge - 75RPesca012.8
75Tampic000.1	35.2981	-108.5337	Tampico Draw abv Rio Nutria - 75Tampic000.1
75ZuniRi040.5	35.0928	-108.7893	Zuni River below Black Rock Dam
77Beaver000.1	33.3359	-108.1027	Beaver Creek abv Taylor Creek - 77Beaver000.1
77BlackC000.1	33.1738	-108.1617	Black Canyon abv East Fork Gila River
77BlackC016.5	33.1836	-108.036	Black Cny Creek at Lower Black Cny Campground
77BlackC028.3	33.1648	-107.9474	Black Canyon Creek ~0.75 mi abv Aspen Canyon
77Bobcat000.8	33.2668	-108.1766	Bobcat Spring between Adobe spring and E. Fork Gila
77Bonner002.4	33.1811	-107.9598	Bonner trib to Black Canyon
77CubCre005.6	33.2931	-108.5544	Cub Creek 1mile abv Middle Fk Gila
77Diamon033.2	33.2809	-107.849	Main Diamond Creek at Trail 42 - 77Diamon033.2
77EFkGil000.2	33.177	-108.201	East Fork Gila abv West Fork - 77EFkGil000.2
77EFkGil010.0	33.1841	-108.1653	East Fork Gila River below Black Canyon
77EFkGil012.1	33.186	-108.1583	East Fork Gila River 1 mile abv Black Canyon
77EFkGil035.4	33.3017	-108.1233	East Fork Gila River below Taylor Creek
77Gilari088.0	33.0762	-108.4882	Gila River 300 meters abv Turkey Creek
77GilaRi092.0	33.0811	-108.4571	Gila River abv Turkey Creek
77Gilita000.2	33.4131	-108.4908	Gilita Creek abv Snow Canyon Creek - 77Gilita000.2
77IronCr000.1	33.3878	-108.4758	Iron Creek abv Middle Fork Gila - 77IronCr000.1
77IronCr009.7	33.3781	-108.5658	IRON CREEK @ FOREST TRAIL 151
77MFkGil000.1	33.2263	-108.2418	Middle Fork Gila abv West Fork - 77MFkGil000.1
77MFkGil028.3	33.3191	-108.3423	Middle Fork Gila River
77MFkGil055.0	33.4144	-108.614	Middle Fork Gila below Snow Lake
77Sapill018.0	33.0308	-108.1668	Sapillo Creek below Lake Roberts - 77Sapill018.0
77Taylor000.1	33.3358	-108.1006	Taylor Creek abv Beaver Creek - 77Taylor000.1
77Taylor004.2	33.3503	-108.0797	Taylor Creek below Wall Lake
77Turkey001.8	33.0892	-108.4861	Turkey Creek (at Wilderness Boundary Trail 155)
77WFkGil000.1	33.1806	-108.2061	West Fork Gila abv East Fork
77WFkGil010.0	33.2293	-108.266	West Fork Gila abv Cliff Dwelling Cyn
77WFkGil038.1	33.2826	-108.4674	West Fork Gila River abv White Creek
77Willow000.1	33.4081	-108.5747	Willow Creek abv Gilita Creek
78BearCr027.0	32.9219	-108.3923	Bear Creek blw Dorsey Springs - 78BearCr027.0

Site ID	Latitude	Longitude	Site Name
78BlueCr000.9	32.6627	-108.83	Blue Creek 0.5 mile abv Gila River - 78BlueCr000.9
78GilaR087.7	32.9693	-108.5873	Gila River @ NM Hwy 211 Bridge - 78GilaR087.7
78GilaRi026.1	32.6469	-108.8458	Gila River @ Red Rock
78GilaRi052.6	32.872	-108.5949	Gila River abv Mangas Creek, near Bill Evans Lake
78GilaRi069.2	32.833	-108.6116	Gila River below Mangas Creek - 78GilaRi069.2
78GilaRi074.8	33.043	-108.5283	Gila River abv Gila
78Mangas000.7	32.8616	-108.5861	Mangas Creek abv Gila River (Forest Road 809)
80Center000.1	33.8306	-108.8447	Centerfire Creek at Forest Road 210
80Center002.1	33.8375	-108.8556	Centerfire Creek abv San Francisco River
80MuleCr015.5	33.122	-108.9596	Mule Creek - 80MuleCr015.5
80Negrit000.1	33.6828	-108.7444	Negrito Creek abv Tularosa River
80SanFra028.6	33.2491	-108.879	San Francisco River below Glenwood at Hot Springs
80SanFra048.8	33.3691	-108.9107	San Francisco River at Alma Bridge - 80SanFra048.8
80SanFra105.7	33.6444	-108.7911	San Francisco River below Reserve - 80SanFra105.7
80SanFra109.6	33.7025	-108.7562	San Francisco River below Reserve WWTP
80SanFra109.7	33.7034	-108.7557	San Francisco River abv Reserve WWTP
80SanFra124.2	33.7869	-108.7702	San Francisco River at Upper Box - 80SanFra124.2
80SanFra154.1	33.8184	-108.992	San Francisco River abv Luna - 80SanFra154.1
80SNegri000.1	33.6069	-108.6311	South Negrito Creek - 80SNegri000.1
80TroutC002.1	33.8472	-108.9527	Trout Creek - Quality Area
80TroutC009.4	33.8813	-109	Trout Creek near FR 220 - 80Trout009.4
80Tularo001.3	33.6756	-108.7599	Tularosa River abv San Francisco River
80Tularo035.8	33.8315	-108.6238	Tularosa River abv Apache Creek - 80Tularo035.8
80Tularo050.8	33.8914	-108.515	Tularosa River abv Aragon at gage # 9442692
80Whitew000.5	33.3167	-108.8833	Whitewater Creek at Glenwood abv San Francisco R.
80WhiteW008.8	33.3729	-108.8414	Whitewater Creek abv campground
ANIMA_36817_108025	36.8172	-108.0247	ANIMAS RIVER
BEAR_32891_108233	32.8908	-108.2328	BEAR CREEK
BITTE_36705_105403	36.7047	-105.4025	BITTER CREEK
CLANT_31534_108875	31.5342	-108.875	CLANTON DRAW
DOUBL_31639_108754	31.6394	-108.7542	DOUBLE ADOBE CREEK
FW08AZ005	33.9123	-109.3565	North Fork East Fork Black River
FW08AZ006	33.7599	-109.434	Centerfire Creek
FW08AZ008	32.8711	-109.1983	Gila River
FW08AZ022	33.3099	-109.4966	Eagle Creek

Site ID	Latitude	Longitude	Site Name
FW08AZ075	33.1056	-109.3015	San Francisco River abv Clifton
FW08AZ107	32.7197	-109.0969	Gila River
FW08AZ134	32.8967	-109.8028	Gila River
FW08AZ139	33.0103	-109.3077	San Francisco River
FW08AZ155	33.0815	-109.4644	Eagle Creek
FW08AZ171	33.6845	-109.0832	Blue River
FW08CO001	37.3659	-108.5933	Hartman Draw
FW08CO020	38.0651	-102.3365	Wolf Creek
FW08CO028	37.6045	-103.606	Purgatoire River
FW08CO029	37.7141	-106.8382	Goose Creek
FW08CO033	37.1761	-105.7311	Rio Grande
FW08CO049	37.3591	-105.7664	Rio Grande
FW08CO060	37.8175	-103.3686	Purgatoire River
FW08CO072	37.3416	-103.9085	Purgatoire River
FW08CO073	37.0617	-105.9831	Rio San Antonio
FW08CO083	37.7228	-108.235	West Dolores River
FW08CO087	38.1856	-106.4897	East Past Creek
FW08CO125	37.5869	-104.8383	Cucharas River
FW08CO129	38.0673	-105.0848	Middle Creek
FW08CO136	37.4159	-102.5214	Bear Creek
FW08KS033	37.9748	-101.7879	Arkansas River
FW08NM001	35.9713	-106.6049	San Antonio Creek
FW08NM002	36.5978	-106.5008	Rio Nutrias
FW08NM003	36.4359	-105.2368	Saladon Creek
FW08NM005	35.7908	-104.6117	Mora River
FW08NM008	34.7508	-106.7434	Rio Grande
FW08NM010	32.9192	-105.3374	Penasco River
FW08NM012	36.1108	-105.7318	Rio De Las Trampas
FW08NM013	35.3771	-104.5055	Conchas River
FW08NM019	33.3008	-108.1255	East Fork Gila River
FW08NM022	36.7079	-108.2115	San Juan River
FW08NM023	34.0049	-104.3148	Pecos River
FW08NM024	35.1681	-106.6583	Rio Grande
FW08NM025	35.2432	-104.9107	Gallinas River
FW08NM026	32.1417	-106.6992	Rio Grande

NMED EXHIBIT 25

Site ID	Latitude	Longitude	Site Name
FW08NM027	33.4146	-104.4566	Rio Hondo
FW08NM031	33.7577	-108.7627	San Francisco River
FW08NM034	34.4472	-106.8037	Rio Grande
FW08NM035	33.2025	-108.2088	West Fork Gila River
FW08NM038	36.6993	-107.9853	San Juan River
FW08NM039	34.4439	-104.2347	Pecos River
FW08NM042	32.5189	-104.3144	Pecos River
FW08NM043	32.9881	-108.5209	Gila River
FW08NM045	36.3594	-106.6758	Rio Chama
FW08NM047	33.1494	-107.2064	Rio Grande
FW08NM048	36.5482	-105.1302	Cimarron River
FW08NM061	36.7889	-106.2405	Unnamed
FW08NM064	36.7974	-104.8782	Vermejo River
FW08NM069	35.7715	-105.0072	Sapello River
FW08NM105	35.265	-105.3653	Pecos River
FW08OK031	36.6969	-101.6767	Beaver River
FW08RAZ9022	32.9563	-109.5314	Bonita Creek
FW08RNM9001	35.9512	-103.6974	Ute Creek
FW08RNM9002	36.2215	-103.8506	Ute Creek
FW08RNM9004	36.5887	-103.3149	Seneca Creek
FW08RNM9006	32.6491	-108.8468	Gila Reference
FW08RNM9030	36.1792	-105.8292	Embudo Creek
FW08RNM9049	32.7498	-105.9117	Dog Canyon
FW08RNM9060	36.9312	-105.7358	Rio Grande
FW08RNM9061	36.34	-105.7311	Rio Grande
FW08RNM9067	36.2164	-106.2481	Rio Chama
FW08RNM9075	33.5974	-104.3633	Pecos River
FW08RNM9076	34.3325	-104.1811	Pecos River
FW08RNM9081	35.3236	-103.9811	Canadian River
FW08RNM9082	36.0662	-104.3706	Canadian River
FW08RTX11553	33.3048	100.529	Croton Creek
FW08RUT9100	37.3885	-109.6885	Fish Creek
FW08RUT95790	37.9831	-109.5161	Indian Creek near Newspaper Rock
FW08RUT95820	37.9378	-109.6369	North Cottonwood Creek
FW08TX012	35.7621	-101.3198	Canadian River

Site ID	Latitude	Longitude	Site Name
FW08TX033	35.9691	-100.8192	Canadian River
FW08TX046	31.7705	-103.7793	Pecos River
FW08TX065	35.4507	-102.003	Canadian River
FW08UT014	37.2239	-109.8753	San Juan River
FW08UT023	38.3547	-104.7525	Colorado River
FW08UT030	37.2744	-109.4367	San Juan River
FW08UT046	37.1944	-109.7183	San Juan River
GILA_33179_108206	33.1794	-108.2061	Gila River
GILA_33222_108244	33.2222	-108.2442	Gila River
GILA_3324_108265	33.2397	-108.265	Gila River
GLORI_35565_105738	35.5651	-105.7377	Glorieta Creek
GLORI_35568_105722	35.5679	-105.7216	Glorieta Creek
GLORI_35571_105755	35.5714	-105.7549	Glorieta Creek
JEMEZ_35392_106537	35.3917	-106.537	Jemez River
LITTL_36301_105239	36.3006	-105.2392	Little Coyote Creek
LITTL_36302_105239	36.3017	-105.2389	Little Coyote Creek
LONG_36937_10358	36.9369	-103.58	Long Canyon Creek
LOSP_3699_107601	36.9897	-107.6011	Los Pinos River
MRG105.009035	35.7439	-106.7119	Jemez River Bel Jemez Springs Effluent Discharge
MRG106.007501	35.6963	-106.741	Rio Guadalupe Abv Confl With Jemez River
MRG106.010015	35.8761	-106.6314	Redondo Creek Near Sulphur Crk
NAVAJ_36949_107072	36.9489	-107.0721	Navajo River
NAVAJ_36967_107041	36.9666	-107.0407	Navajo River
OWW04440-0045	35.9584	-106.4867	San Antonio 2
OWW04440-0077	36.8688	-106.4545	Canones Creek
OWW04440-0205	36.4357	-105.237	Saladon Creek
OWW04440-0333	36.4926	-106.0073	Rio Tusas
OWW04440-0429	31.419	-103.3413	Pecos River
OWW04440-0557	35.971	-106.5999	San Antonio (2)
OWW04440-0717	36.148	-105.6725	Rio Santa Barbara
OWW04440-0845	36.5977	-106.4998	Rio Nutrias
OWW04440-1037	33.6084	-108.6356	Negritos Creek
OWW04440-1059	35.7675	-101.3163	Canadian River
OWW04440-1069	35.7182	-106.7213	Jemez Creek
OWW04440-1101	36.9551	-106.5418	Wolf Creek

Site ID	Latitude	Longitude	Site Name
OWW04440-NM01	36.1998	-103.8457	Ute Creek,Nm
OWW04440-NM03	33.4024	-105.8838	Three Rivers
OWW04440-NM07	33.0845	-108.4876	Turkey Creek
OWW04440-NM08	33.2806	-107.8484	Diamond Creek
PECOS_35708_105206	35.7075	-105.206	Pecos Arroyo
RIOC_35779_105711	35.7788	-105.7111	Rio Chupadero
RIOS_36103_105621	36.1033	-105.6206	Rio Santa Barbara
RIVER_36951_106145	36.9514	-106.145	River Los Pinos
SANTA_35582_10628	35.5822	-106.2803	Santa Fe River
SFR602.005030	33.6361	-108.7913	San Francisco River Below Reserve
TESUQ_35769_105725	35.7686	-105.725	Tesuque Creek
UPR211.001529	35.5658	-105.2117	Gallinas Riv Approx 400'below Stp Abv Arroyo
URG110.002050	35.6211	-106.1061	Santa Fe R 1.0 Mi Below 1st Bridge Below Wwtf
URG116.020005	36.8791	-106.587	Rio Chamita 25m Below Chama Outfall
URG116.020055	36.98	-106.6594	Rio Chamita Abv Confluence With Sexto Creek
UT111142	38.391	-109.217	Lasal Creek
WAZP04-RBON1	32.9568	-109.5313	Bonita Creek
WAZP04-RLCR1	34.0778	-109.4262	Little Colorado River
WAZP04-RMIN1	34.18	-109.6184	Mineral Creek
WAZP99-0512	32.8708	-109.1986	Gila River
WAZP99-0545	33.9122	-109.3558	Black River
WAZP99-0569	33.5922	-109.3219	Kp Creek
WAZP99-0599	32.8407	-109.5821	Gila River
WAZP99-0605	33.4603	-109.1819	Blue River
WAZP99-0615	33.6814	-109.445	Conklin Creek
WAZP99-0639	33.7501	-109.216	Campbell Blue Creek
WAZP99-0645	33.9486	-109.2024	Nutrioso Creek
WAZP99-0653	35.918	-109.3968	Nazlini Creek
WAZP99-0669	36.3549	-109.1131	Tsaile Creek
WAZP99-0681	33.2404	-109.1915	Blue River
WAZP99-0687	33.7596	-109.4336	Centerfire Creek
WAZP99-0701	35.8385	-109.1131	Bonito Creek
WAZP99-0722	33.5343	-109.293	Thompson Creek
WAZP99-0750	33.1385	-109.4935	Eagle Creek
WAZP99-0783	33.338	-109.0661	Lanphier Canyon

Site ID	Latitude	Longitude	Site Name
WAZP99-0828	33.8629	-109.3192	North Fork Black River
WAZP99-0840	33.851	-109.1508	San Francisco River
WAZP99-0876	36.2086	-109.1329	Wheatfields Creek
WAZP99-0888	33.6844	-109.3965	Fish Creek
WAZP99-0906	34.2842	-109.3521	Little Colorado River
WCOP01-0734	38.1608	-104.6781	Salt Creek
WCOP01-0765	38.1283	-102.1347	Wild Horse Creek
WCOP01-0777	37.4942	-103.6308	Chacuaco Creek
WCOP01-0812	37.4214	-103.8042	Purgatoire River
WCOP01-0819	37.7892	-103.8214	Timpas Creek
WCOP01-0833	38.0681	-104.9453	North St. Charles River
WCOP01-0836	38.1056	-103.3697	Horse Creek
WCOP03-R005	38.4364	-106.3722	Agate Creek
WCOP03-R007	37.6319	-107.8781	East Fork Hermosa Creek
WCOP03-R008	37.5208	-108.1106	Bear Creek
WCOP03-R009	37.4803	-107.0969	East Fork Piedra River
WCOP04-R003	37.5134	-103.0267	Two Butte Creek
WCOP04-R006	38.16	-108.4083	Naturita Creek
WCOP04-R007	37.3639	-108.9508	Yellow Jacket Creek
WCOP04-R009	37.8271	-103.773	Timpas Creek
WCOP99-0502	37.3294	-106.6897	Adams Fork Conejos River
WCOP99-0507	37.8747	-106.5686	Groundhog Creek
WCOP99-0508	37.6206	-107.0214	Red Mountain Creek
WCOP99-0513	38.07	-107.7403	Whitehouse Creek
WCOP99-0568	37.1342	-108.1642	La Plata River
WCOP99-0574	38.0211	-107.3905	Henson Creek
WCOP99-0591	37.9336	-108.0394	Fall Creek
WCOP99-0621	37.9736	-108.8267	Dolores River
WCOP99-0622	37.3703	-108.6011	Hartman Draw
WCOP99-0627	38.0664	-106.3811	Houselog Creek
WCOP99-0634	37.5961	-105.3989	Ute Creek
WCOP99-0646	37.2961	-108.3664	Mud Creek
WCOP99-0670	37.5231	-108.2336	Lost Canyon Creek
WHITE_35759_10567	35.7592	-105.6697	White Flow
WILLO_35747_105655	35.7467	-105.655	Willow Creek

Site ID	Latitude	Longitude	Site Name
WRIGH_35703_105485	35.7033	-105.4847	Wright Canyon

Appendix COutlier Analysis

We searched the database for nutrient and other values that were unusual, inexplicable, or associated with anomalous sampling conditions. Identification of outlier values was subjective; extremes were identified and then assessed individually. The approach we took was to look for outliers both within sites and across all data points. The outlier analysis addressed 10,064 nutrient records in the NMED database, including river sites.

Outlier TN and TP values (and associated NO_3NO_2 and TKN) were identified in two ways. First, the maximum value at each site was compared to the geometric mean value (which included the maximum). The difference between maximum and geometric mean divided by the geometric mean was used as a flag of possible high outlier values. When ratios were high (TN ratio >5 [72 cases], TP ratio > 10 [77 cases]), the maximum values were investigated as possible outliers to be removed. The second screen was on the maximum value alone. This screen helped to identify possible outliers in sites with single or few nutrient records. Values >5mg/L TN (47 cases) and >2mg/L TP (40 cases) were investigated as possible outliers to be removed.

All values in samples associated with high flow ratings or possible fire effects were also investigated. Flow and fire information was available as a comment associated with the sampling record. Flow was also recorded as a numeric rating in some cases. In sites with high flows (either relative to other recorded flows or rated as “4 – high flow”), the nutrient value was removed as a possible outlier. If no flow information was available, high turbidity was used as an indicator of recent flow disturbance. High nutrient values were identified as outliers if turbidity associated with the sample was high relative to other values at the same site. Sites with fires in the catchment were identified along with an estimate of the years the effects were probable. All nutrient values were reviewed for those sites and years and all high values (>5mg/L TN and >2mg/L TP) were removed as outliers. If no other supporting data were available (flow, turbidity, or fire effects), then high nutrient values were removed or retained depending on variability in other values at the site. If all other values were consistently low, the outlier was removed, and if there was high variability in other values at the site, the high value was retained. Through this process, 28 TN values and 24 TP values were removed from analyses (~0.25% of records).

Outliers for other variables (e.g. field and lab chemistry) were addressed ad hoc. Values outside the normal range were eliminated (e.g., dissolved oxygen > 20 mg/L). Unusually high values in a distribution were considered for removal. The level of scrutiny for non-nutrient variables was not as intense as it was for nutrients.

Outliers in the NRSA and WSA data sets were evaluated across sites, because within site replication was minimal. In the NRSA data, one record was considered for removal for both TN (6.6 mg/L) and TP (11.7 mg/L) based on high values, high TSS value (12,568 mg/L), and location (in the Texas plains). These values may be valid, but the record was removed for specific analyses (e.g., to simplify correlations with response variables). No outliers were removed from the WSA/EMAP data.

NMED conducted a review of high outlier values in reference sites. The threshold for review was lower in reference sites. High values did not automatically disqualify a site as reference. TN and TP average concentrations per reference site were plotted and outlier values were identified in the plots (Figure C-

1). All reference sites with average concentrations >0.15 mg/L TP or >0.80 mg/L TN were listed for review of data validity and appropriate reference designation (Tables C-1 and C-2). The table shows the numbers of samples included in the average, the median and maximum concentrations, and the standard deviation. These are presented to determine the persistence of high concentration values. For example, if median values are much lower than average values, then few high outliers that went into the average value are suspected of being unrepresentative.

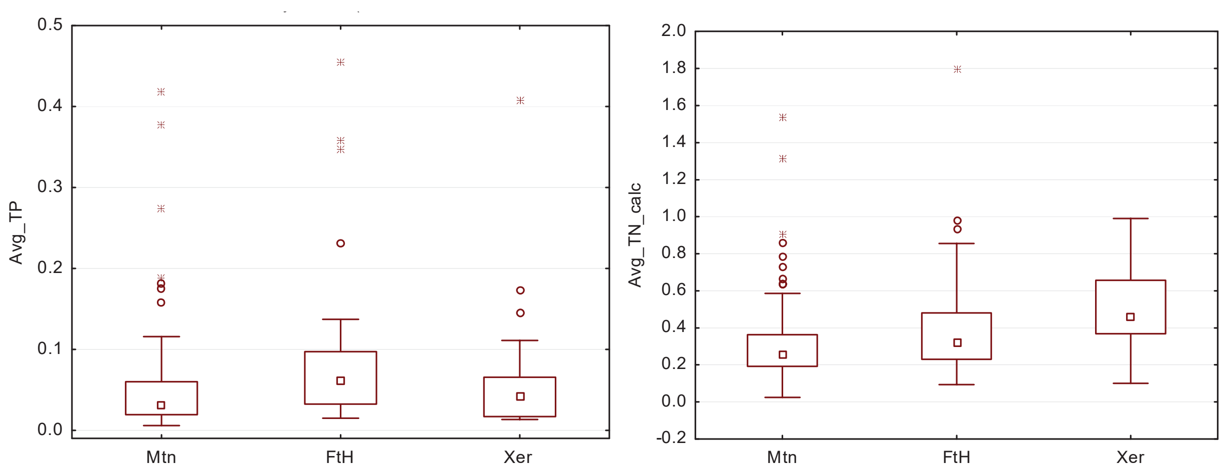

Figure C-1. Distributions of TP and TN concentrations (mg/L) in reference and near-reference sites by sediment site classes; Mountains (N = 98), Foothills (N = 54), and Xeric areas (N = 30).

NMED EXHIBIT 25

Table C-1. TP outlier values at reference sites and statistics.

AltSiteID	MLOC_NAME	Years, # visits	Avg TP	TP Medn	Max TP	TP StdDev
40Alamos058.5	Alamosa Creek below USGS Gage	2004-2011, 10	0.454	0.0198	4.31	1.355
05NPonil023.2	North Ponil Cr abv Seally Cr	2006, 5	0.418	0.035	1.58	0.014
06OcateC025.1	Ocate creek @ I-25	2002, 3	0.408	0.058	1.15	0.643
RIOS_36103_105621	RIO SANTA BARBARA	1990, 3	0.377	0.015	1.1	0.626
80SanFra124.2	San Francisco River at Upper Box	2011, 9	0.359	0.1835	1.54	0.501
GILA_33222_108244	Gila River	1992-1996, 10	0.348	0.0325	1.8	0.569
LITTL_36302_105239	Little Coyote Creek	1991, 6	0.274	0.285	0.515	0.187
45Mimbre112.2	Mimbres River at Upper Nature Conservency Property	2002-2009, 17	0.231	0.1065	2.15	0.513
LITTL_36301_105239	Little Coyote Creek	1991, 6	0.189	0.1575	0.385	0.106
07Maesta000.4	Maestas Cr. abv Manuelitas Cr.	2002, 2	0.182	0.1815	0.307	0.177
WCOP99-0627	Houselog Creek	2002, 1	0.176			
WCOP01-0734	Salt Creek	2003, 1	0.174			
57RBonit061.1	Rio Bonito abv Bonito Lk At Fr 107 Blw Bonito S.	2003-2012, 11	0.157	0.073	1.16	0.334

Table C-2. TN outlier values at reference sites and statistics.

AltSiteID	MLOC_NAME	Years, # visits	Avg TN	TN Medn	Max TN	TN StdDev
48NogalC000.2	Nogal Creek at County Rd B-17	2012, 3	1.795	1.795	1.91	0.163
49Sacram014.6	Sacramento River at Gage	2012, 3	1.540	1.54	1.64	0.141
38RSalad030.0	Rio Salado 1 Mile abv the Box	2005-2008, 4	1.315	1.03	3.03	1.214
60BlueSp002.0	Blue Spring abv Bounds Diversion	2003-2007, 3	0.990	0.849	1.35	0.315
40Alamos058.5	Alamosa Creek Blw USGS Gage	2004-2011, 10	0.976	0.35	6.29	1.876
77Beaver000.1	Beaver Creek Above Taylor Crk	2011, 4	0.933	0.67	2.03	0.746
LITTL_36302_105239	Little Coyote Creek	1991, 6	0.907	0.868	1.41	0.423
80SanFra124.2	San Francisco River at Upper Box	2011, 9	0.856	0.5	3.01	1.002
57RRuido052.4	Rio Ruidoso at Mescalero Boundary at Gage	1993-2012, 19	0.854	0.666	2.86	0.710
16Corrum051.1	Corrumpa Creek at Hwy 370	2006, 1	0.840	0.84	0.84	0.000

Appendix D Estimated Values for Censored Data

Portions of the TN and TP data were reported as below detection limits, noted in the data set as “less than” a numeric value. The current default for these values has been substitution of ½ of a standardized less-than value for all samples with values below that standard or marked as below detection at a higher reported detection limit.

Some analyses rely on summary statistics of site nutrient conditions. Therefore, treatment of the censored data in summary statistics must be addressed before incorporating the site statistics into specific analyses, such as frequency distributions across sites. In addition, sites have varying numbers of samples, so the summary may be based on single or multiple values. TN is calculated from nitrate+ nitrite and TKN, both of which have their own detection limits.

One alternative for dealing with censored data is to continue to use the ½ detection substitution (HDS) in all cases. This is the simplest end of the spectrum of alternatives. Another alternative, elimination of all censored data, is not feasible as this would not account for low nutrient concentrations as an important reference condition. The Kaplan-Meier (KM) technique is a non-parametric method that relies only on the ranks of the data and makes no assumptions about the statistical distribution from which they originate. Regression on order methods (ROS) are techniques that calculate summary statistics with a regression equation on a probability plot. Maximum likelihood estimation (ML) techniques are methods that rely on knowing the underlying statistical distribution from which the data are derived. The most sophisticated approach is a multilevel model to estimate a grand mean using a Bayesian multilevel model. Given the small number of samples at each site, the KM non-parametric method and ROS are most appropriate of these alternatives. These techniques are described in the literature (Helsel 2010, Antweiler and Taylor 2008).

The Kaplan-Meier relies heavily on the detected values. The KM estimate returns a mean of 0 for single non-detect observations or sites with all observations as non-detects. If a site has one detected value and all others are non-detects, the detected value becomes the mean. So the KM estimated mean will be higher than the ½ substitution mean in all cases where there is at least one detected value.

The ROS method is also sensitive to the number of detections versus non-detects. It returns a mean of 0 for single non-detect observations or sites with >80% of observations as non-detects. When only one value is above detection, a warning is given to scrutinize results.

We ran an illustrative analysis in R software, calculating means using different methods for an example site with 5 values ranging from 2 to 10 (Table D-1). In the illustration, we only considered 3 methods: HDS, KM, and ROS. The table shows that for increasing numbers of non-detect values, only the HDS mean consistently decreases. Warnings are associated with ROS mean values derived from 1 or no detected values. The KM method also gave warnings when all values were non-detects. In the example, only the HDS method results in a consistently decreasing mean value as the number of non-detect values increases. This matches our expectations: If we can’t see it most of the time, average concentrations are less than in sites where it is detected more often.

Table D-1. Illustrative data sets and mean values calculated with various methods for interpreting non-detects. FALSE = value is above detection levels. TRUE = value is below detection levels (ND).

Value	All Detected	ND: 2/5	ND: 3/5	ND: 4/5	All ND
10	FALSE	FALSE	FALSE	FALSE	TRUE
9	FALSE	FALSE	FALSE	TRUE	TRUE
4	FALSE	FALSE	TRUE	TRUE	TRUE
3	FALSE	TRUE	TRUE	TRUE	TRUE
2	FALSE	TRUE	TRUE	TRUE	TRUE
Method					
HDS	5.6	5.1	4.7	3.8	2.8
KM	5.6	6.2	9.2	10	0
ROS	5.6	5.3	8.0	10[a]	0[b]

a: ROS warning: Prediction from a rank-deficient fit may be misleading
b: ROS warning: Input > 80% censored -- Results are tenuous.

The applications we must consider are as follows:

1. Calculating TN from TKN and NO_3NO_2 for single sampling events
2. Calculating TN from TKN and NO_3NO_2 for site summaries
3. Using site summary data to calculate quantiles for site subsets
4. Using site summary data to calculate mean values for site subsets
5. Using site summary data to regress responses on sites
6. Using site summary data to calculate change-points

1. Calculating TN from TKN and NO_3NO_2 for single sampling events

There are no methods for estimating non-detect values for single observations. If we are going to combine the TKN and NO_3NO_2 values for a sampling event, we must use some value for the non-detected concentrations. The ½ detection level is a reasonable substitution as opposed to substituting the detection limit or 0. The ½ detection level assumes that the distribution of non-detected concentrations is neither all 0 nor all at the detection level. This issue is not relevant for TP, which is measured directly a single value.

2. Calculating TN from TKN and NO_3NO_2 for site summaries

If we forego sample-specific calculation of TN and instead target site-based calculations, we can use other mean estimation methods for TKN and NO_3NO_2 in each site, then add the mean values to get a site mean TN value. Alternatively, we could keep track of cases where both TKN and NO3NO2 are not detected and assign a ND value to TN for that sample. If one is ND and the other is detected, we would substitute the ½ detection for that sample only. This second alternative seems cumbersome and difficult to justify.

3. Using site summary data to calculate quantiles for site subsets

There will be relatively few sites for which all samples have values below detection. Therefore, we would need to consider a very low quantile before the non-detected values are part of the equation. Substitution values of 0, ½ detection, or detection level could be used for site summary non-detect values with no effect on the results if quantiles are 20th or greater. This is based on our observation that 17-21% of TKN samples had non-detect values and that after incorporating into site summaries, a smaller percentage of sites would have site non-detect values. Therefore, the decisions at the site summary level (#1 and #2) will have more impact than the decision on the substitution value for site non-detect values. Non-detect percentages for NO_3NO_2 and TP were higher and the critical quantiles should be investigated.

4. Using site summary data to calculate mean values for site subsets

We don't typically use mean values to summarize nutrient values in subsets of sites. We usually use non-parametric median and quantile values. These are not sensitive to the non-detects as long as the quantile examined is greater than the number of sites with non-detect values.

5. Using site summary data to regress responses on sites

Given the performance of site mean values in the example data analysis (Table D-1), it appears that the HDS method would give results that conform with our expectations for a site with varying numbers of non-detect values. By setting standard ½ detection values, we might risk creation of a non-normal distribution, but this is a relatively unimportant consideration. The site summary statistics outweigh the site group considerations.

6. Using site summary data to calculate change-points

As with regression, the distribution of non-detect values will be non-normal when using a standard substitution. This might affect the deviance calculations in the change-point analysis, showing very little variability at the lowest levels. However, the increased mean values and variability introduced by the KM and ROS methods might be misleading in other ways. Again, the decisions used to arrive at the site summary statistics will be more important than any manipulation or interpretation of summary statistics for site groups (as occurs in the change-point analysis).

TKN detection and reporting limits: a summary of TKN value distributions

NMED provided a file called Master TKN. This is not all of the TKN data, but is a large part of it. Master TKN was screened by limiting the 7090 records to those that were associated with valid sites for analysis. The resulting 4014 records were associated with 444 sites (including 145 ref and near_ref sites).

685 of 4014 values (17%) were flagged as "less than" or non-detects. The range of "less than" values was 0.04 – 0.25mg/L TKN. 216 "less than" values were below 0.05. 423 "less than" values were 0.10mg/L TKN. 46 "less than" values were between 0.10 and 0.26mg/L TKN. Because it was the mode of non-detect values, 0.10mg/L was considered as the standard non-detect value.

3062 of 4014 values (76%) had values <0.50mg/L TKN. This was the suggested MRL level.

1271 of 4014 records are from reference or near_ref sites. 270 reference or near_ref values (21%) were flagged as "less than". 241 of these values were ≤0.10. 1104 of 1271 records (87%) had values <0.50mg/L (suggested MRL level).

Conclusions

In prominent literature on dealing with censored data, Helsel (2010) suggests not to substitute for non-detects. However, this is not an option given the NMED data set with many non-detect values, especially in reference sites. In his review, Helsel concluded that the Maximum Likelihood Estimation (MLE, AKA Cohen's), Regression on Order Statistics (ROS), Kaplan–Meier (KM), and substitution methods each has a place. Antweiler and Taylor (2008) compared MLE, ROS, KM, and HDS methods in data sets with varying degrees of censored data. They recommended using KM or HDS when censored data was below 70%.

NMED also investigated this issue with an earlier data set. They decided that the ½ substitution or Kaplan-Meier methods were most appropriate (NMED – unpublished <Nut Crit Development Process final.doc>). The ½ substitution method was used because it gave results that were similar to the Kaplan-Meier method. A fairly large portion of the data were censored, i.e. below the detection limit (15-67% for TP, 10-86% for N+N, and 6-38% for TKN). Percentiles were calculated in two ways; using the substitution method (one half the detection limit) and using the nonparametric Kaplan-Meier method. In cases where the proportion of censored data was too high for Kaplan-Meier analysis (>50% non-detects), Regression on Order Statistics (ROS) were used. The results from the different analyses produced very similar results (Table D-2).

After discussions with NMED (6/26/2014), we decided to use the ½ substitution method for all analyses.

Table D-2. Comparison of the percentiles (mg/L), calculated using the substitution (substitut.) and Kaplan-Meier (KM) and ROS methods. Groups are defined by ecoregion number and method. The proportion of the data that was below the detection limit is shown in the % < DL columns.

	Total Phosphorus				Total Kjeldahl Nitrogen				Nitrate plus Nitrite			
Group	n	25th	50th	%< DL	n	25th	50th	%<DL	n	25th	50th	%<DL
21-substitut.	2160	0.015	0.020	41	2167	0.100	0.200	24	2217	0.025	0.050	60
21-KM			0.020			0.100	0.200			0.018	0.040	
22-substitut.	320	0.020	0.040	19	399	0.115	0.330	22	236	0.050	0.140	30
22-KM		0.020	0.040			0.130	0.330				0.140	
23- substitut.	855	0.020	0.020	49	864	0.110	0.200	19	829	0.025	0.050	57
23-KM		0.030	0.020			0.120	0.200			0.019	0.05	
24- substitut.	149	0.040	0.070	7	140	0.100	0.250	34	132	0.160	0.300	4
24-KM		0.040	0.070				0.270		129	0.160	0.300	
26- substitut.	502	0.010	0.020	42	494	0.158	0.325	18	415	0.050	0.090	36
26-KM	428		0.020	45		0.160	0.316		414	0.040	0.090	

Appendix E Seasonal Analysis

The NMED nutrient data were collected mostly in non-winter months (FigureE-1). The relative paucity of sample in the winter was a factor in deciding whether they would be included in the general analyses. If some bias was evident in the uncommon data, their removal would reduce bias in the remaining bulk of the data set. Also, during application of any nutrient criteria, any seasonal patterns of bias could be recognized and assessments in the non-winter months could be encouraged. At first glance, it appeared that there was some bias in the NMED winter nutrient values (N is high and P is low) (Figure E-2). The NRSA and WSA + EMAP samples were collected within a narrower index period (generally May to September), minimizing seasonal effects.

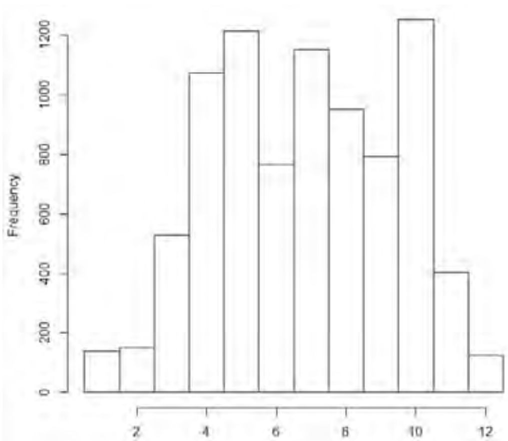

Figure E-1. Sampling frequency by month (NMED data).

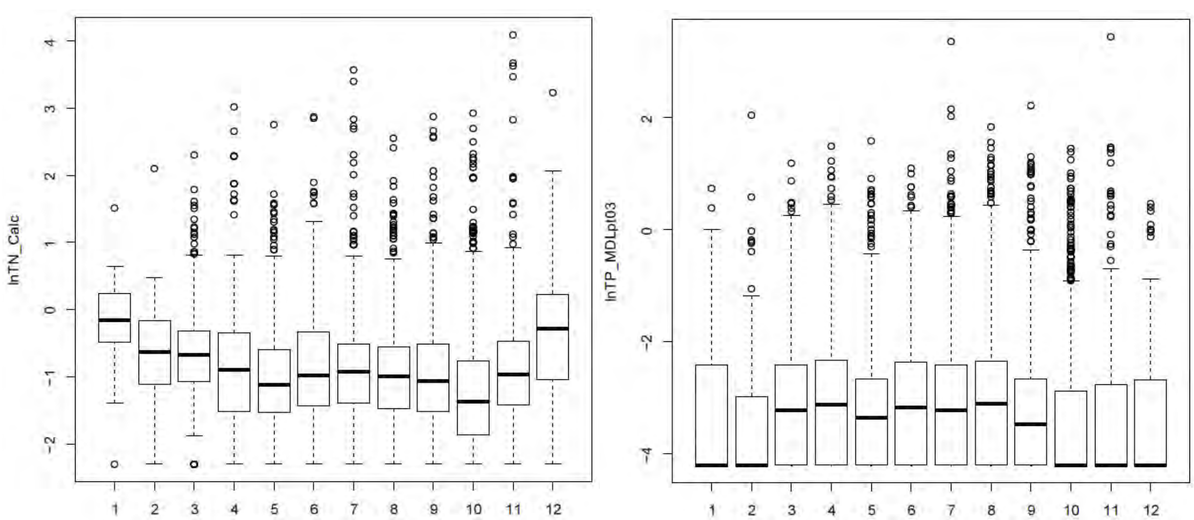

Figure E-2. TN (left) and TP (right) concentrations by month (NMED data).

We continued to explore the seasonality of TN and TP in indicator site classes (mountain, foothill, and xeric), in reference sites, and in selected sites that had several records over time. We limited this analysis to sites with multiple samples (only those with > 14 samples) because we were interested in seeing temporal patterns within sites, not just across sites. The analysis is exploratory and based on graphic interpretations. We do not expect that nutrient differences among months are significant and did not apply an ANOVA or other statistical tests.

Nitrogen

First, we show all sites (with >14 samples) and dates (by month over years) in the site classes with a Loess regression line superimposed. In each site class, there appears to be a drop in TN over the first 5 months (Figure E-3), perhaps coinciding with increasing temperatures, increasing denitrification as temperatures increase, and increased photosynthetic production that would absorb nutrients. In the mountains, a low point is reached in June and increases are seen in July and August. In the foothills and xeric classes, the peaks are also in July and August but the low point is in May. The peaks may be related to saturated uptake capacity in the streams and more free TN. There is a drop in the autumn before increases again in November or December. Xeric areas have low values in may and higher values in July.

When we limited the TN analysis to reference and near-reference sites, the same pattern was clear in the foothills (Figure E-4). In the mountains, there was still a trough in June and a peak in August, but the winter peak was not apparent (perhaps an artifact of fewer samples). The peak in April was as high as the one in August. In xeric areas, reference sites showed a peak in June and generally lower values in the fall. No winter peak was apparent. Given this comparison of reference and all sites (including non-reference), higher winter nutrients in all sites may indicate that the winter TN is either from unnatural sources or can be assimilated in natural areas.

We saw variety in TN concentration patterns for individual sites. In one series of graphs, TN concentrations in the Rio Hondo are displayed for particular years (Figure E-5). Rio Hondo site (28RHondo014.8) is in the mountains and is neither reference nor stressed (other). In 1991 and 1992 the troughs in TN concentration were in mid-summer, not as we saw in the composite of sites. The highest value was in the winter. In 2000, there were high values in May and August, but there were also low values during those months. In 2004, TN decreased over the year after peak values in February and March. In 2009, peak values were in March and August, which is similar to overall patterns. This kind of variation was seen in other sites also, suggesting that the general annual patterns are not rules that apply to all sites or to all years.

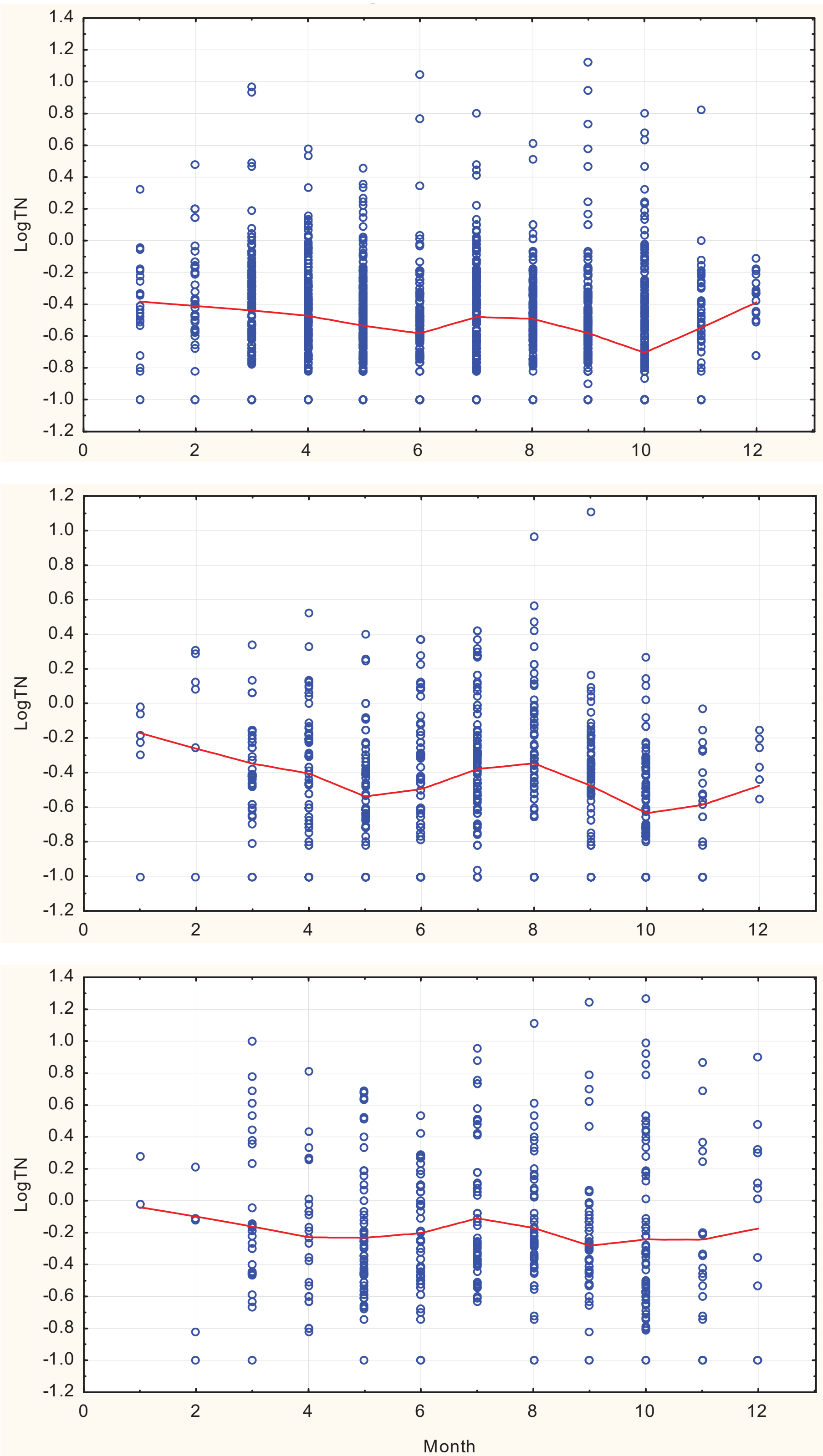

Figure E-3. TN concentration (log10 mg/L) by month in the mountain (top), foothill (middle), and xeric (bottom) site classes. The Loess regression line is shown as a red curve.

NMED EXHIBIT 25

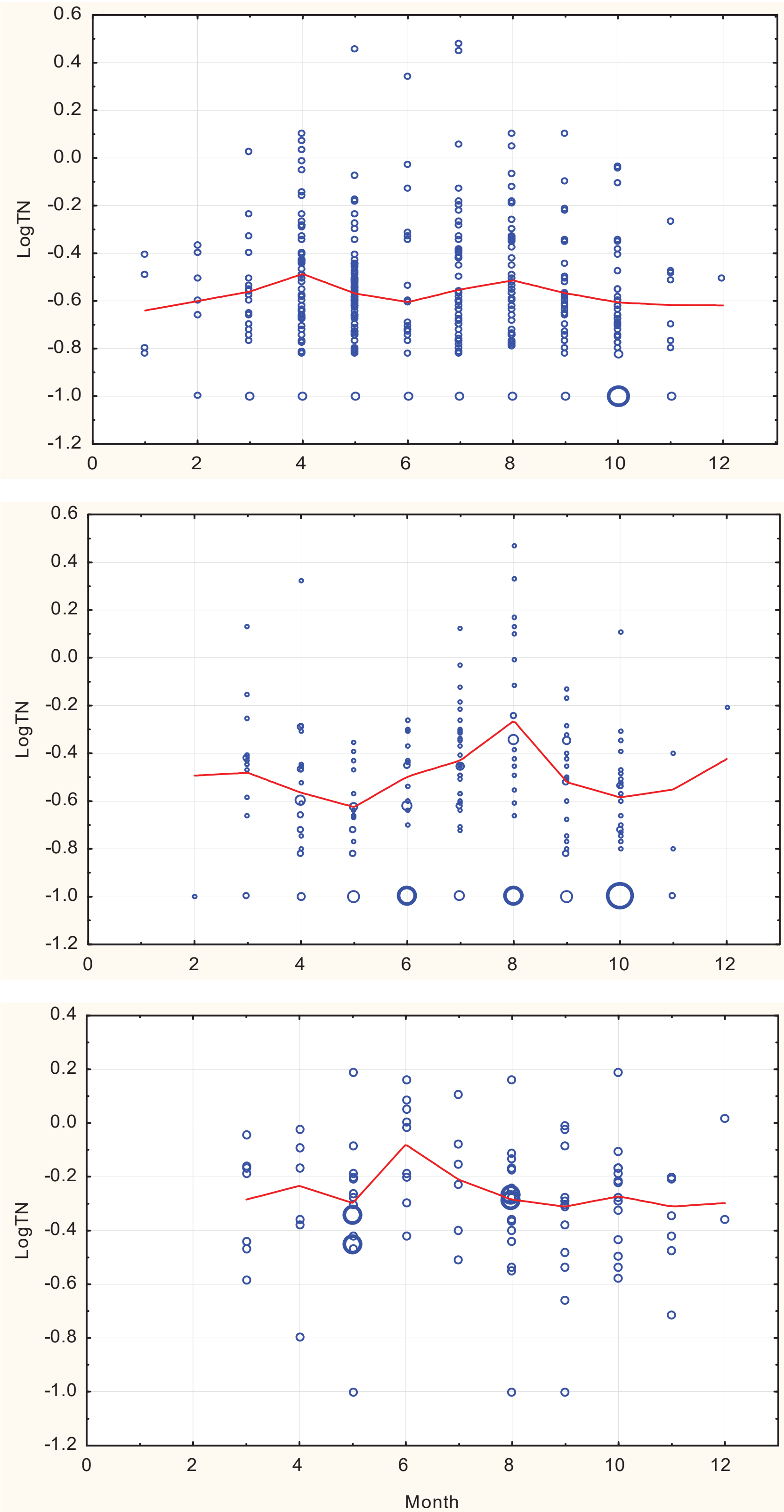

Figure E-4. Reference site TN concentration (log10 mg/L) by month in the mountain (top), foothill (middle), and xeric (bottom) site classes. Larger markers represent multiple samples.

NMED EXHIBIT 25

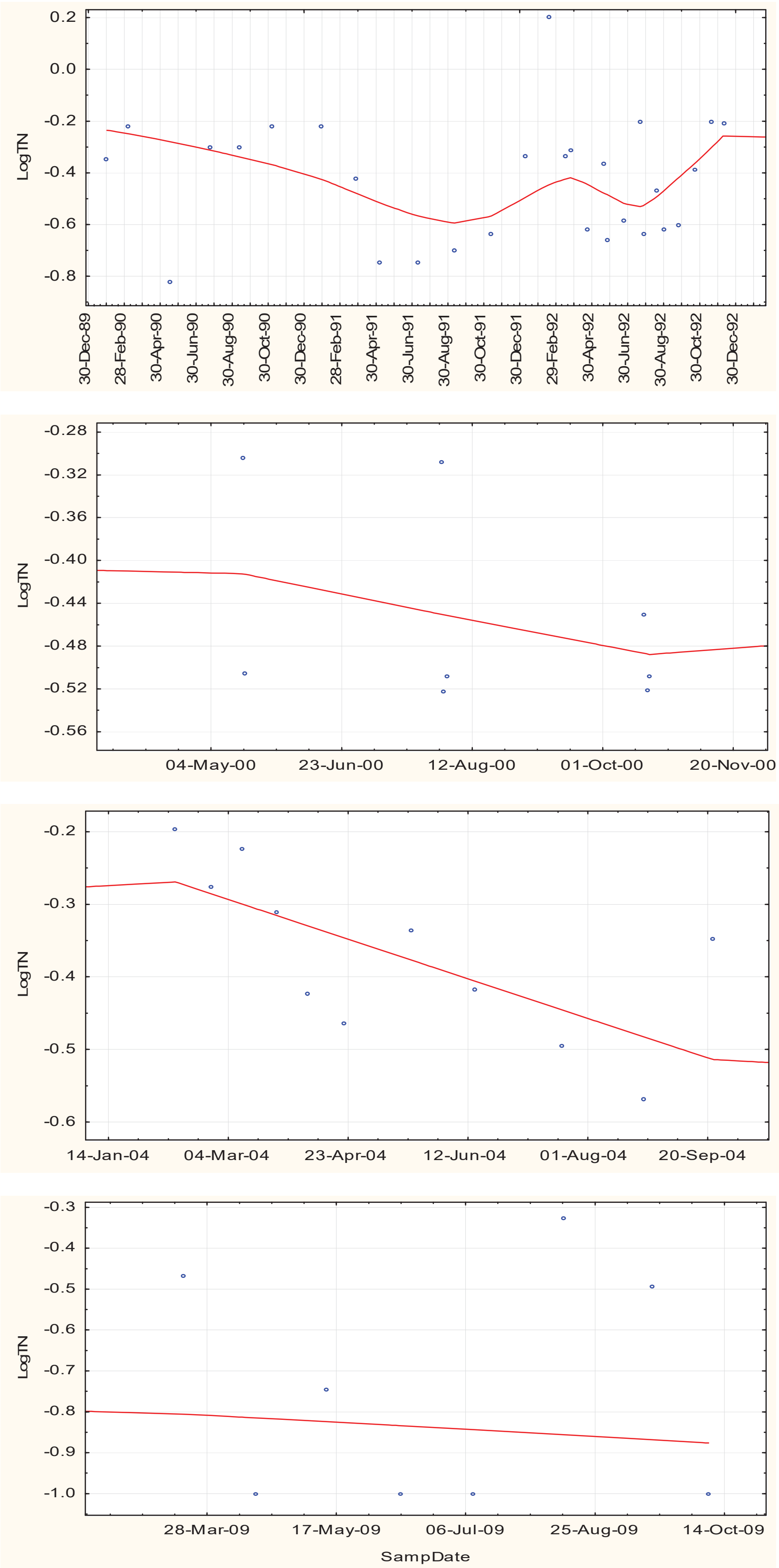

Figure E-5. TN concentrations over time in the Rio Hondo (28RHondo014.8) site.

NMED EXHIBIT 25

Phosphorus

We show the same graphics for TP concentrations, all sites (with >14 samples) and dates (by month over years) in the site classes with a Loess regression line superimposed. The Loess regression line is subject to a large number of non-detect values (they appear as single points for each month along the bottom of the y-axis) (Figure E-6). The non-detects mask any true patterns, but we can see a slight peak in April in the mountains that coincides with a broader peak in the foothills. The foothills and xeric areas have peaks in July. TP in the winter drops off, though the few points in January in the xeric areas are higher. These patterns are also seen in the reference data set (Figure E-7).

We selected three sites to examine in more detail and again found variable patterns over time. The Rio Pueblo de Taos below the Taos effluent channel (28RPuebT008.1) is in the mountains and is neither reference nor stressed (other). From 1989 to 1995 there was a gradual decline in TP and then a slight increase in 1996 (Figure E-8, top). This pattern suggests that management actions were reducing TP sources over that period. In 2000, peak values were lowest in August (Figure E-8, middle). In 2009, TP was highest in July and October (Figure E-8, bottom).

In the Rio Ruidoso 7 miles below WWTP at Glencoe (57RRuido019.8), a stressed site in the foothills, we see relatively stable TP concentrations over years and variation within years that is not consistently related to seasons (Figure E-9). In the Tularosa River above the San Francisco River (80Tularo001.3), a near reference site in the foothills, we see variation over years that is much greater than the variation within years (Figure E-10).

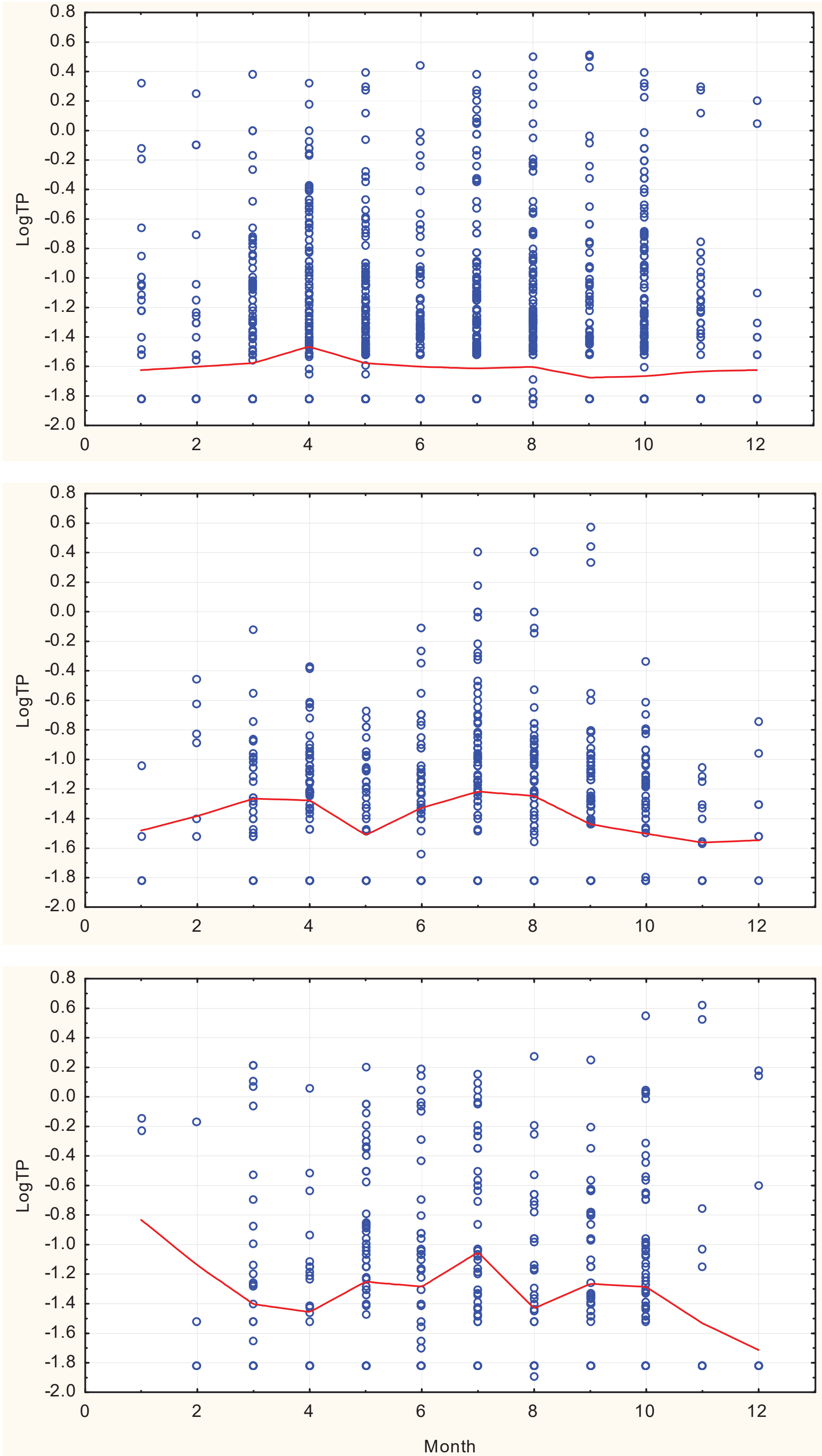

Figure E-6. TP concentration (log10 mg/L) by month in the mountain (top), foothill (middle), and xeric (bottom) site classes. The Loess regression line is shown as a red curve.

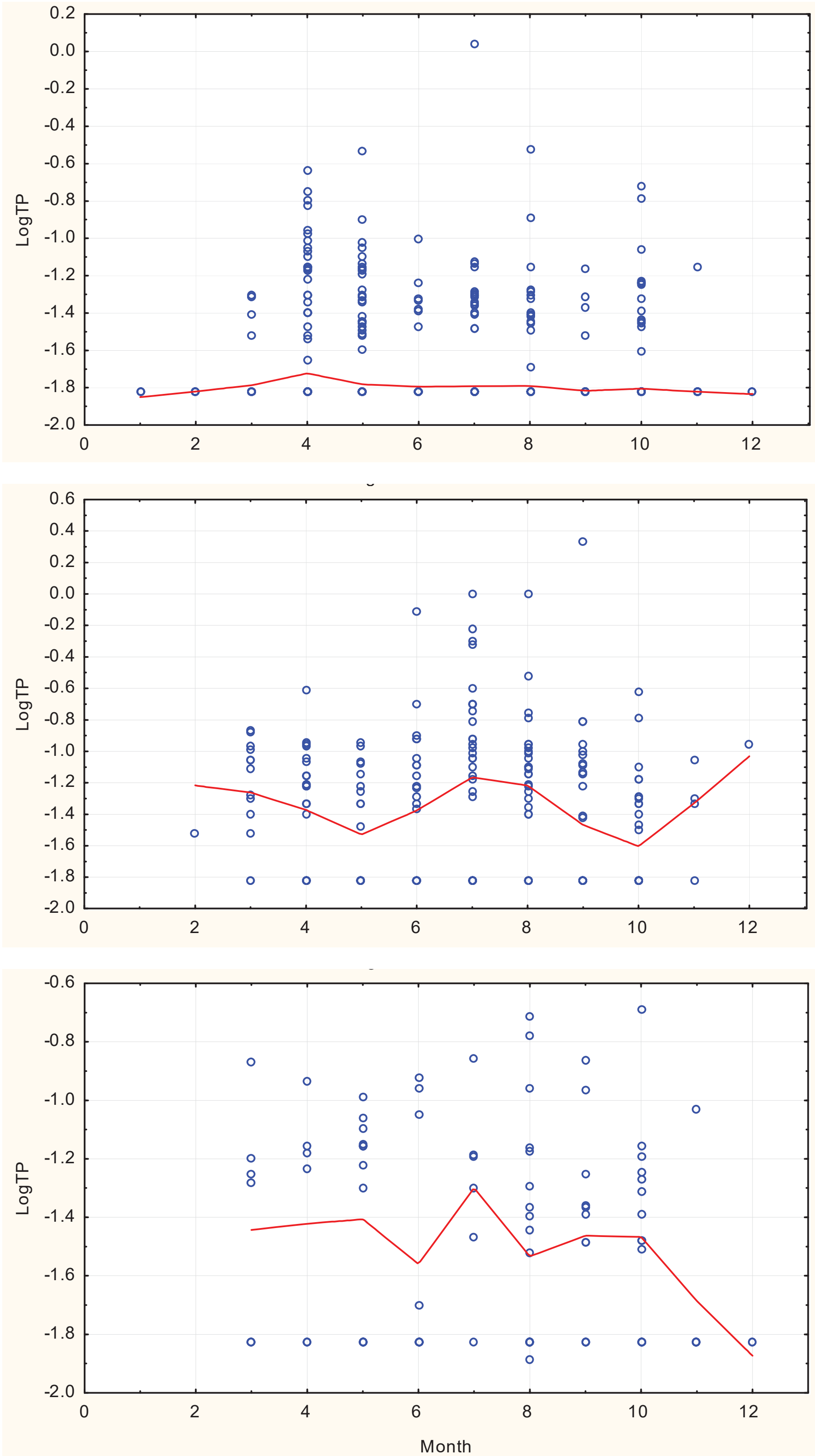

Figure E-7. Reference TP concentration (log10 mg/L) by month in the mountain (top), foothill (middle), and xeric (bottom) site classes.

NMED EXHIBIT 25

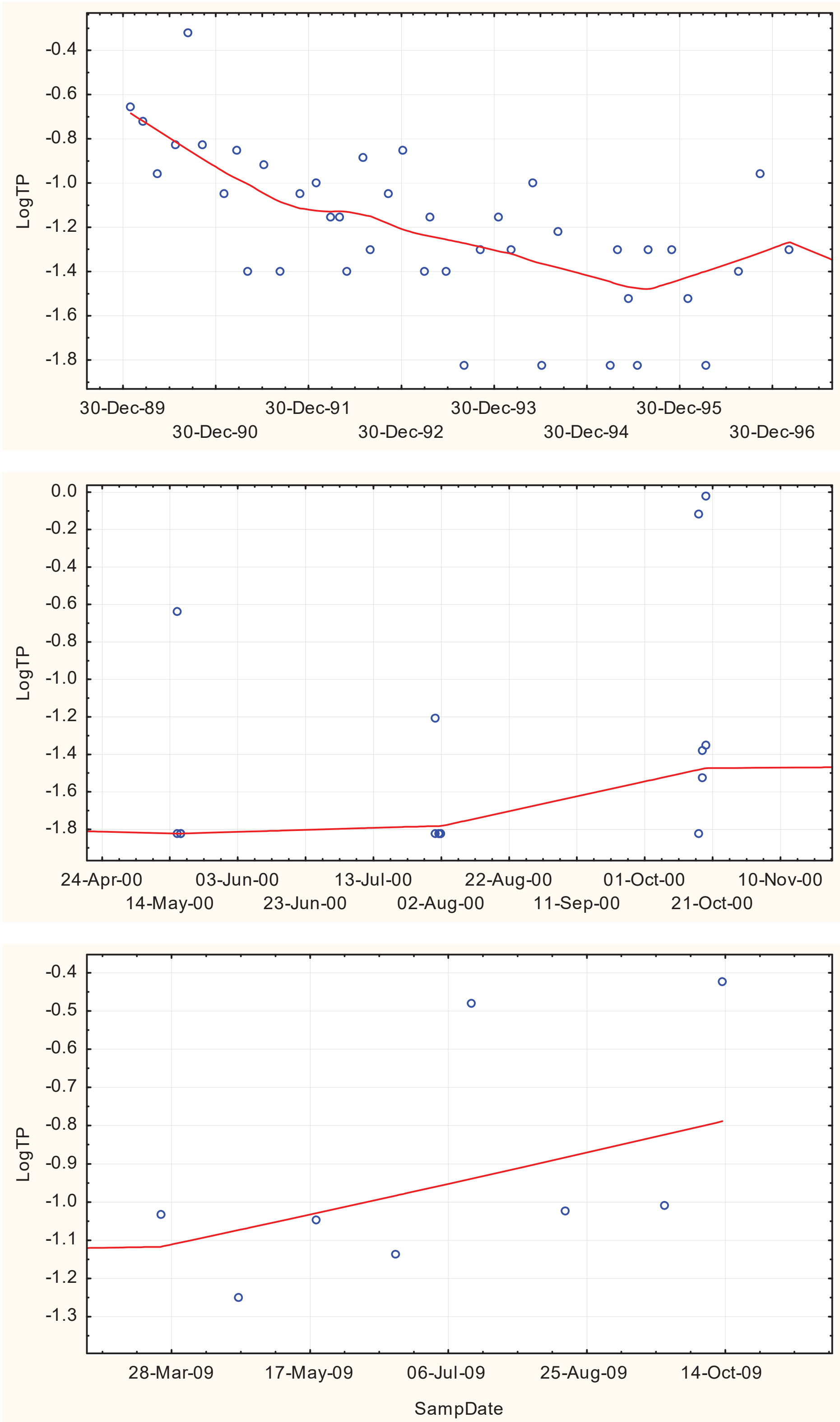

Figure E-8. TP concentrations over time in the Rio Pueblo de Taos (28RPuebT008.1) site.

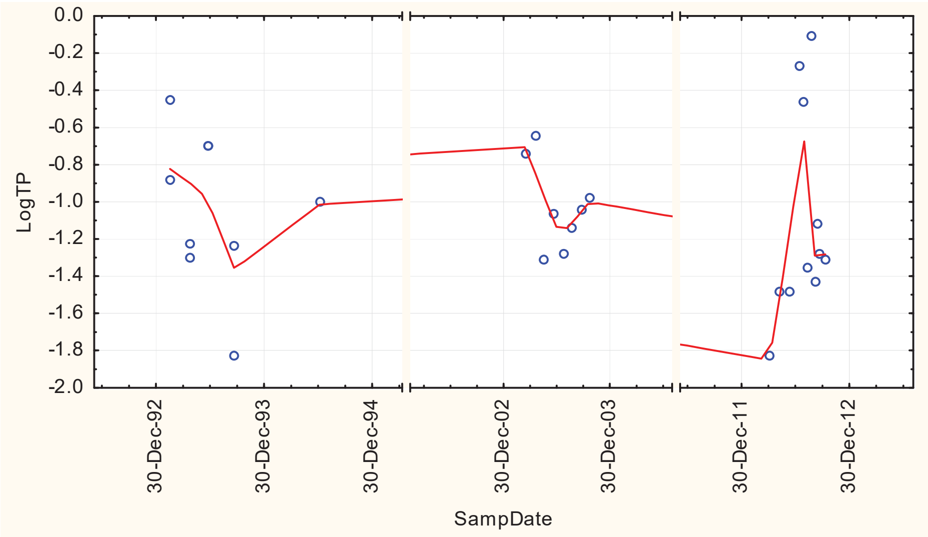

Figure E-9. TP concentrations over time in the Rio Ruidoso (57RRuido019.8) site.

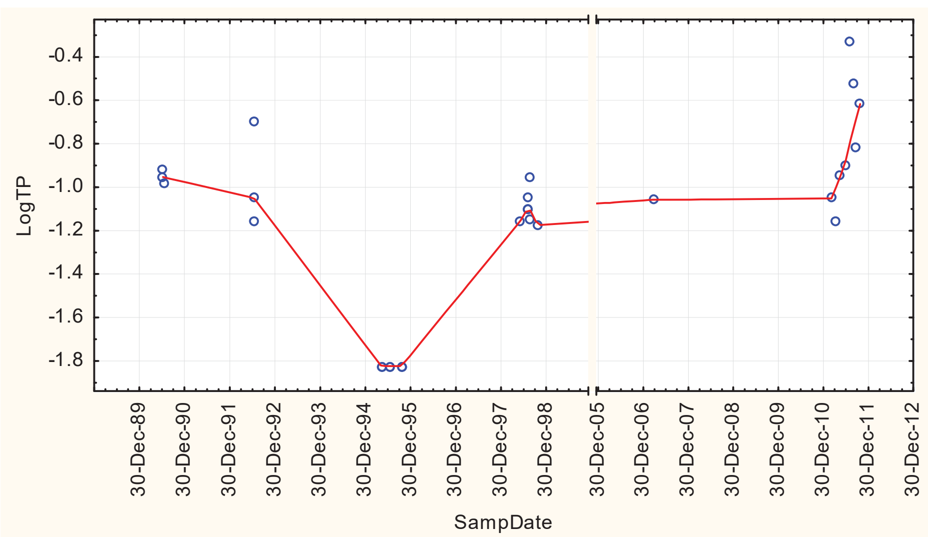

Figure E-10. TP concentrations over time in the Tularosa River (80Tularo001.3) site.

NMED EXHIBIT 25

Conclusions on Nutrient Seasonality

The observations of TN and TP over time in site types and individual sites can influence our approaches in ongoing analyses. First, it is apparent that the winter samples are collected less frequently and do not show repeatable patterns. Winter samples may be associated with higher TN values in non-reference sites. This suggests that winter discharges should be monitored because there may be less assimilative capacity in streams in the winter. However, because the existing data set has so few winter samples, they are not representative of winter samples in all sites. Winter samples (December, January, and February) were excluded from general analyses, including site summaries of median values or other statistics. In stressor-response analysis, all of the matching response data are from non-winter months.

There appears to be a summer peak in TN around July and August. In comparison, TN concentrations in spring and fall are lower (and as we said, the winter may be higher, but not in reference sites). There may be a secondary peak in mountain reference sites in April, but this is not seen when non-reference sites are included and not in the other site classes. Therefore, the spring peak is suspicious. The peak in xeric reference sites may occur earlier in the season (June) compared to the foothill and mountain reference sites (August). We suggested possible associations of nutrients with temperature, productivity, and assimilative capacity, but did not analyze these relationships.

We did not conduct a comprehensive study of patterns in individual sites. Instead, we selected a few sites with higher numbers of samples collected over time and in various site classes and reference types. In those examples, the overall patterns exhibited in all sites are only supported in some sites and in some years. We also see some opposite patterns (low TN in the summers of 91 and 92 in the Rio Hondo) and some signs of management (gradual decrease in TP in the Rio Pueblo de Taos from 1989 – 1995). In reference sites, TP patterns were generally stable within years. Several reference sites were not selected as examples because the TP values were almost all non-detects (no patterns there).

The perceived TN and TP peaks in the data were not strong enough to warrant different nutrient expectations during the year. There may be times of the year when nutrient concentrations will be more predictable in relation to a criterion, but the seasonal effects appear to be variable or not supported in examples from individual sites. Therefore, we recommend using a statistical summary value for TN and TP concentrations within each site. This is also practical because the numbers of samples collected within sites varies considerably (1 to 75) and using individual sample values in a multi-site analysis would give undue weight to data-rich sites.

In reviewing these graphics, we can imagine the effects of averaging values within a site. In the examples, the average would probably be a sufficient estimate of overall site nutrient conditions. To reduce possible effects of high outliers, we use the median value within a site. Obviously sites with few samples will be represented by values near or above the mean value.

Seasonal effects on nutrient concentrations should be considered and analyzed in future analyses.

Appendix F Site Reference Designations

Table F-1. Site reference designations and count of samples. The total number of samples collected at each site between 1990 and 2012 (# Samps) were distributed among years (# Years) for TN and TP. Sites are ordered by collection agency and by short name.

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
NMED Sites						
29Abiqui001.8	Abiquiu Creek	Strs	11	2	11	2
29Abiqui002.3	Abiquiu Creek	NearRef	1	1	1	1
32AboArr037.7	Abo Arroyo	Other	3	1	3	1
59AguaCh029.0	Agua Chiquita	Strs	16	2	16	2
40Alamos058.5	Alamosa Creek	NearRef	9	3	9	3
66Animas001.7	Animas River	XStrs	35	6	31	5
66Animas018.0	Animas River	Strs	23	7	23	7
66Animas027.8	Animas River	Strs	22	5	22	5
66Animas043.0	Animas River	Strs	1	1	1	1
66Animas054.6	Animas River	Strs	10	2	10	2
66Animas055.8	Animas River	Strs	8	1	8	1
50AHerma000.1	Arroyo Hermanos	Strs	1	1	1	1
78BearCr027.0	Bear Creek	NearRef	9	2	9	2
BEAR_32891_108233	Bear Creek	Strs	1	1	1	1
50Beaver000.1	Beaver Creek	Ref	3	2	3	2
77Beaver000.1	Beaver Creek	NearRef	3	1	4	1
28BigTes013.2	Big Tesuque Creek	Other	6	1	6	1
28Bitter003.0	Bitter Creek	Other	4	1	4	1
BITTE_36705_105403	Bitter Creek	Other	2	1	2	1
77BlackC000.1	Black Canyon	Ref	1	1	1	1
77BlackC028.3	Black Canyon Creek	Ref	2	1	2	1
77BlackC016.5	Black Cny Creek	Ref	13	2	13	2
60BlackR005.7	Black River	Other	14	4	14	4
60BlackR019.8	Black River	Other	3	2	3	2
60BlackR023.7	Black River	Other	6	3	6	3
60BlackR052.0	Black River	NearRef	13	5	13	5
78BlueCr000.9	Blue Creek	Ref	4	4	4	4
60BlueSp002.0	Blue Spring	Ref	3	2	3	2
36Bluewa003.5	Bluewater Creek	NearRef	13	2	13	2
36Bluewa016.7	Bluewater Creek	Other	4	1	4	1
36Bluewa018.9	Bluewater Creek	Other	23	5	23	5
36Bluewa023.2	Bluewater Creek	NearRef	8	4	8	4
77Bobcat000.8	Bobcat Spring	NearRef	2	2	2	2

NMED EXHIBIT 25

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
77Bonner002.4	Bonner Trib To Black Canyon	Other	1	1	1	1
30Bulldo000.1	Bulldog Gulch	Other	2	2	2	2
28Cabres005.4	Cabresto Creek	NearRef	7	3	8	3
31Calave001.1	Calaveras Creek	NearRef	18	2	15	2
27CTGran000.7	Canada Tio Grande	NearRef	4	1	4	1
04Canadi352.7	Canadian River	Other	9	1	9	1
04Canadi402.9	Canadian River	Other	9	2	9	2
06Canadi232.6	Canadian River	Other	10	3	10	3
06Canadi305.0	Canadian River	NearRef	3	3	3	3
06Canadi348.3	Canadian River	Other	3	2	3	2
09Canadi001.2	Canadian River	Other	7	1	7	1
09Canadi062.4	Canadian River	Other	3	2	3	2
09Canadi144.5	Canadian River	Other	8	2	8	2
09Canadi204.1	Canadian River	Other	2	1	2	1
29Canjil006.2	Canjilon Creek	Other	16	3	16	3
29Canjil039.5	Canjilon Creek	Other	2	1	2	1
30CValle003.9	Canon De Valle	Other	1	1	1	1
29Canone001.7	Canones Creek	Other	5	1	5	1
29Canone004.6	Canones Creek	Other	11	2	11	2
29Canone002.4	Cañones Creek	Other	6	2	4	2
57Carriz001.4	Carrizo Creek	XStrs	1	1	1	1
02Carriz002.7	Carrizozo Creek	NearRef	8	1	7	1
28Casias000.6	Casias Creek	Ref	8	1	8	1
29Cecili000.1	Cecilia Canyon Creek	Other	13	3	13	3
80Center000.1	Centerfire Creek	Other	3	1	3	1
80Center002.1	Centerfire Creek	Other	8	1	6	1
29RChama147.1	Chama River	Strs	2	1	2	1
29RChama161.1	Chama River	Other	3	1	3	1
28Chamis003.0	Chamisal Creek	XStrs	3	1	3	1
04Chicor010.9	Chicorica Creek	Other	9	2	9	2
04Chicor034.4	Chicorica Creek	Other	9	2	9	2
29Chihua000.1	Chihuahuenos Creek	Other	9	1	9	1
05Cieneg006.3	Cieneguilla Creek	Strs	18	4	18	4
05Cieneg016.5	Cieneguilla Creek	XStrs	5	1	5	1
05Cieneg019.3	Cieneguilla Creek	Strs	18	4	18	4
05Cieneg021.9	Cieneguilla Creek	XStrs	9	2	9	2
05Cimarr013.4	Cimarron River	Other	12	2	12	2
05Cimarr041.2	Cimarron River	Other	1	1	1	1
05Cimarr050.8	Cimarron River	Other	22	8	21	8
05Cimarr077.2	Cimarron River	Strs	18	4	17	4
29ClearC000.1	Clear Creek	Other	17	3	17	3

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
31ClearC002.3	Clear Creek	Other	16	2	16	2
31ClearC009.2	Clear Creek	Ref	2	1	2	1
28Columb000.1	Columbine Creek	Ref	3	1	3	1
28Comanc007.7	Comanche	Other	21	6	21	6
28Comanc000.1	Comanche Creek	Other	13	2	13	2
08Concha025.1	Conchas River	Other	3	1	3	1
28Cordov001.5	Cordova Creek	Other	13	3	13	3
28Cordov006.2	Cordova Creek	NearRef	12	2	12	2
16Corrum051.1	Corrumpa Creek	NearRef	1	1	1	1
28RCosti032.2	Costilla Creek	NearRef	8	1	8	1
28RCosti032.5	Costilla Creek	NearRef	13	2	13	2
50CowCre011.5	Cow Creek	Other	7	1	7	1
50CowCre023.7	Cow Creek	Other	9	2	9	2
50CowCre023.8	Cow Creek	Other	15	2	15	2
07Coyote001.7	Coyote Creek	Other	9	2	9	2
29Coyote005.6	Coyote Creek	Other	12	3	12	3
77CubCre005.6	Cub Creek	Ref	1	1	1	1
50Dalton000.1	Dalton Canyon Creek	NearRef	4	1	4	1
62Delawa006.0	Delaware River	Other	6	3	6	3
48DogCan002.7	Dog Canyon	Ref	13	3	13	3
04Dogget002.3	Doggett Creek	XStrs	5	4	4	3
DOUBL_31639_108754	Double Adobe Creek	NearRef	1	1	1	1
02DryCim122.7	Dry Cimarron	NearRef	7	1	7	1
02DryCim003.2	Dry Cimarron River	NearRef	18	3	18	3
02DryCim047.2	Dry Cimarron River	NearRef	12	3	12	3
02DryCim074.5	Dry Cimarron River	NearRef	15	2	15	2
02DryCim108.2	Dry Cimarron River	NearRef	20	5	20	5
77EFkGil000.2	East Fork Gila River	Ref	21	4	21	4
77EFkGil010.0	East Fork Gila River	Ref	1	1	1	1
77EFkGil012.1	East Fork Gila River	Other	2	1	2	1
77EFkGil035.4	East Fork Gila River	Other	10	2	10	2
31EFkJem000.1	East Fork Jemez	Other	16	2	16	2
31EFkJem020.7	East Fork Jemez	Other	17	2	17	2
31EFkJem026.1	East Fork Jemez	NearRef	3	2	3	2
31EFkJem015.2	East Fork Jemez River	NearRef	8	1	8	1
50ElPorv000.1	El Porvenir Creek	Ref	55	10	55	10
50ElPorv004.8	El Porvenir Creek	Ref	23	5	22	5
50ElPorv012.6	El Porvenir Creek	Ref	2	1	2	1
29ElRito035.9	El Rito	Other	1	1	1	1
29ElRito050.2	El Rito	Ref	1	1	1	1
50ElRito000.2	El Rito Creek	XStrs	15	4	15	4

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
50ElRito000.3	El Rito Creek	XStrs	10	3	10	3
28Embudo000.8	Embudo Creek	Strs	23	4	23	4
28Embudo010.1	Embudo Creek	Other	10	2	9	2
28Embudo020.5	Embudo Creek	Other	7	2	7	2
48FresCa001.0	Fresnal Creek	Other	1	1	1	1
48FresCa008.3	Fresnal Creek	Other	5	1	5	1
30Galist030.9	Galisteo Creek	Other	3	1	3	1
30Galist050.4	Galisteo Creek	Other	8	1	8	1
64Galleg000.4	Gallegos Canyon	Strs	1	1	1	1
45Gallin021.5	Gallinas Creek	Other	10	2	10	2
50Gallin075.0	Gallinas River	Strs	37	8	37	8
50Gallin101.8	Gallinas River	Strs	20	6	26	6
50Gallin102.1	Gallinas River	Other	27	6	28	7
50Gallin104.9	Gallinas River	Strs	1	1	1	1
50Gallin114.6	Gallinas River	Other	11	2	11	2
50Gallin119.7	Gallinas River	Other	56	10	56	10
50Gallin131.8	Gallinas River	NearRef	44	9	44	9
50Gallin140.8	Gallinas River	Ref	13	3	13	3
50Gallin141.9	Gallinas River	Ref	30	7	30	7
UPR211.001529	Gallinas River	Other	2	2	2	2
77Gilari088.0	Gila River	Ref	5	3	5	3
77GilaRi092.0	Gila River	Ref	1	1	1	1
78GilaR087.7	Gila River	NearRef	11	2	11	2
78GilaRi026.1	Gila River	Other	14	5	13	5
78GilaRi052.6	Gila River	Other	1	1	1	1
78GilaRi069.2	Gila River	Other	10	2	10	2
78GilaRi074.8	Gila River	NearRef	2	1	2	1
GILA_33179_108206	Gila River	NearRef	3	1	3	1
GILA_33222_108244	Gila River	NearRef	10	2	9	2
77Gilita000.2	Gilita Creek	Ref	4	1	4	1
50Glorie001.8	Glorieta Creek	Strs	16	5	16	5
50Glorie012.6	Glorieta Creek	Strs	8	4	8	4
50Glorie013.5	Glorieta Creek	Strs	3	1	3	1
GLORI_35565_105738	Glorieta Creek	Strs	1	1	1	1
GLORI_35568_105722	Glorieta Creek	Strs	6	3	6	3
GLORI_35571_105755	Glorieta Creek	Strs	1	1	1	1
50Holing000.1	Hollinger Creek	Ref	3	2	3	2
50HolyGh000.1	Holy Ghost Creek	Other	21	5	21	5
77IronCr000.1	Iron Creek	Ref	12	3	12	3
77IronCr009.7	Iron Creek	Ref	12	4	12	4
31Jarami008.0	Jaramillo	Other	17	2	17	2

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
31JemezR046.6	Jemez River	Strs	8	1	8	1
31JemezR048.7	Jemez River	Strs	8	1	8	1
31JemezR049.2	Jemez River	Strs	9	2	9	2
31JemezR058.6	Jemez River	Other	8	1	8	1
31JemezR064.9	Jemez River	Other	17	1	17	1
JEMEZ_35392_106537	Jemez River	XStrs	6	1	6	1
MRG105.009035	Jemez River	Strs	9	1	9	1
48KarrCa002.9	Karr Canyon	Other	12	2	12	2
33LaJara009.7	La Jara Creek	Ref	14	2	14	2
48LaLuzC014.2	La Luz Creek	Other	2	1	2	1
67LaPlat000.3	La Plata River	Other	14	3	15	3
67LaPlat024.8	La Plata River	Other	14	2	14	2
67LaPlat033.8	La Plata River	Other	16	2	16	2
41LAnima029.3	Las Animas Creek	Ref	9	6	9	6
41LAnima038.3	Las Animas Creek	Ref	1	1	1	1
30LHuert010.0	Las Huertas Creek	Other	8	1	8	1
30LHuert019.0	Las Huertas Creek	Other	5	1	5	1
LITTL_36301_105239	Little Coyote Creek	Ref	6	1	6	1
LITTL_36302_105239	Little Coyote Creek	Ref	6	1	6	1
29LitTus003.4	Little Tusas	Other	1	1	1	1
02LongCa004.1	Long Canyon	Other	15	2	15	2
LONG_36937_10358	Long Canyon Creek	Other	3	1	3	1
LOSP_3699_107601	Los Pinos River	Other	7	2	5	2
30SantaF030.5	Lower Santa Fe River	XStrs	7	3	7	3
07Maesta000.4	Maestas Creek	NearRef	2	1	1	1
77Diamon033.2	Main Diamond Creek	Ref	5	2	5	2
78Mangas000.7	Mangas Creek	Other	12	3	12	3
07Manuel020.9	Manuelitas Creek	NearRef	9	2	9	2
45McKnig011.9	Mcknight Canyon Creek	Ref	13	2	13	2
77MFkGil000.1	Middle Fork Gila River	Ref	20	4	20	4
77MFkGil028.3	Middle Fork Gila River	Ref	1	1	1	1
05MPonil000.1	Middle Ponil Creek	NearRef	13	2	13	2
05MPonil016.2	Middle Ponil Creek	Other	4	1	4	1
45Mimbre127.4	Mimbes River	Ref	16	3	16	3
45Mimbre062.7	Mimbres	Other	16	3	16	3
45Mimbre094.6	Mimbres River	Other	20	4	20	4
45Mimbre104.8	Mimbres River	Other	16	3	16	3
45Mimbre112.2	Mimbres River	Ref	16	3	15	3
45Mimbre127.8	Mimbres River	Ref	3	2	3	2
07MoraRi000.8	Mora River	Other	1	1	1	1
07MoraRi139.9	Mora River	Other	11	2	11	2

NMED EXHIBIT 25

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
07MoraRi146.6	Mora River	Other	11	2	11	2
07MoraRi147.1	Mora River	Other	10	2	10	2
07MoraRi147.2	Mora River	Other	4	2	4	2
07MoraRi170.9	Mora River	Other	11	2	11	2
05Moreno003.7	Moreno Creek	Other	19	4	19	4
80MuleCr015.5	Mule Creek	Other	16	3	9	2
28NFkTes000.6	N.Fork Of Tesuque Creek	Other	22	4	23	4
29NaborC000.1	Nabor Creek	Other	5	2	4	2
33Nacimi003.4	Nacimiento Creek	Other	4	2	4	2
33Nacimi008.0	Nacimiento Creek	Strs	12	2	12	2
64Navajo022.1	Navajo River	Other	12	2	12	2
64Navajo023.3	Navajo River	Other	6	1	6	1
NAVAJ_36949_107072	Navajo River	Other	6	1	6	1
NAVAJ_36967_107041	Navajo River	Strs	6	1	6	1
80Negrit000.1	Negrito Creek	Ref	6	2	6	2
32RGrand305.0	Nmw-05549-08	Other	1	1	1	1
32RGrand346.1	Nmw-05549-12	Other	1	1	1	1
32RGrand385.1	Nmw-05549-25	Strs	1	1	1	1
32RGrand326.4	Nmw05549-28	Other	1	1	1	1
32RGrand392.1	Nmw05549-29	XStrs	1	1	1	1
48NogalC000.2	Nogal Creek	NearRef	3	1	3	1
05NPonil000.1	North Ponil Creek	Ref	13	3	12	3
05NPonil023.2	North Ponil Creek	Ref	3	1	3	1
05NPonil027.5	North Ponil Creek	Ref	4	1	4	1
57NSprin000.6	North Spring River	XStrs	1	1	1	1
57NSprin002.0	North Spring River	XStrs	1	1	1	1
57NSprin004.8	North Spring River	XStrs	2	2	2	2
02OakCre000.1	Oak Creek	Ref	15	2	15	2
06OcateC025.1	Ocate Creek	NearRef	3	1	2	1
30Pajari012.6	Pajarito Canyon	Other	2	2	3	3
30Pajari015.2	Pajarito Canyon	Other	1	1	1	1
30Pajari016.1	Pajarito Canyon	Other	2	2	2	2
09Pajari001.0	Pajarito Creek	Other	1	1	2	2
09Pajari020.0	Pajarito Creek	Other	9	2	9	2
30Pajari018.5	Pajarito Creek	Ref	1	1	1	1
50PecosR512.6	Pecos River	Other	35	9	35	9
50PecosR529.1	Pecos River	XStrs	8	1	8	1
50PecosR529.2	Pecos River	NearRef	10	3	10	3
50PecosR540.8	Pecos River	Other	6	1	6	1
50PecosR601.2	Pecos River	Other	5	2	5	2
50PecosR670.2	Pecos River	Other	9	1	9	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
50PecosR670.3	Pecos River	NearRef	6	4	6	4
50PecosR678.5	Pecos River	NearRef	1	1	1	1
50PecosR696.0	Pecos River	Other	18	2	10	2
50PecosR700.3	Pecos River	Other	4	1	4	1
50PecosR722.0	Pecos River	Other	30	3	19	3
50PecosR765.3	Pecos River	Other	8	1	8	1
50PecosR772.0	Pecos River	Other	7	1	7	1
50PecosR783.7	Pecos River	Other	6	1	6	1
50PecosR784.1	Pecos River	Other	8	1	8	1
50PecosR795.2	Pecos River	Other	35	5	26	5
50PecosR797.7	Pecos River	Ref	18	2	9	2
52PecosR305.0	Pecos River	Other	1	1	1	1
52PecosR430.0	Pecos River	Other	1	1	1	1
52PecosR447.7	Pecos River	Other	8	1	8	1
56PecosR169.0	Pecos River	Other	9	2	9	2
56PecosR301.0	Pecos River	Other	7	2	7	2
60PecosR033.2	Pecos River	Other	7	1	7	1
60PecosR050.2	Pecos River	Other	9	2	9	2
60PecosR088.4	Pecos River	Other	8	1	8	1
41Percha025.3	Percha Creek	Other	9	3	9	3
64PiedrAbvrNav	Piedras River	Other	1	1	1	1
28Pionee000.7	Pioneer Creek	Other	8	3	8	3
28Pojoaq005.0	Pojoaque River	Other	5	1	5	1
29PoleoC009.5	Poleo Creek	Ref	14	3	14	3
29Polvad008.8	Polvadera Creek	NearRef	15	4	15	4
05PonilC000.1	Ponil Creek	Other	9	2	8	2
05PonilC002.2	Ponil Creek	NearRef	6	2	5	2
05PonilC014.9	Ponil Creek	NearRef	9	2	9	2
05PonilC023.8	Ponil Creek	NearRef	4	1	4	1
04RatonC007.8	Raton Creek	Strs	8	2	8	2
04RatonC010.9	Raton Creek	XStrs	5	4	4	3
04RatonC013.8	Raton Creek	XStrs	1	1	1	1
05Rayado001.8	Rayado Creek	Other	9	1	9	1
05Rayado033.8	Rayado Creek	Ref	12	4	10	4
28RedRiv005.3	Red River	Strs	8	1	8	1
28RedRiv005.9	Red River	Other	8	1	8	1
28RedRiv014.0	Red River	Other	17	2	17	2
28RedRiv024.4	Red River	Other	17	2	16	2
28RedRiv027.8	Red River	Other	9	1	9	1
28RedRiv031.1	Red River	Other	9	1	9	1
28RedRiv035.5	Red River	NearRef	17	2	17	2

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
31Redond001.2	Redondo Creek	Other	19	4	19	4
MRG106.010015	Redondo Creek	Other	7	1	7	1
57RBonit027.7	Rio Bonito	NearRef	12	3	12	3
57RBonit053.4	Rio Bonito	Other	6	2	6	2
57RBonit059.9	Rio Bonito	Other	2	1	2	1
57RBonit061.1	Rio Bonito	Ref	10	2	10	2
29RBrazo001.6	Rio Brazos	Other	14	2	11	2
29RBrazo010.1	Rio Brazos	Ref	9	3	7	3
31RCebol000.1	Rio Cebolla	Other	9	1	9	1
31RCebol011.4	Rio Cebolla	Other	9	1	9	1
31RCebol017.9	Rio Cebolla	Ref	8	1	8	1
29RChama079.5	Rio Chama	Other	17	5	17	5
29RChama082.8	Rio Chama	Other	1	1	1	1
29RChama143.8	Rio Chama	Other	5	4	5	4
29RChama174.0	Rio Chama	Strs	15	2	14	2
29RChama183.4	Rio Chama	Ref	20	3	18	3
29RChami002.7	Rio Chamita	Strs	11	3	11	3
29RChami002.8	Rio Chamita	Other	12	4	10	4
URG116.020005	Rio Chamita	Strs	10	3	10	3
URG116.020055	Rio Chamita	Other	4	1	4	1
28RChiqB000.1	Rio Chiquito	Other	3	1	3	1
28RChupa014.3	Rio Chupadero	Other	13	5	13	5
28RChupa015.2	Rio Chupadero	Other	8	1	8	1
RIOC_35779_105711	Rio Chupadero	Ref	4	1	4	1
28RCosti052.2	Rio Costilla	NearRef	13	5	13	5
07RioLaC006.2	Rio De La Casa	Ref	8	1	8	1
31RVacas000.1	Rio De Las Vacas	Other	16	2	16	2
31RVacas011.1	Rio De Las Vacas	Other	7	1	7	1
31RVacas023.7	Rio De Las Vacas	Ref	15	2	15	2
31RVacas026.5	Rio De Las Vacas	Ref	4	1	4	1
27RPinos002.6	Rio De Los Pinos	Ref	18	3	18	3
27RPinos007.3	Rio De Los Pinos	Ref	5	5	5	5
27RPinos011.3	Rio De Los Pinos	Ref	8	1	8	1
29RMedio002.7	Rio Del Medio	Other	1	1	1	1
29RioOso001.9	Rio Del Oso	Other	8	1	8	1
29RioOso004.7	Rio Del Oso	Other	4	3	4	3
28RMedio007.2	Rio En Medio	NearRef	17	5	17	5
28RMedio013.3	Rio En Medio	XStrs	10	5	10	5
28RMedio016.9	Rio En Medio	Other	35	5	35	5
28RMedio017.5	Rio En Medio	Ref	17	5	17	5
58RFelix002.1	Rio Felix	Other	1	1	1	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
28RFerna000.3	Rio Fernando De Taos	Strs	4	1	4	1
28RFerna031.7	Rio Fernando De Taos	Other	21	5	21	5
29RGalli000.5	Rio Gallina	Other	3	2	3	2
29RGalli005.5	Rio Gallina	Other	1	1	1	1
29RGalli045.1	Rio Gallina	Ref	25	7	25	7
28RGrand547.2	Rio Grande	Other	1	1	1	1
28RGrand550.8	Rio Grande	XStrs	1	1	1	1
28RGrand650.8	Rio Grande	Other	7	1	7	1
28RGrand725.5	Rio Grande	Other	1	1	1	1
30RGrand541.7	Rio Grande	Other	2	1	2	1
32RGrand258.0	Rio Grande	Other	19	4	19	4
32RGrand286.9	Rio Grande	Other	6	2	6	2
32RGrand407.8	Rio Grande	Strs	9	2	9	2
32RGrand435.2	Rio Grande	XStrs	1	1	1	1
32RGrand445.4	Rio Grande	XStrs	17	4	17	4
42RGrand001.1	Rio Grande	Other	8	1	8	1
42RGrand004.1	Rio Grande	Strs	2	2	2	2
42RGrand038.7	Rio Grande	Other	9	2	9	2
42RGrand044.2	Rio Grande	Other	9	2	9	2
42RGrand115.0	Rio Grande	Other	10	3	10	3
42RGrand160.3	Rio Grande	Other	8	1	8	1
42RGrand171.9	Rio Grande	Other	5	2	5	2
28RGRanc000.2	Rio Grande Del Rancho	Other	16	2	16	2
28RGRanc013.1	Rio Grande Del Rancho	Ref	17	6	17	6
31RGuada000.1	Rio Guadalupe	Strs	9	2	9	2
MRG106.007501	Rio Guadalupe	Strs	7	1	7	1
28RHondo000.1	Rio Hondo	Other	25	3	24	3
28RHondo003.9	Rio Hondo	Other	9	1	9	1
28RHondo012.1	Rio Hondo	Other	18	2	18	2
28RHondo014.8	Rio Hondo	Other	65	10	65	10
28RHondo022.4	Rio Hondo	Other	25	3	25	3
28RHondo026.7	Rio Hondo	XStrs	8	1	8	1
28RHondo026.9	Rio Hondo	XStrs	36	7	36	7
28RHondo027.3	Rio Hondo	Other	36	4	36	4
57RHondo004.3	Rio Hondo	Other	8	1	8	1
57RHondo009.4	Rio Hondo	Other	1	1	1	1
57RHondo131.1	Rio Hondo	Other	28	4	28	4
28RLucer013.0	Rio Lucero	Ref	4	1	4	1
50RioMor000.3	Rio Mora	Ref	38	9	38	9
28RNambe005.1	Rio Nambe	Ref	6	2	6	2
75RNutri024.7	Rio Nutria	Other	4	1	4	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
29RNutri005.4	Rio Nutrias	Other	5	1	5	1
29RNutri028.4	Rio Nutrias	Other	5	2	5	2
29ROjoCa005.1	Rio Ojo	Other	8	1	8	1
59RPenas108.4	Rio Penasco	NearRef	16	3	16	3
59RPenas140.2	Rio Penasco	Other	12	2	12	2
59RPenas170.4	Rio Penasco	Other	7	3	7	3
59RPenas176.0	Rio Peñasco	NearRef	9	1	9	1
75RPesca012.8	Rio Pescado	Other	7	1	7	1
28Pueblo013.4	Rio Pueblo	Ref	4	1	4	1
28RPuebl000.3	Rio Pueblo	Other	18	4	17	4
28RPuebl019.0	Rio Pueblo	Ref	21	6	21	6
28RPuebT000.1	Rio Pueblo De Taos	Other	16	3	16	3
28RPuebT008.1	Rio Pueblo De Taos	Other	59	10	59	10
28RPuebT008.3	Rio Pueblo De Taos	Other	4	3	4	3
28RPuebT013.2	Rio Pueblo De Taos	Other	17	3	17	3
33RPuerc241.8	Rio Puerco	Other	14	3	14	3
33RPuerc244.0	Rio Puerco	Other	8	2	8	2
33RPuerc248.7	Rio Puerco	Other	14	3	14	3
33RPuerc256.0	Rio Puerco	NearRef	10	2	10	2
29RPuerc011.0	Rio Puerco De Chama	Other	17	3	17	3
29RPuerc037.5	Rio Puerco De Chama	Ref	15	4	15	4
28RQuema003.1	Rio Quemado	Other	7	2	7	2
57RRuido019.8	Rio Ruidoso	Strs	26	4	26	4
57RRuido030.2	Rio Ruidoso	Strs	12	3	12	3
57RRuido030.5	Rio Ruidoso	Strs	2	1	2	1
57RRuido031.5	Rio Ruidoso	Strs	32	6	31	6
57RRuido045.3	Rio Ruidoso	Other	11	1	11	1
57RRuido052.4	Rio Ruidoso	NearRef	19	5	19	5
38RSalad030.0	Rio Salado	Ref	3	2	3	2
27RSanAn000.4	Rio San Antonio	NearRef	9	2	9	2
27RSanAn025.3	Rio San Antonio	NearRef	9	2	9	2
28RSanBa000.1	Rio Santa Barbara	Other	14	2	14	2
28RSanBa002.0	Rio Santa Barbara	Other	4	2	4	2
28RSanBa013.2	Rio Santa Barbara	Ref	12	2	12	2
28RSanBa017.9	Rio Santa Barbara	Ref	12	5	12	5
RIOS_36103_105621	Rio Santa Barbara	Ref	3	1	2	1
48RTular030.0	Rio Tularosa	Other	34	8	34	8
29RTusas000.1	Rio Tusas	Other	30	4	30	4
29RTusas028.5	Rio Tusas	NearRef	1	1	1	1
29RValle037.8	Rio Vallecito	Other	4	3	4	3
29RValle007.9	Rio Vallecitos	Other	11	2	11	2

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
07RitoCe004.6	Rito Cebolla	Other	3	1	3	1
28RiOlla000.8	Rito De La Olla	Ref	8	1	8	1
31RPalom000.1	Rito De Las Palomas	Other	9	1	9	1
30RFrijo000.7	Rito De Los Frijoles	Other	1	1	1	1
31RIndio000.2	Rito De Los Indios	NearRef	17	2	17	2
29REncin009.7	Rito Encino	Other	12	3	12	3
36RMoqui006.4	Rito Moquino	Other	7	2	7	2
31RPNegr000.1	Rito Penas Negras	Other	8	1	8	1
29RResum001.9	Rito Resumidero	Ref	6	1	6	1
29RResum002.5	Rito Resumidero	Other	21	3	13	3
07RSanJo000.5	Rito San Jose	Strs	5	1	5	1
29RTierr026.1	Rito Tierra Amarilla	NearRef	2	2	5	2
RIVER_36951_106145	River Los Pinos	Ref	2	1	2	1
49Sacram014.6	Sacramento River	NearRef	3	1	2	1
31SanAnt000.1	San Antonio Creek	Other	9	1	9	1
31SanAnt004.7	San Antonio Creek	Other	8	1	8	1
31SanAnt008.4	San Antonio Creek	Ref	16	2	16	2
31SanAnt025.7	San Antonio Creek	NearRef	17	2	17	2
30SanCri000.5	San Cristobal Creek	Other	5	1	5	1
80SanFra028.6	San Francisco River	NearRef	21	5	21	5
80SanFra048.8	San Francisco River	NearRef	13	3	13	3
80SanFra105.7	San Francisco River	Strs	10	2	10	2
80SanFra109.6	San Francisco River	Other	6	1	6	1
80SanFra109.7	San Francisco River	Other	5	1	5	1
80SanFra124.2	San Francisco River	NearRef	6	1	4	1
80SanFra154.1	San Francisco River	Other	20	4	20	4
64SanJua113.5	San Juan River	XStrs	8	1	8	1
64SanJua126.2	San Juan River	Other	17	3	17	3
64SanJua144.8	San Juan River	Other	18	3	18	3
64SanJua162.8	San Juan River	Other	4	2	4	2
66SanJua100.2	San Juan River	Other	13	4	13	4
67SanJua082.6	San Juan River	Strs	17	2	17	2
67SanJua088.1	San Juan River	Other	9	2	9	2
30SanPed011.1	San Pedro Creek	Other	4	2	4	2
45SanVic053.9	San Vicente Arroyo	XStrs	15	2	15	2
45SanVic055.5	San Vicente Arroyo	XStrs	7	1	7	1
30Sandia009.0	Sandia Canyon	XStrs	1	1	1	1
28SanCru004.2	Santa Cruz River	Other	9	3	9	3
28SanCru012.1	Santa Cruz River	Other	1	1	1	1
30SantaF012.9	Santa Fe River	XStrs	53	8	51	7
30SantaF015.3	Santa Fe River	XStrs	8	1	7	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
30SantaF028.4	Santa Fe River	XStrs	7	2	7	2
30SantaF057.4	Santa Fe River	Ref	38	6	0	0
30SantaF061.2	Santa Fe River	Ref	41	7	41	7
SANTA_35582_10628	Santa Fe River	XStrs	7	1	7	1
URG110.002050	Santa Fe River	XStrs	0	0	1	1
07Sapell044.4	Sapello River	Other	9	1	9	1
07Sapell069.8	Sapello River	Ref	12	2	12	2
77Sapill018.0	Sapillo Creek	Other	4	1	4	1
16Seneca043.0	Seneca Creek	Ref	4	3	4	3
33Senori008.8	Senorito Creek	Strs	13	2	13	2
60Sittin000.1	Sitting Bull Creek	Other	5	3	5	3
60Sittin000.3	Sitting Bull Creek	Other	2	2	2	2
60Sittin001.6	Sitting Bull Creek	Other	1	1	1	1
05Sixmil001.4	Sixmile Creek	Other	22	4	17	4
41SPalom000.1	South Fork Palomas Creek	NearRef	3	1	3	1
80SNegri000.1	South Negrito Creek	NearRef	11	2	11	2
31Sulphu000.2	Sulphur Creek	Other	1	1	7	1
75Tampic000.1	Tampico Draw	Strs	4	1	4	1
77Taylor000.1	Taylor Creek	NearRef	4	1	4	1
77Taylor004.2	Taylor Creek	Other	10	2	10	2
50Tecolo042.3	Tecolote Creek	Other	15	2	15	2
28Tesuqu023.4	Tesuque Creek	Ref	12	2	12	2
TESUQ_35769_105725	Tesuque Creek	Ref	4	1	4	1
48ThreeR022.8	Three Rivers	Ref	13	2	13	2
32Tijera021.0	Tijeras Arroyo	XStrs	6	1	13	4
32Tijera027.2	Tijeras Arroyo	Strs	5	1	5	1
80TroutC002.1	Trout Creek	Other	1	1	5	2
80TroutC009.4	Trout Creek	Other	7	1	7	1
80Tularo001.3	Tularosa River	NearRef	28	6	28	6
80Tularo035.8	Tularosa River	Other	7	1	7	1
80Tularo050.8	Tularosa River	NearRef	4	2	4	2
77Turkey001.8	Turkey Creek	Ref	5	3	5	3
04UnaGat020.9	Una De Gato Creek	XStrs	9	2	9	2
04UnaGat000.1	Una De Gato Creek	Other	8	2	8	2
05MPonil027.2	Upper Middle Ponil Creek	Ref	4	1	4	1
05UteCre000.6	Ute Creek	Other	14	2	11	2
10UteCre104.3	Ute Creek	NearRef	9	3	9	3
10UteCre150.7	Ute Creek	NearRef	1	1	1	1
31RValle015.5	Vallecito Creek	Other	9	1	9	1
31RValle012.2	Vallecitos	Other	9	1	9	1
04Vermej080.2	Vermejo River	Other	8	1	8	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
77WFkGil000.1	West Fork Gila River	NearRef	6	1	6	1
77WFkGil010.0	West Fork Gila River	Ref	12	5	12	5
77WFkGil038.1	West Fork Gila River	Ref	1	1	1	1
WHITE_35759_10567	White Flow	Other	11	3	11	3
80Whitew000.5	Whitewater Creek	Other	22	4	23	4
80WhiteW008.8	Whitewater Creek	Ref	16	4	16	4
29Willow000.1	Willow Creek	Other	1	1	1	1
77Willow000.1	Willow Creek	Other	9	2	9	2
50Winsor000.2	Winsor Creek	NearRef	8	2	8	2
07WolfCr000.6	Wolf Creek	Other	4	1	4	1
WRIGH_35703_105485	Wright Canyon	Other	7	1	7	1
04YorkCa000.1	York Canyon Creek	Other	8	1	8	1
75ZuniRi040.5	Zuni River	Other	1	1	1	1
NRSA Sites						
FW08KS033	Arkansas River	Other	1	1	1	1
FW08CO136	Bear Creek	Other	1	1	1	1
FW08OK031	Beaver River	Other	1	1	1	1
FW08AZ171	Blue River	NearRef	1	1	1	1
FW08RAZ9022	Bonita Creek	Ref	1	1	1	1
FW08RNM9081	Canadian River	Other	1	1	1	1
FW08RNM9082	Canadian River	Other	1	1	1	1
FW08TX012	Canadian River	Strs	1	1	1	1
FW08TX033	Canadian River	XStrs	1	1	1	1
FW08TX065	Canadian River	Strs	1	1	1	1
FW08AZ006	Centerfire Creek	Other	1	1	1	1
FW08NM048	Cimarron River	Other	1	1	1	1
FW08UT023	Colorado River	Ref	1	1	1	1
FW08NM013	Conchas River	Other	1	1	1	1
FW08CO125	Cucharas River	XStrs	1	1	1	1
FW08RNM9049	Dog Canyon	Ref	1	1	1	1
FW08AZ022	Eagle Creek	Ref	1	1	1	1
FW08AZ155	Eagle Creek	Ref	1	1	1	1
FW08NM019	East Fork Gila River	NearRef	1	1	1	1
FW08CO087	East Past Creek	Other	1	1	1	1
FW08RNM9030	Embudo Creek	Other	1	1	1	1
FW08RUT9100	Fish Creek	Ref	1	1	1	1
FW08NM025	Gallinas River	Other	1	1	1	1
FW08RNM9006	Gila	Ref	1	1	1	1
FW08AZ008	Gila River	Other	1	1	1	1
FW08AZ107	Gila River	Other	1	1	1	1
FW08AZ134	Gila River	Other	1	1	1	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
FW08NM043	Gila River	Strs	1	1	1	1
FW08CO029	Goose Creek	Other	1	1	1	1
FW08CO001	Hartman Draw	Strs	1	1	1	1
FW08RUT95790	Indian Creek	Other	1	1	1	1
FW08CO129	Middle Creek	Other	1	1	1	1
FW08NM005	Mora River	Other	1	1	1	1
FW08RUT95820	North Cottonwood Creek	Other	1	1	1	1
FW08AZ005	North Fork East Fork Black River	Other	1	1	1	1
FW08NM023	Pecos River	Other	1	1	1	1
FW08NM039	Pecos River	Other	1	1	1	1
FW08NM042	Pecos River	Other	1	1	1	1
FW08NM105	Pecos River	Other	1	1	1	1
FW08RNM9075	Pecos River	Other	1	1	1	1
FW08RNM9076	Pecos River	Other	1	1	1	1
FW08TX046	Pecos River	Other	1	1	1	1
FW08NM010	Penasco River	Other	1	1	1	1
FW08CO028	Purgatoire River	Other	1	1	1	1
FW08CO060	Purgatoire River	Other	1	1	1	1
FW08CO072	Purgatoire River	Other	1	1	1	1
FW08NM045	Rio Chama	Other	1	1	1	1
FW08RNM9067	Rio Chama	Other	1	1	1	1
FW08NM012	Rio De Las Trampas	Other	1	1	1	1
FW08CO033	Rio Grande	Other	1	1	1	1
FW08CO049	Rio Grande	Other	1	1	1	1
FW08NM008	Rio Grande	Strs	1	1	1	1
FW08NM024	Rio Grande	Other	1	1	1	1
FW08NM026	Rio Grande	Other	1	1	1	1
FW08NM034	Rio Grande	Strs	1	1	1	1
FW08NM047	Rio Grande	Other	1	1	1	1
FW08RNM9060	Rio Grande	XStrs	1	1	1	1
FW08RNM9061	Rio Grande	Other	1	1	1	1
FW08NM027	Rio Hondo	Other	1	1	1	1
FW08NM002	Rio Nutrias	Other	1	1	1	1
FW08CO073	Rio San Antonio	Other	1	1	1	1
FW08NM003	Saladon Creek	Ref	1	1	1	1
FW08NM001	San Antonio Creek	NearRef	1	1	1	1
FW08AZ075	San Francisco River	Other	1	1	1	1
FW08AZ139	San Francisco River	Other	1	1	1	1
FW08NM031	San Francisco River	Other	1	1	1	1
FW08NM022	San Juan River	Other	1	1	1	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
FW08NM038	San Juan River	Other	1	1	1	1
FW08UT014	San Juan River	NearRef	1	1	1	1
FW08UT030	San Juan River	Strs	1	1	1	1
FW08UT046	San Juan River	Other	1	1	1	1
FW08NM069	Sapello River	Other	1	1	1	1
FW08RNM9004	Seneca Creek	Ref	1	1	1	1
FW08NM018	Unknown	Other	1	1	1	1
FW08NM061	Unnamed	Ref	1	1	1	1
FW08NM070	Unnamed	Other	1	1	1	1
FW08RNM9001	Ute Creek	Ref	1	1	1	1
FW08RNM9002	Ute Creek	Ref	1	1	1	1
FW08NM064	Vermejo River	Strs	1	1	1	1
FW08CO083	West Dolores River	NearRef	1	1	1	1
FW08NM035	West Fork Gila River	Ref	1	1	1	1
FW08CO020	Wolf Creek	Other	1	1	1	1
WSA data						
WCOP99-0502	Adams Fork Conejos River	Ref	1	1	1	1
WCOP03-R005	Agate Creek	Other	1	1	1	1
WCOP03-R008	Bear Creek	NearRef	1	1	1	1
WAZP99-0545	Black River	Other	1	1	1	1
WAZP99-0605	Blue River	Other	1	1	1	1
WAZP99-0681	Blue River	Other	1	1	1	1
WAZP04-RBON1	Bonita Creek	Ref	1	1	1	1
WAZP99-0701	Bonito Creek	Strs	1	1	1	1
WAZP99-0639	Campbell Blue Creek	NearRef	1	1	1	1
OWW04440-1059	Canadian River	Strs	1	1	1	1
OWW04440-0077	Canones Creek	Strs	1	1	1	1
WAZP99-0687	Centerfire Creek	Other	1	1	1	1
WCOP01-0777	Chacuaco Creek	Other	1	1	1	1
WAZP99-0615	Conklin Creek	NearRef	1	1	1	1
OWW04440-NM08	Diamond Creek	Ref	1	1	1	1
WCOP99-0621	Dolores River	Other	1	1	1	1
WAZP99-0750	Eagle Creek	Other	1	1	1	1
WCOP03-R007	East Fork Hermosa Creek	Other	1	1	1	1
WCOP03-R009	East Fork Piedra River	Other	1	1	1	1
WCOP99-0591	Fall Creek	Other	1	1	1	1
WAZP99-0888	Fish Creek	Other	1	1	1	1
WAZP99-0512	Gila River	Other	1	1	1	1
WAZP99-0599	Gila River	Other	1	1	1	1
WCOP99-0507	Groundhog Creek	NearRef	1	1	1	1
WCOP99-0622	Hartman Draw	Strs	1	1	1	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
WCOP99-0574	Henson Creek	Ref	1	1	1	1
WCOP01-0836	Horse Creek	Other	1	1	1	1
WCOP99-0627	Houselog Creek	NearRef	1	1	1	1
OWW04440-1069	Jemez Creek	Other	1	1	1	1
WAZP99-0569	Kp Creek	Other	1	1	1	1
WCOP99-0568	La Plata River	XStrs	1	1	1	1
WAZP99-0783	Lanphier Canyon	Ref	1	1	1	1
WAZP04-RLCR1	Little Colorado River	Other	1	1	1	1
WAZP99-0906	Little Colorado River	Other	1	1	1	1
WCOP99-0670	Lost Canyon Creek	Other	1	1	1	1
WCOP01-0817	Markham Arroyo	Strs	1	1	1	1
WAZP04-RMIN1	Mineral Creek	Ref	1	1	1	1
WCOP99-0646	Mud Creek	XStrs	1	1	1	1
WCOP04-R006	Naturita Creek	XStrs	1	1	1	1
WAZP99-0653	Nazlini Creek	Other	1	1	1	1
OWW04440-1037	Negritos Creek	Ref	1	1	1	1
WAZP99-0828	North Fork Black River	Strs	1	1	1	1
WCOP01-0833	North St. Charles River	XStrs	1	1	1	1
WAZP99-0645	Nutrioso Creek	Other	1	1	1	1
OWW04440-0429	Pecos River	Other	1	1	1	1
WCOP01-0812	Purgatoire River	Strs	1	1	1	1
WCOP99-0672	Purgatoire River	Other	1	1	1	1
WCOP99-0508	Red Mountain Creek	Other	1	1	1	1
OWW04440-0845	Rio Nutrias	Other	1	1	1	1
OWW04440-0717	Rio Santa Barbara	Other	1	1	1	1
OWW04440-0333	Rio Tusas	Other	1	1	1	1
OWW04440-0205	Saladon Creek	Ref	1	1	1	1
WCOP01-0734	Salt Creek	NearRef	1	1	1	1
OWW04440-0045	San Antonio	Other	1	1	1	1
OWW04440-0557	San Antonio	NearRef	1	1	1	1
WAZP99-0840	San Francisco River	Other	1	1	1	1
OWW04440-NM03	Three Rivers	Ref	1	1	1	1
WCOP01-0819	Timpas Creek	Other	1	1	1	1
WCOP04-R009	Timpas Creek	Other	1	1	1	1
WAZP99-0669	Tsaile Creek	Other	1	1	1	1
OWW04440-NM07	Turkey Creek	Ref	1	1	1	1
WCOP04-R003	Two Butte Creek	Other	1	1	1	1
OWW04440-NM01	Ute Creek	Ref	1	1	1	1
WCOP99-0634	Ute Creek	Ref	1	1	1	1
WAZP99-0876	Wheatfields Creek	Other	1	1	1	1
WCOP99-0513	Whitehouse Creek	Ref	1	1	1	1

SiteID	ShortName	RefStatus	# TN Samps	# TN Years	# TP Samps	# TP Years
WCOP01-0765	Wild Horse Creek	Other	1	1	1	1
OWW04440-1101	Wolf Creek	Other	1	1	1	1
WCOP99-0510	Wolf Creek	Other	1	1	1	1
WCOP04-R007	Yellow Jacket Creek	Strs	1	1	1	1

Appendix G Additional Classification Analyses

Preliminary Classification Exploration

Exploration started with box plots of site average TN and TP values by collection program and potential site classes. Among collection programs, it appeared that the values are similar at the center of the distributions, but that the NMED values had higher minimum values and upper extremes when compared to both NRSA and WSA samples (Figure G-1). The difference in minimum values is related to variable detection limits, which are not specified for the NMED and WSA data. The higher extremes in the NMED data might be due to targeting some effluent dominated streams. The NRSA and WSA sites were randomly selected or targeted for reference conditions and highly stressed sites might be less common in those data sets. The patterns seen among programs in all sites were similar (though with lower magnitudes) when plotting only 'Ref' and 'NearRef' distributions (not shown). In our analysis, 'Ref' and 'NearRef' sites (N = 179) were predominantly from the NMED data set (N = 152), in contrast to the NRSA (N = 15) and WSA (N = 12). Although the median TN values are somewhat higher in the NMED compared to NRSA or WSA, we pooled the data collection programs when considering basic nutrient statistics.

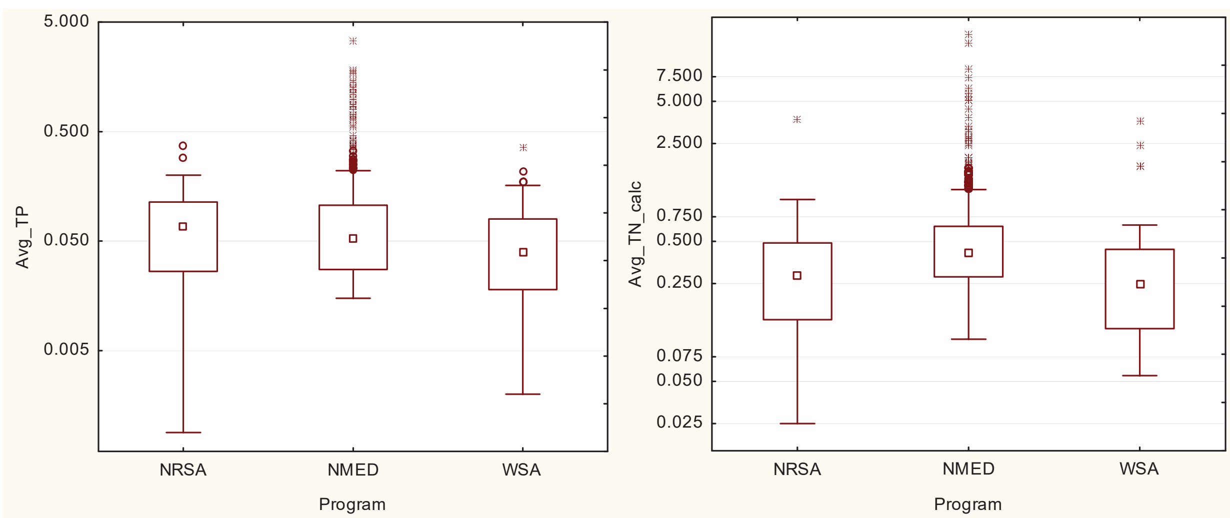

Figure G-1. Distributions of average TP and TN concentrations for all sites among sampling programs. In this and other box plots in this section, the symbols represent the median, quartiles, non-outlier ranges, and outliers.

Average TP and TN values by reference status were plotted, combining all collection programs (Figure G-2). These plots suggest that the nutrients are generally related to the reference designations, with lower concentrations in reference and near-reference sites in comparison to stressed and extremely-stressed sites. In several of the classification analyses, we looked at data from the reference and near-reference sites only so that influences of stressors would be minimized and nutrient relationships with natural conditions would be maximized.

NMED EXHIBIT 25

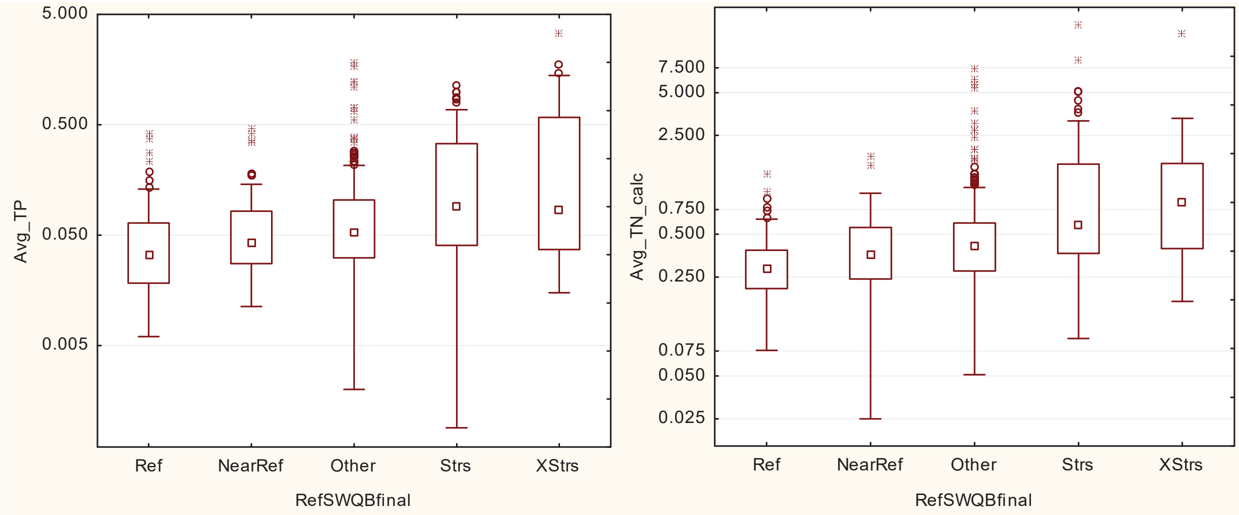

Figure G-2. Distributions of average TP and TN concentrations for all sites among disturbance categories.

Next, reference and near-reference nutrient concentrations were examined in classes of sites that are established and may be appropriate as final nutrient classes. These potential site classes include the sediment-specific site classes (Mountains, Foothills, and Xeric), nutrient categories (designated uses and ecoregions) (NMED 2011), and level 3 ecoregions (Griffith et al. 2006). These site classes simplify the landscape of New Mexico into categories of sites with similar ecological characteristics (ecoregions), including natural characteristics that might affect nutrients such as geology, terrain, vegetation, temperature, and precipitation patterns. The sediment site classes (Figure G-3) and the existing NMED nutrient classes were based on level 3 and 4 ecoregions of New Mexico. In general, the Mountain ecoregions are higher elevation, colder temperature, wetter, and have smaller drainages than the Xeric areas (Table G-1). Foothills are transitional. The Xeric areas have higher conductivity, even in reference sites, compared to the Mountains and Foothills.

Table G-1. Mean (standard deviation) of watershed characteristics by level 3 ecoregion.

Ecoregion Level 3	Sediment Class	Elevation (m)	Drainage Area (mi^2)	Land slope (%)	Avg. Ann. Precipitation (mm)	Avg. Air Temperature (C)
21 Southern Rockies (N=237)	Mtn-Fthl	2402 (301)	67 (97)	27 (9)	732 (145)	4.7 (1.5)
22 AZ/NM Plateau (N=58)	Mtn-Xer	1932 (229)	278 (333)	22 (10)	556 (148)	6.9 (2.1)
23 AZ/NM Mountains (N=125)	Fthl-Mtn	1938 (329)	242 (424)	26 (10)	607 (126)	9 (1.8)
79 Madrean Archipeligo (N=7)	Foothills	1297 (232)	1010 (1209)	24 (4)	511 (37)	12 (1.4)
26 Southwest Tablelands (N=82)	Xeric	1641 (268)	1062 (2197)	13 (7)	485 (74)	9.5 (1.8)
24 Chihuahuan Deserts (N=17)	Xeric	1186 (294)	323 (439)	15 (10)	414 (66)	14.4 (1.8)
20 Colorado Plateau (N=14)	Xeric	1814 (145)	429 (474)	23 (11)	580 (156)	6.8 (2)
25 High Plains (N=2)	Xeric	1174 (151)	145 (41)	2 (0)	418 (7)	11.7 (0.4)

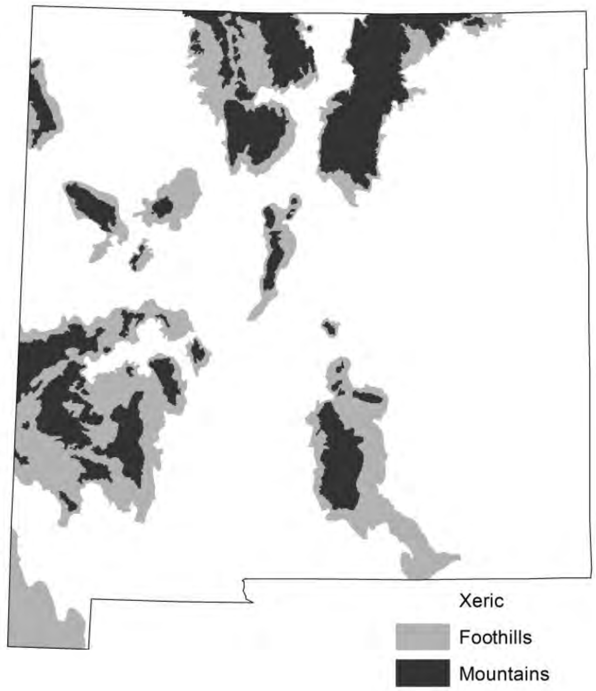

Figure G-3. Regional site classes defined for sediment analyses in New Mexico.

When we compared average TP and TN concentrations in reference and near reference sites among the existing sediment site classes, we found that concentrations were lowest in Mountain sites for both TP and TN (Figure G-4). Although differences are probably not significant, the highest median concentration of TP was in the Foothills and the highest for TN was in the Xeric areas.

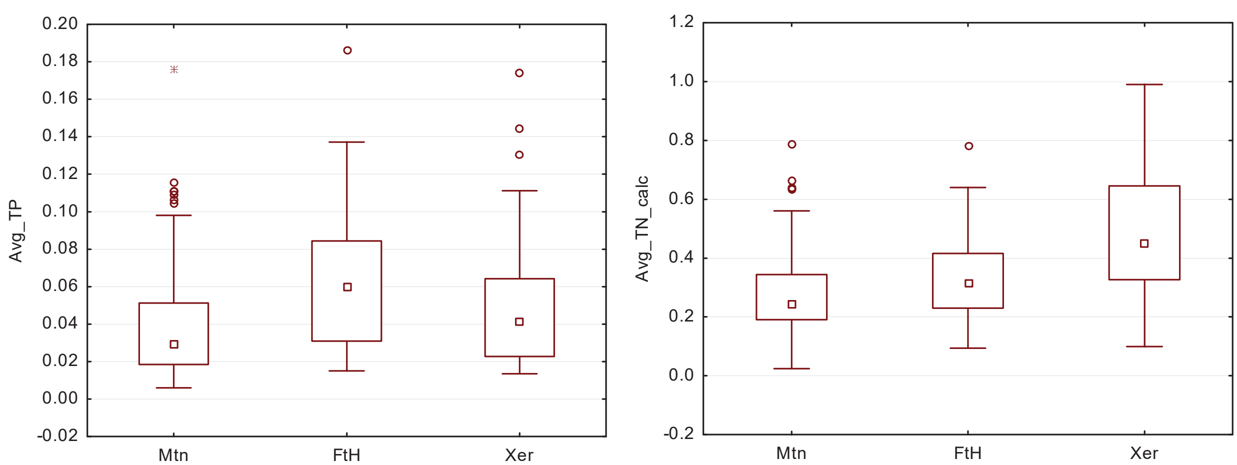

Figure G-4. Distributions of TP and TN concentrations (mg/L) in reference and near-reference sites by sediment site classes; Mountains (N = 88), Foothills (N = 53), and Xeric areas (N = 36).

Among ecoregions, TP and TN values differed somewhat (Figure G-5), though many of the ecoregions were represented by too few reference and near reference sites to justify classification. Among the regions with more than 5 sites, the Southern Rockies (Mountains and Foothills) had the lowest median TP values. The Southwestern Tablelands (Xeric) had the highest median TN values.

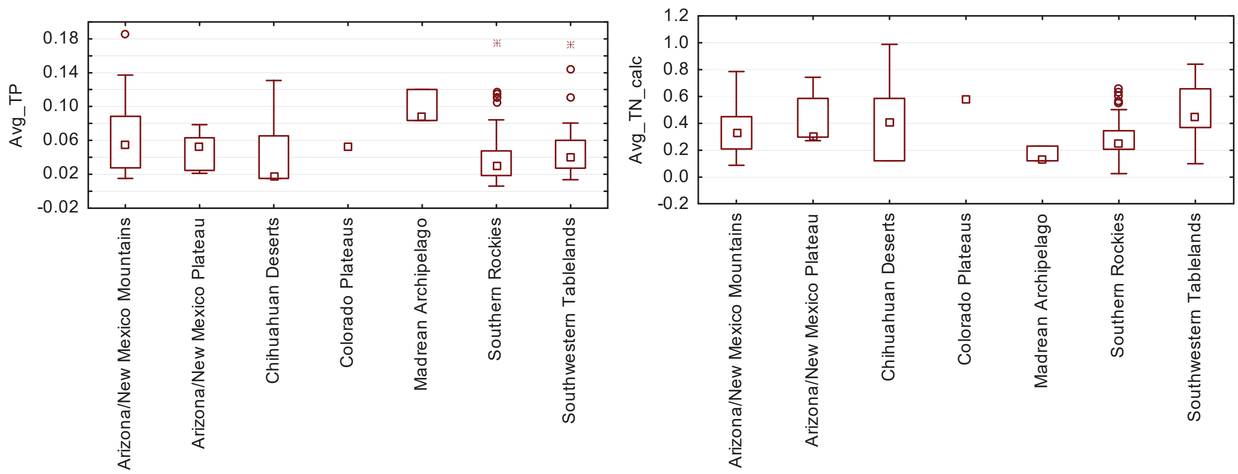

Figure G-5. Distributions of TP and TN concentrations (mg/L) in reference and near-reference sites by level 3 ecoregion. Sample sizes for ecoregions are 54, 5, 5, 1, 3, 84, and 25, in the order displayed.

When comparing reference nutrient concentrations among the established NMED nutrient regions, cold-water groups generally had lower TN concentrations (Figure G-6). For TP, patterns were not clearly associated with water temperature. The distributions of both TN and TP values difference among cold versus transitional and warm-water sites the Southern Rockies (21) and between transitional and warm-water site in the Southwestern Tablelands (26) (no reference or near-reference sites were sampled in the High Plains (25)).

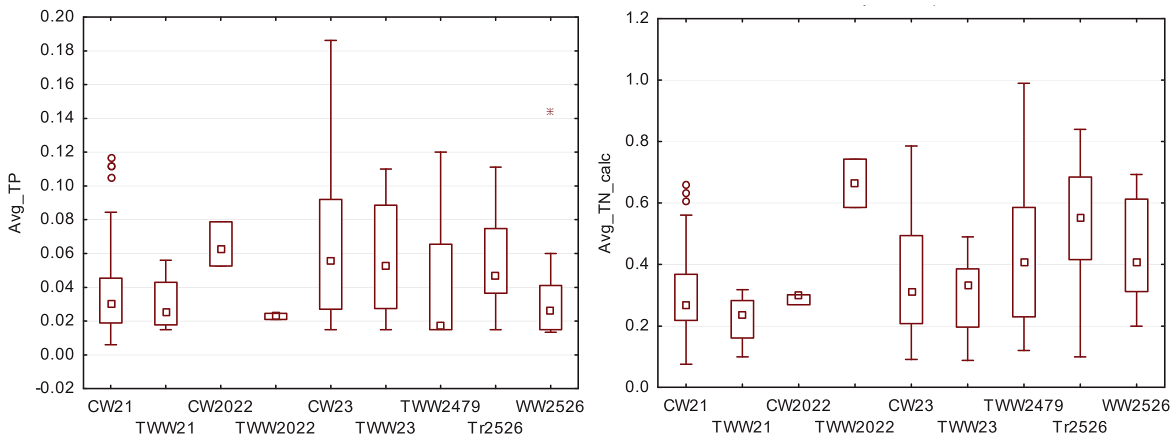

Figure G-6. Distributions of TP and TN concentrations (mg/L) in reference and near-reference sites by established NMED nutrient classes (cold, warm and transitional-water, and ecoregions number. Sample sizes for ecoregions are 74, 4, 3, 2, 39, 15, 5, 14 and 10, in the order displayed.

Hybrid Site Classes for TN and TP

If NMED was inclined to identify site classes that are identical for both nutrients, then we could find a hybrid threshold for land slope between the one used for TP (29%) and for TN (32%). Inspection of Figures 10 and 14 suggests that a compromise threshold of 30% would divide higher concentrations below the threshold and lower concentrations above the threshold for both nutrients.

The 15% land slope threshold that was recognized for TN may be applicable for TP also. Sites with flat landscapes have lower TP than sites with moderate land slopes, except for a few outliers (Figure 10). This was recognized in the CART analysis, though we had earlier dismissed it as possibly overfitting and did not want to define a class based on only a few eastern sites with a land slopes threshold < 12.4% as identified through CART. With a higher threshold (15% instead of 12.4%) and including western sites, the flat landscape site class has sufficient sample size and apparent distinctions in TP concentrations compared to sites with moderate slopes.

In the sites with moderate slopes, the western sites (west of longitude -108) have higher TP than eastern sites (Figure G-7). For TN, there is no distinction with longitude (-105) in the moderate land slope class. Regional distinctions in the site classes are evident when mapping all sites (Figure G-8).

These observations suggest a hybrid site classification that could work for both TN and TP (Table G-2). Distributions of TN and TP appear to be distinct in the hybrid classes, though some classes might be combined (Figure G-7). The two moderate classes have indistinct TN concentrations. The flat and steep classes have similar TP concentrations, but the justification for combining these classes is uncertain because of the large difference in landscape types. The non-parametric Kruskal-Wallis comparison among groups suggests that the hybrid scheme is not as strong as the nutrient specific schemes.

Table G-2. Potential hybrid site classes for TN and TP.

	Flat	Moderate West	Moderate East	Steep
Longitude	NA	< -108	> -108	NA
Land slope (%)	< 15	15 - 30	15 - 30	>= 30
Ref-NearRef N	31	57	32	57

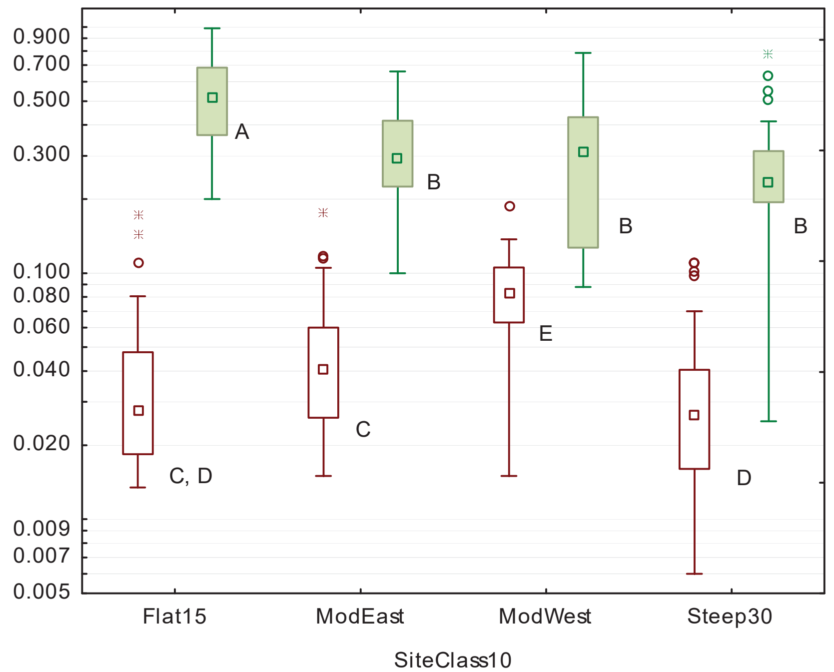

Figure G-7. TN (solid) and TP (open) concentrations in hybrid site classes. Distributions with different letter designations are significantly different (Kruskal-Wallis p<0.05).

Similarities among samples were examined by comparing differences in TN and TP concentrations among sites within (W) classes versus among sites between (B) classes, as demonstrated by Van Sickle and others (Van Sickle 1997, Van Sickle and Hughes 2000). TN and TP values were standardized by log transforming and then converting each to a proportional score of the observed range of reference and near-reference log-transformed values. Absolute differences between each sample pair were calculated for TN and TP separately. We also calculated a Bray-Curtis (BC) similarity index to compare combined TN and TP concentrations among samples. The samples were grouped according to the classification scheme to be tested. The average difference or BC value within groups (W), weighted by sample size, was compared to the average value between groups (B). Distinct classification was indicated by high similarity within groups compared to between groups, measured as the difference of W-B.

Van Sickle and Hughes (2000) found W-B values in the range of 0.03 – 0.05 for comparing biological metrics among ecoregions or basins in western Oregon streams. These are comparable to our values in Table G-3. When we divided the TN and TP reference and near-reference data into three equal-sized groups based on high, moderate, and low nutrient concentrations, the best W-B classification strengths were 0.14 and 0.23 for TN and TP. Therefore, the TN classification explains roughly 0.03/0.14 (21%) of

NMED EXHIBIT 25

the variability and the TP classification explains 0.05/0.13 (22%). We found that the site classes developed as a hybrid of the specific TN and TP classes were almost as effective at distinguishing TN as the TN-specific classes.

Table G-3. Classification strengths (W-B) of site classes

Nutrient	Comparison	Classification Scheme		
		TN specific	TP specific	TN/TP hybrid
TN	1 – absolute difference*	0.030	NA	0.029
TP	1 – absolute difference*	NA	0.047	0.049
TN/TP	Bray-Curtis similarity	0.029	0.028	0.031

* Subtracting the difference from 1 converts the difference to a similarity measure among samples.

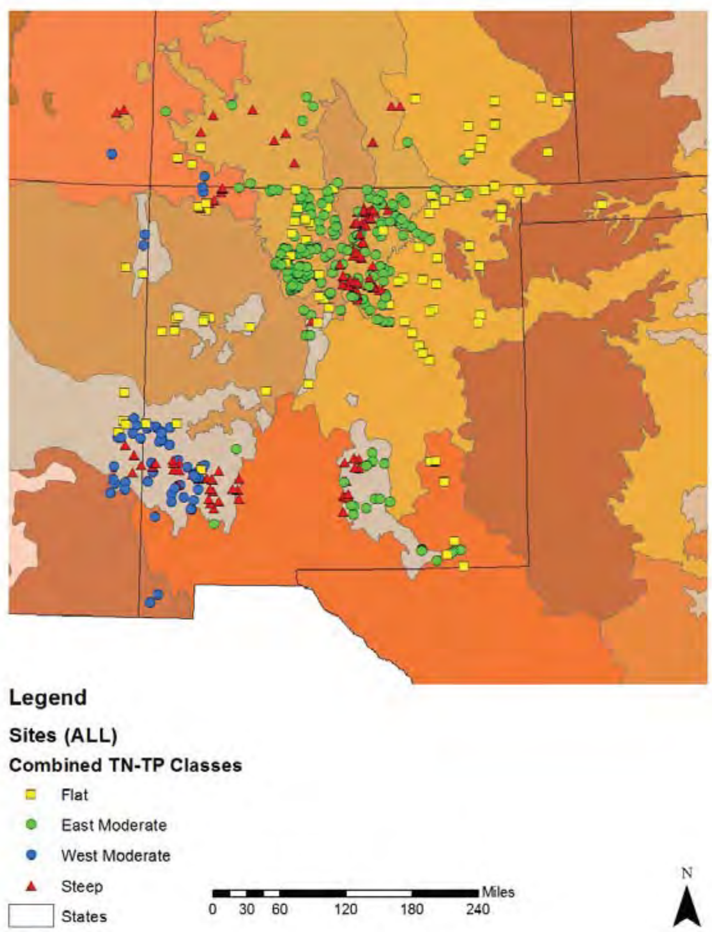

Figure G-8. All sites in the ecoregions of New Mexico, marked by the hybrid TN-TP site classes.

Residual Variations of TP and TN with Environmental Variables

Phosphorus

A correlation analysis of environmental variables was run with phosphorus within site classes to find those variables that still showed relationships with phosphorus after recognizing the site classes (Table G-4). The correlations show that longitude is still related to phosphorus in the WestFlat class (Figure G-9), latitude and turbidity are related in the EFltWStp class (Figure G-10), and latitude and temperature were related in the EastSteep class (Figure G-11).

Table G-4. Correlation coefficients for reference and near reference phosphorus concentrations and environmental variables within site classes.

	Marked correlations are significant at p <.05000								
Class	LndSlp Avg%	Lat	Long	Elev m	DrArea Mi2	Precip Avg30	Temp Avg30	Gm EC	Gm turbidity
WestFlat	0.23	-0.18	-0.42	-0.16	-0.06	0.26	0.04	-0.28	0.29
EFltWStp	0.06	0.42	0.06	0.06	0.07	-0.03	-0.14	-0.03	0.37
EastSteep	0.23	-0.45	-0.25	-0.29	-0.16	-0.29	0.44	-0.08	0.14

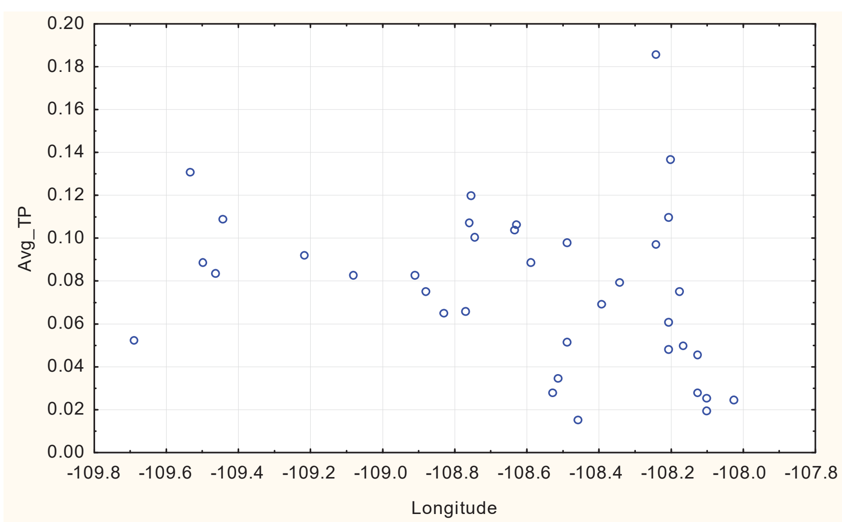

Figure G-9. This residual relationship in the WestFlat class between longitude and TP suggests that TP is generally lowest in the east (of the western site class). However, higher values are about as likely from east to west. The AZ border is at longitude -109.

NMED EXHIBIT 25

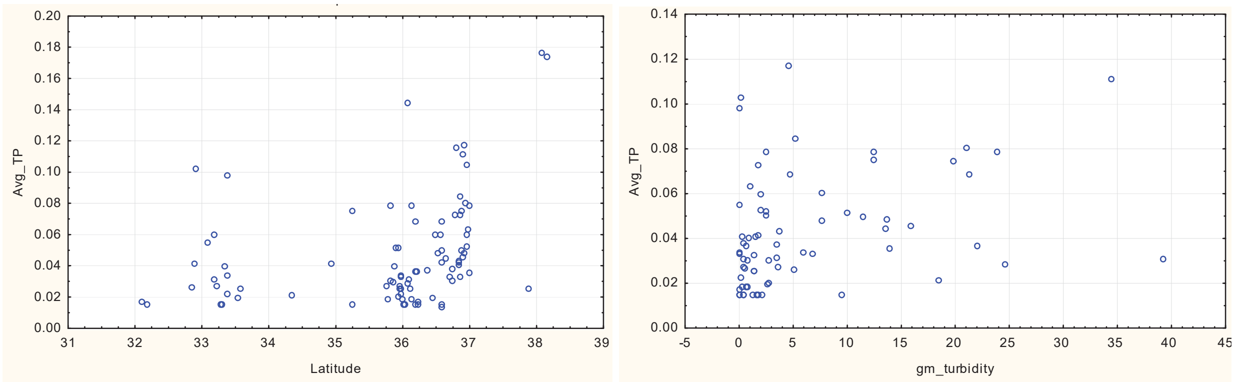

Figure G-10. These residual relationships in the EFltWStp class suggest that TP is generally highest in the north. The CO border is at latitude 37. The turbidity relationship is associated with numerous low-turbidity/low-TP sites. As turbidity increases above 5 ntu, there are fewer reference and near reference sites in general, and fewer with very low TP.

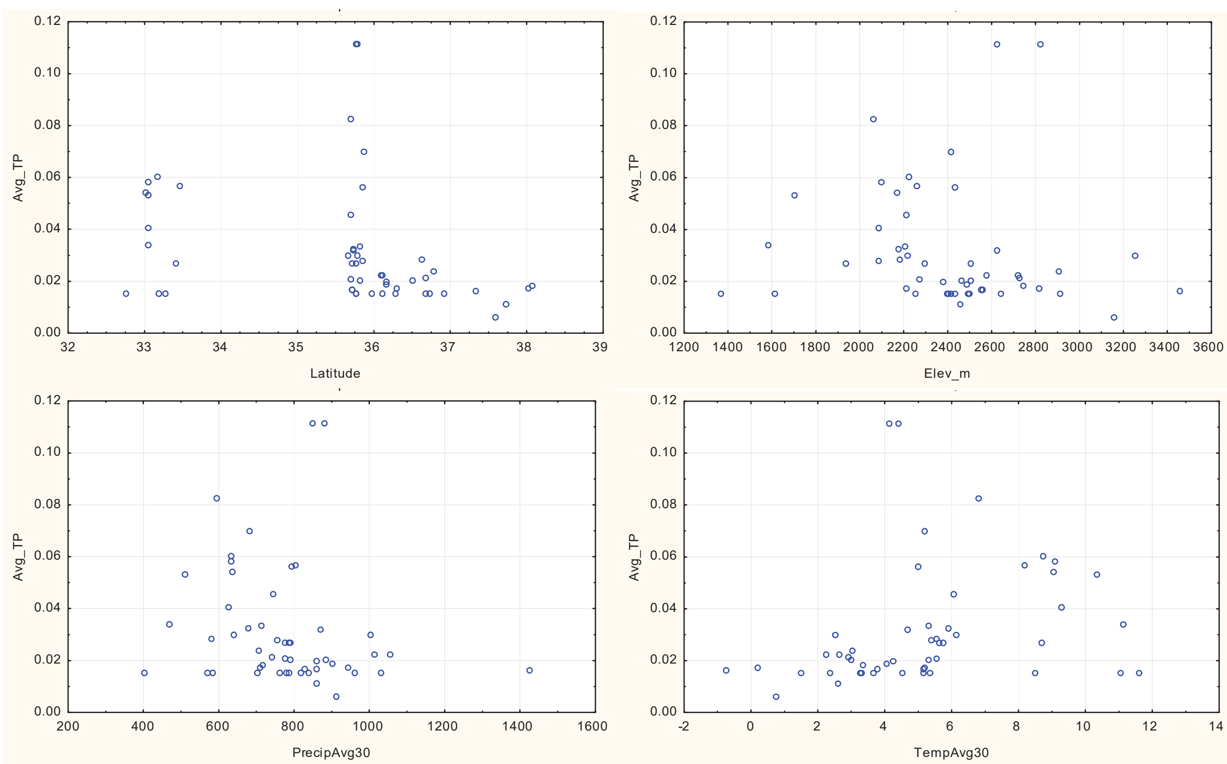

Figure G-11. These residual relationships in the EastSteep class suggest that TP is generally highest in the mid-latitudes. In this site class, there might be fewer exceedances north of latitude 36. Relationships with elevation, precipitation and temperature are variable and do not suggest biased nutrient expectations.

Nitrogen

We ran a correlation analysis of environmental variables with nitrogen within site classes to find those variables that still showed relationships with nitrogen after recognizing the site classes (Table G-5). The correlations show that elevation and conductivity are still related to nitrogen in the flat class (Figure G-12), conductivity is related in the moderate class (Figure G-13), and latitude and conductivity were related in the steep class (Figure G-14).

Table G-5. Correlation coefficients for reference and near reference nitrogen concentrations and environmental variables within site classes.

Class	Marked correlations are significant at p <.05000								
	LndSlp Avg%	Lat	Long	Elev m	DrArea Mi2	Precip Avg30	Temp Avg30	Gm EC	Gm turbidity
Flat	-0.17	-0.08	0.25	-0.53	0.31	-0.32	0.39	0.51	0.37
Moderate	-0.07	-0.03	0.20	-0.12	0.07	-0.25	0.18	0.40	0.29
Steep	0.18	-0.42	-0.02	-0.28	0.05	-0.34	0.40	0.10	-0.01

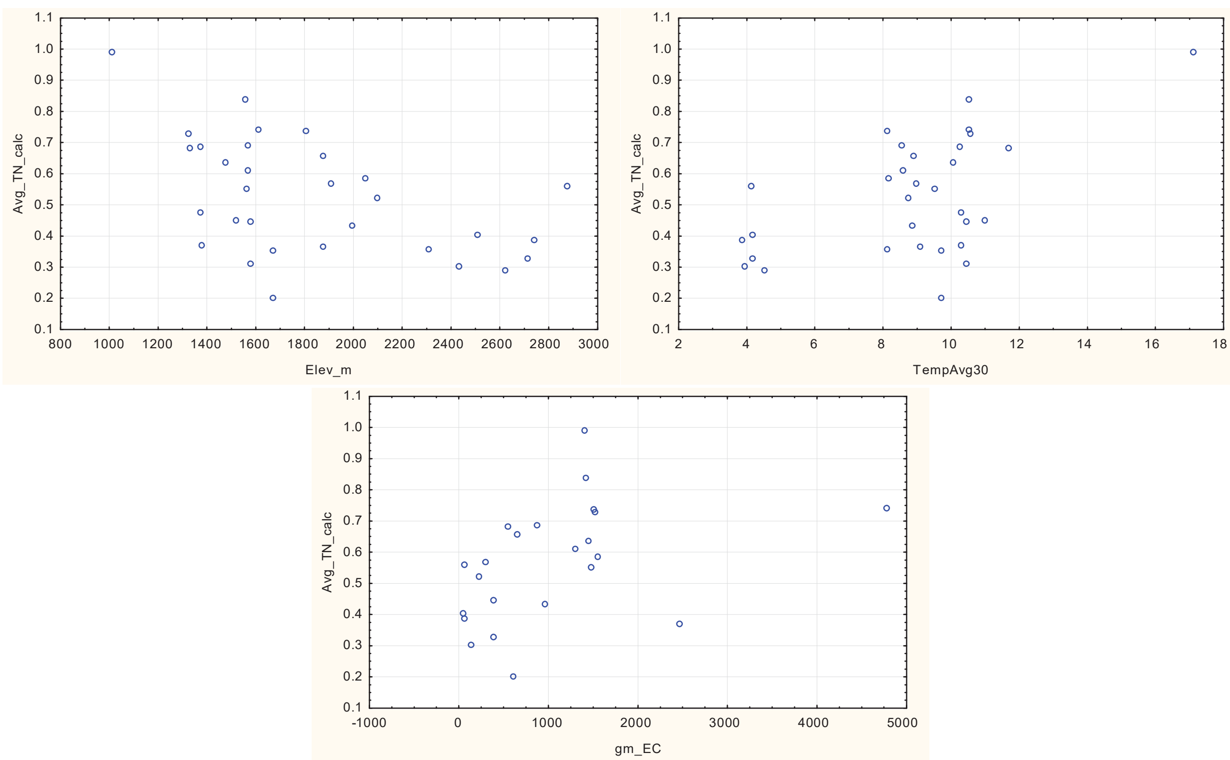

Figure G-12. In the Flat sites, there appear to be more high TN values in low elevation, high temperature, and high conductivity sites.

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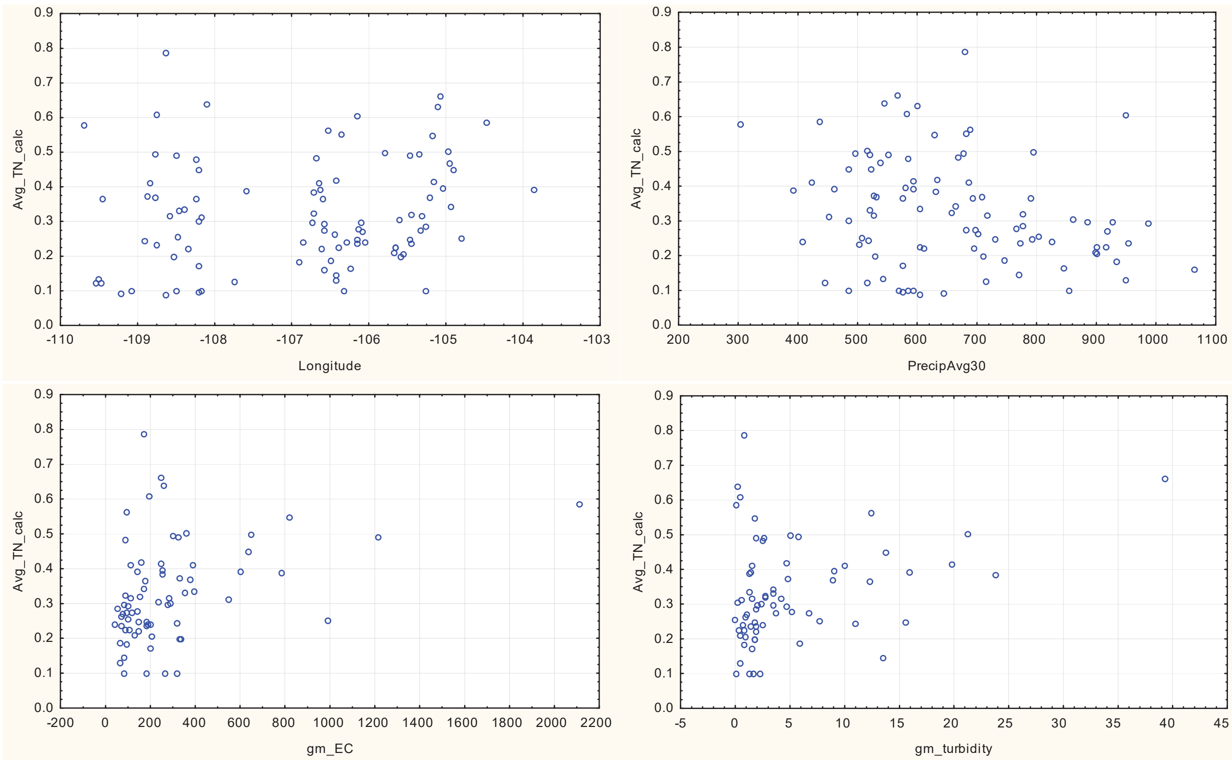

Figure G-13. In sites with moderate land slopes, longitude does not show a pattern consistent with the correlation coefficient. Higher precipitation is generally associated with lower TN. Sites with higher conductivity and turbidity do not have the lowest TN.

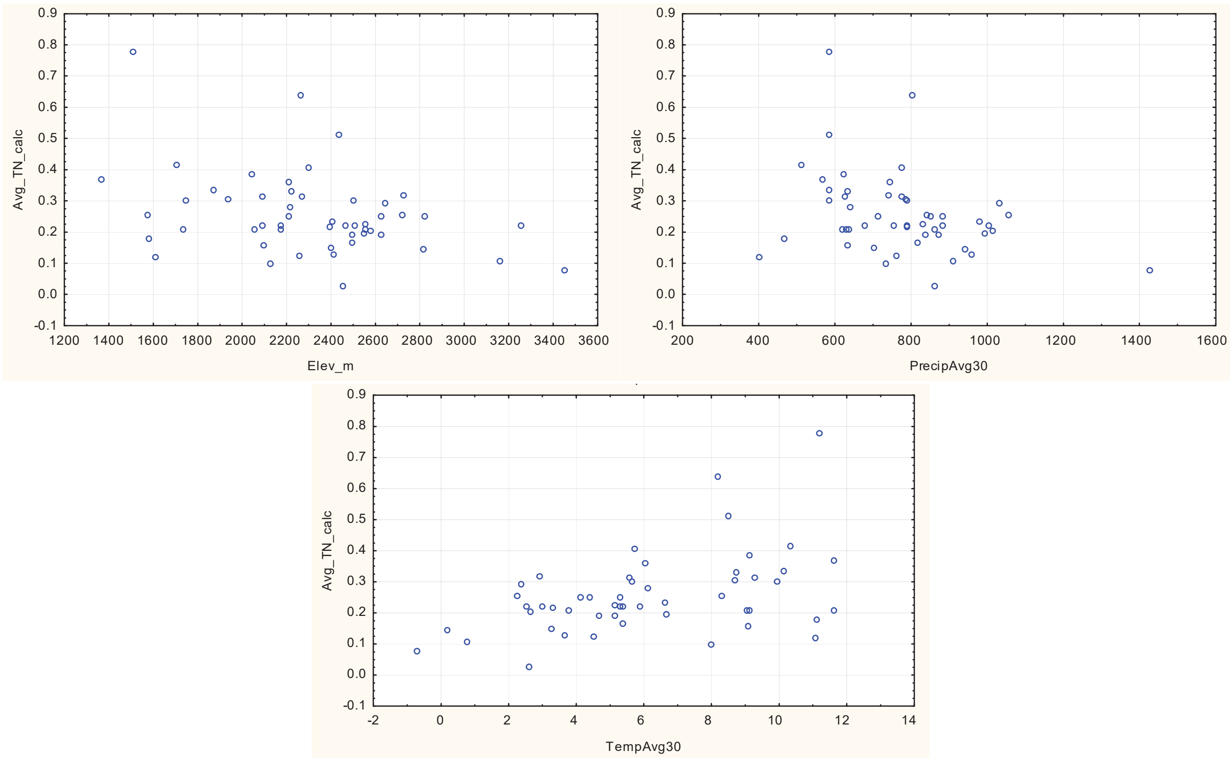

Figure G-14. In the steep site class, higher TN is in lower, drier, and warmer sites.

Appendix H Modifying factors of chlorophyll a

Multiple Regressions

A forward stepwise multiple regression analysis was conducted to predict benthic chl-a from nutrients, water quality and site characteristics. Separate analyses were run for NMED and NRSA data because there was lower benthic chl-a in NRSA sites, on average. The variables considered as possible predictors of benthic chl-a included drainage area, latitude, longitude, TP, TN, conductivity, turbidity, temperature, and pH.

In the NMED analysis limiting variables to a *p* to enter of 0.05, two variables entered the model to predict benthic chl-a, including conductivity and TP, in decreasing order of correlation strength. Chl-a increased with TP and conductivity. The model had an adjusted R^2 of 0.16.

In the NRSA model, only latitude entered the model (no nutrients entered). The model adjusted R^2 was 0.14. Benthic chl-a was negatively correlated with latitude (higher chl-a was found in the south of the study region).

Multiple regression analysis was conducted with limited numbers of variables to test assumptions regarding watershed size and turbidity affecting the relationships between nutrients and chl-a. In analyses to predict chl-a from TN, TP, turbidity, and catchment size, only TP entered for NMED data and no variables entered the models for NRSA data ($p>0.05$).

Random Forest

In a classification exercise using a random forest algorithm and NMED data for all regions, conductivity, elevation, drainage area, longitude, and pH were most important in the multiple iterations of the models to classify benthic chl-a. TP and TN were less important. Hydrological and canopy variables were not available for many sites in this analysis, those they might have modifying effects. The strong positive relationship between chl-a and conductivity and the relative absence of a chl-a relationship with TN or TP (Figure H-1) suggests that conductivity is a stronger influence on chl-a density than nutrients. A CART analysis with the most important variables resulted in conductivity in the first two splits, at values of 192 and 370 uS/cm.

In a similar analysis using the NRSA data, latitude was the most important variable in the random forest analysis, followed by TP and conductivity (Figure H-2). NRSA sites in the south had moderate TP concentrations, neither the lowest nor highest in the data set. The relationship between TP and benthic chl-a was unexpectedly negative.

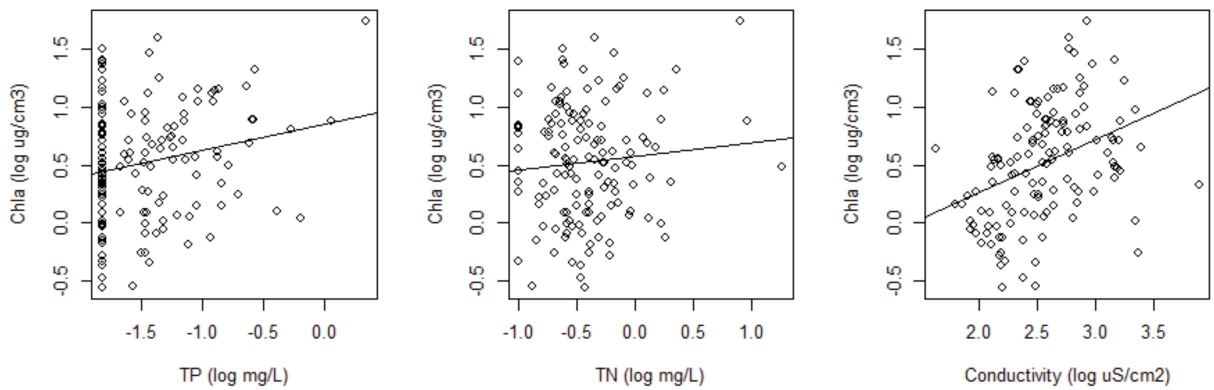

Figure H-1. Relationships between conductivity TP, TN, and conductivity and benthic chl-a density in the NMED data set. R^2 values for regressions with chl-achl-are 0.035 ($p<0.05$), 0.002 ($p>0.1$), and 0.126 ($p<0.001$), respectively.

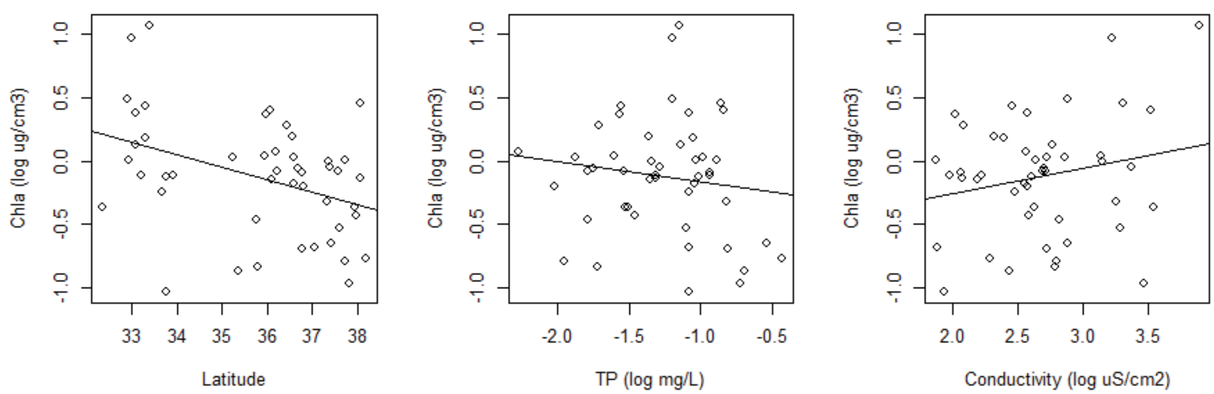

Figure H-2. Relationships between latitude, TP, conductivity (EC), and benthic chl-a density in the NRSA data set. R^2 values for regressions with chl-achl-are 0.131 ($p<0.01$), -0.002 ($p>0.1$), and 0.023 ($p>0.1$), respectively.

The relationship between benthic chl-a and conductivity is strong in the NMED data and recognizable in the NRSA data set (third most important variable in the random forest analysis). TN was higher with higher conductivity and was significantly correlated in the NMED data set (Spearman rho = 0.37, $p<0.05$). TP was not significantly correlated with conductivity.

The relationships between conductivity and landscape variables were further explored to determine possible sources of conductivity, such as land uses or catchment size. Both chl-a and conductivity were positively related to catchment size in the NMED data, though the regression coefficients were small (Figure H-3). With land use, conductivity was positively related to agricultural uses, though the uses never amount to any large percentages of the catchments (Figure H-4). Agricultural uses include crops, hay, and pasture. Percent forest cover has a stronger relationship to conductivity (Figure H-4). Because agriculture and urban uses are relatively small in the catchments, the dominant alternative to forest is scrubland. Small catchments were mostly forested (R^2 = 0.15, p<0.001). Conductivity was lowest in small forested catchments.

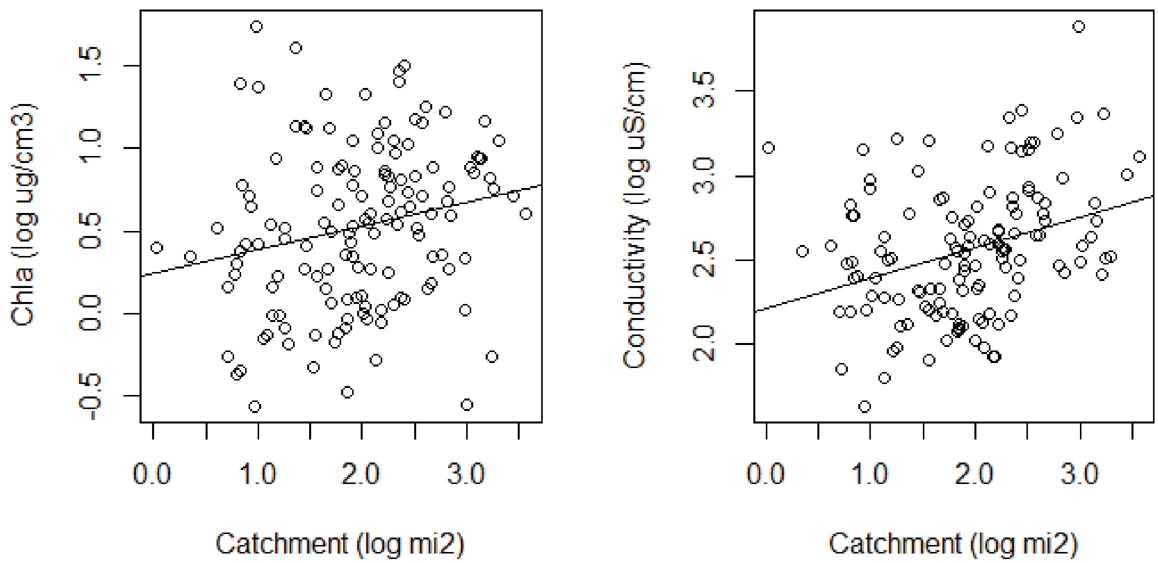

Figure H-3. Relationships between benthic chl-a density, conductivity (EC), and stream catchment area in the NMED data set. R^2 values for regressions with catchment area are 0.046 (p<0.05) and 0.110 (p<0.001), respectively.

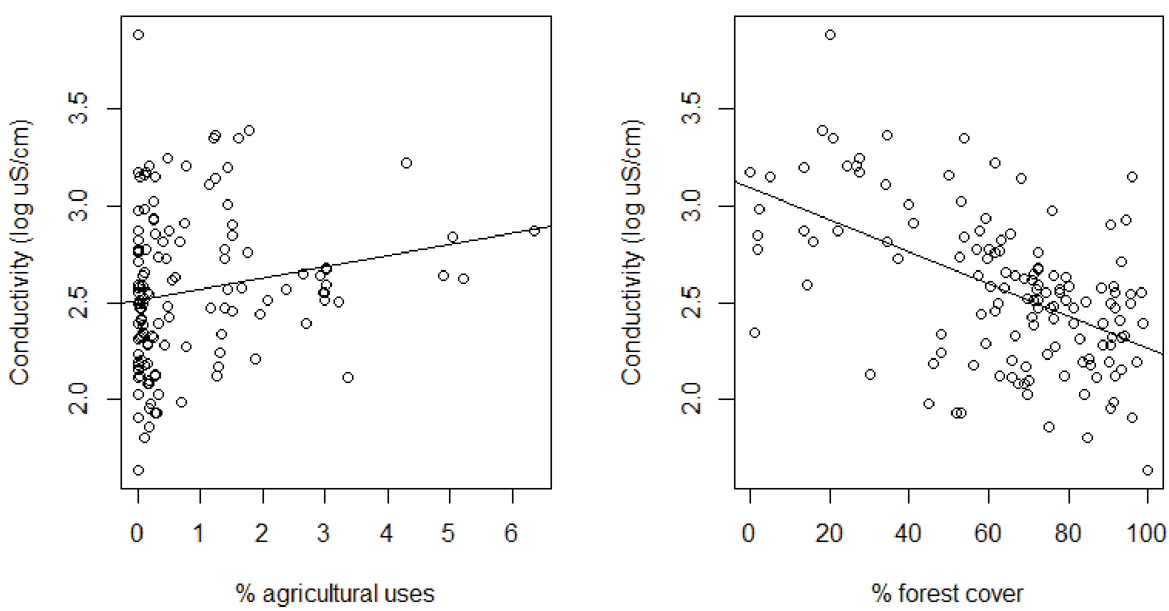

Figure H-4. Relationships between conductivity and agricultural land uses and percent forest cover in the NMED data set. R^2 values for regressions with conductivity are 0.034 (p<0.05) and 0.28 (p<0.001), respectively.

In a random forest analysis that included land use and cover, conductivity was the most important classification variable for chl-a (Table H-1). Elevation, % forest cover, catchment area, and longitude were more important than nutrients or land use activities. In turn, conductivity was most often classified by elevation, % forest cover, and longitude. This suggests that conductivity is an important determinant of chl-a and that conductivity is related to natural characteristics of the landscape.

Table H-1. Random forest importance assigned to variables in classifying NMED benthic chl-a and conductivity data.

Chl-a				Conductivity			
Variable	Import.	Variable	Import.	Variable	Import.	Variable	Import.
LogEC	6.7	LogTP	1.9	Elev_m	4.1	LogTN	1.1
Elev_m	2.9	Latitude	1.9	ForestIndx	3.5	Latitude	0.9
ForestIndx	2.5	UrbanIndex	1.6	Longitude	3.0	Crops82	0.8
LogDrArea	2.5	Crops82	1.6	LogChla	2.0	AgIndex	0.6
Longitude	2.4	AgIndex	1.6	LogDrArea	1.5	PasHay81	0.4
LogTN	2.2	PasHay81	1.5	UrbanIndex	1.1	LogTP	0.4

Factoring out conductivity to refine the relationship between chl-a and nutrients was attempted by categorizing the NMED data into bins of low, medium and high conductivity. Regressions between nutrients and chl-a were explored within those bins. A CART analysis identified 200 and 400 µS/cm as breakpoints between the low, medium, and high categories. Relationships between nutrients and chl-a were not strong within the conductivity bins (Table H-2). Only TP had a significant p value ($p<0.10$), though the regression coefficient indicated a weak relationship ($R^2 = 0.069$).

Table H-2. Regression coefficients (R^2) and p-values for regressions of TP, TN, and conductivity versus chl-a in bins of low, medium, and high electrical conductivity (EC). Measures were all log transformed before regression analysis.

	Low EC (N = 36)	Med EC (N = 43)	High EC (N = 54)
TN	R^2= 0.015, p= 0.48	R^2= 0.0008, p= 0.86	R^2= 0.0005, p= 0.87
TP	R^2= 0.027, p= 0.33	R^2= 0.069, p= 0.09	R^2= 0.03, p= 0.19
Conductivity	R^2= 0.016, p= 0.46	R^2= 0.0068, p= 0.60	R^2= 0.05, p= 0.10

The residual chl-a values were calculated from a regression against conductivity and nutrient relationships with those residuals were tested. In the NMED data, the regression equation for conductivity on chl-a was significant, but the coefficient was low ($R^2 = 0.126$, $p<0.001$). A constant (1.0) was added to the difference (predicted Chl_a – observed Chl_a) to keep the residual range positive. The resulting regressions with nutrients were negative with TP and flat with TN (Figure H-5). TN was correlated with conductivity, so that factoring out conductivity also factored out TN. TP did not have a significant relationship with conductivity, but after factoring out conductivity, the relationship was negative, which was unexpected.

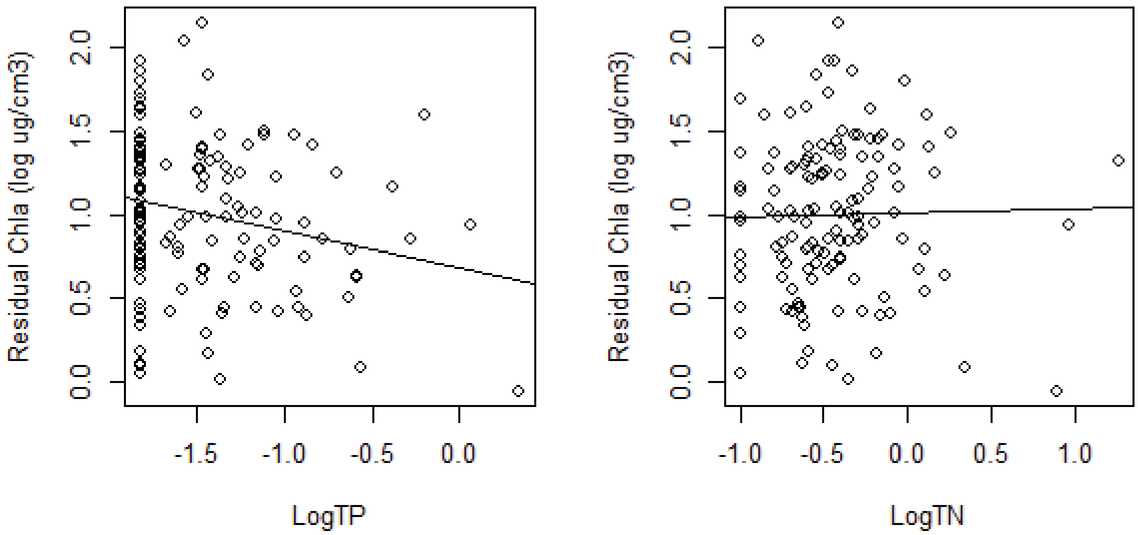

Figure H-5. Relationships between residuals of chl-a after accounting for conductivity and nutrients in the NMED data set. R^2 values for regressions are 0.046 ($p<0.05$) and 0.00 ($p>0.10$) for TP and TN, respectively.

Benthic chl-a variance in samples collected over several visits within the same sites was investigated. Using a mixed model, the among-site variance of log(chl-a) was 0.091 while the within-site variance was 0.146. Therefore, at most 38% of the variability in chl-a measurements can be explained with differences in site characteristics (e.g., nutrient concentrations). In Figure H-6, the mean chl-a for each site was plotted on the horizontal axis and for each mean value, the observed sampled values. So, the vertical spread of each set of points is the within-site variability, and the spread of values across the horizontal axis is the among-site variability.

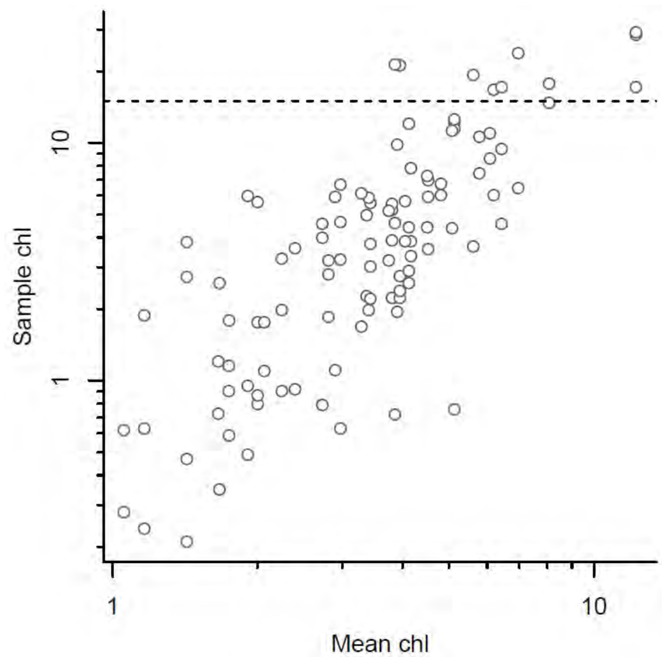

Figure H-6. Benthic chl-a (µg/cm²) plotted as a mean of multiple samples within sites on the x-axis (Mean chl) and as individual samples on the y-axis (Sample chl). Dashed line is at 15 µg/cm².

Appendix I Diatom Metric Correlations

NMED and NRSA data were analyzed separately. For TN in the NMED data, 21 of the 68 diatom metrics were significantly ($p<0.05$) correlated (Table I-1). The correlations were strongest in the flat site class, where 27 metrics were significantly correlated. In the moderate and steep site classes, only 0 and 3 metrics, respectively, were significantly correlated to TN. In the flat site class, the percentage of tolerant organisms (category 1 in the metric names) increases with increasing TN and the percentage of sensitive organisms (category 2) decreases, as expected. This can be seen in the NAWQA TN 1 metric (Figure I-1). The moderate site class does not have any significant correlations, though the trends (signs of the correlation coefficient) appear to follow those seen in the significant metrics of the flat site class (Table I-1). The steep site class shows increasing percentages of non-nitrogen-fixing diatoms (pi_NF_20) with increasing TN (Table I-1). Percentages of diatoms in the order Fragilariales increase with increasing TN in the flat site class. In the steep site class, diatoms in the Surirellales and Tabellariales orders increase with increasing TN.

For TP in the NMED data, 36 of the 68 diatom metrics were significantly correlated ($p<0.05$) in all sites combined (Table I-1). Based on the number of significant correlations, diatoms appear to be more sensitive to TP than to TN. In the site classes, only the TP Flat site class had several correlated metrics (28) compared to fewer in the TP High Volcanic (9) and TP Steep (5) classes. In each of the classes, the TP sensitive diatoms had lower percentages with increasing TP, as shown for metrics pi_NAWQA_TP_2 (Figure I-2) and pi_Ptpv_TP_all_Lo.

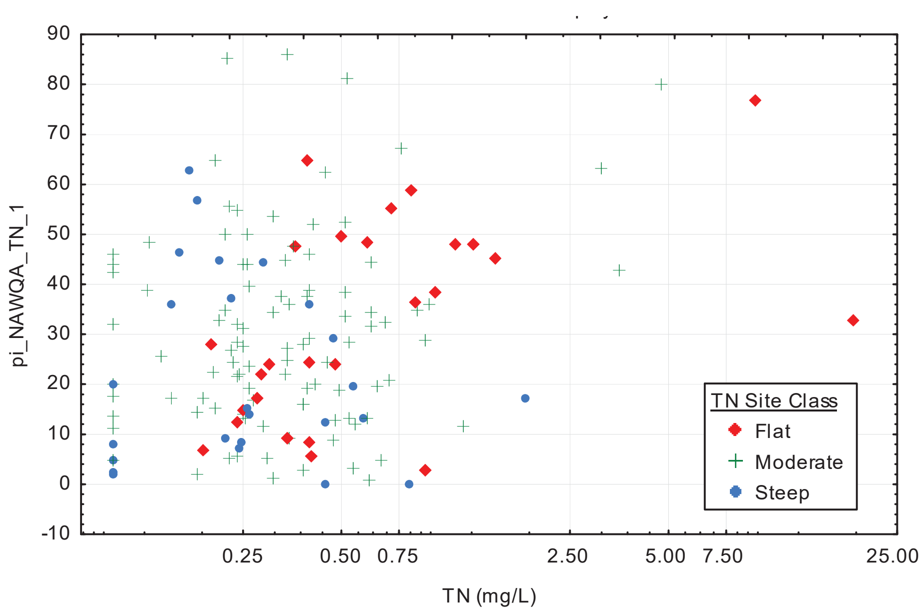

Figure I-1. Metric values (% NAWQA TN category 1 individuals) against TN concentrations, marked by site class.

NMED EXHIBIT 25

Table I-1. Spearman rank correlation coefficients for TN and TP against diatom metrics in all NMED sites and by site class. Marked correlations are significant at p <.05.

	TN				TP			
Metric	All Grps	Flat	Moderate	Steep	All Grps	High Volcanic	TP Flat	TP Steep
N:	151	26	100	25	151	18	105	28
ni_total	0.10	0.47	-0.02	-0.03	0.20	0.23	0.19	0.21
nt_total	0.04	-0.13	0.06	0.10	0.06	-0.14	0.09	-0.32
pi_Ben_Ses_1	0.01	-0.04	-0.01	0.18	-0.04	-0.22	0.11	-0.25
pi_Ben_Ses_2	-0.01	0.03	-0.01	-0.19	0.00	0.12	-0.14	0.17
pi_Diat_CA_1	0.28	0.21	0.17	0.29	-0.06	-0.02	0.02	-0.37
pi_Diat_CA_2	-0.12	-0.13	0.00	-0.08	0.01	-0.27	0.11	0.04
pi_Motility_1	0.20	0.30	0.08	0.21	0.19	-0.16	0.22	-0.40
pi_Motility_2	-0.21	-0.30	-0.10	-0.21	-0.19	0.16	-0.22	0.41
pi_NAWQA_CL_1	0.17	0.40	-0.07	0.33	0.01	0.42	0.04	-0.07
pi_NAWQA_CL_2	-0.15	-0.42	-0.06	0.05	-0.27	-0.23	-0.17	-0.11
pi_NAWQA_Cond_1	0.24	0.25	0.11	0.14	0.05	0.00	0.01	-0.04
pi_NAWQA_Cond_2	-0.03	0.10	0.04	-0.07	-0.14	-0.38	-0.07	-0.14
pi_NAWQA_TN_1	0.15	0.51	0.07	-0.05	0.33	-0.24	0.43	-0.36
pi_NAWQA_TN_2	0.01	-0.43	0.13	0.12	-0.21	-0.35	-0.22	-0.01
pi_NAWQA_TP_1	0.18	0.51	0.11	-0.17	0.32	0.07	0.36	-0.39
pi_NAWQA_TP_2	0.04	-0.10	0.12	0.22	-0.23	-0.71	-0.17	-0.22
pi_NF_1	-0.12	-0.40	-0.02	-0.38	0.02	-0.21	0.01	-0.01
pi_NF_2	0.07	0.41	-0.09	0.45	-0.05	0.10	-0.01	-0.04
pi_Ptpv_TN_all_Hi	0.14	0.48	0.05	-0.02	0.38	0.03	0.42	-0.25
pi_Ptpv_TN_all_Lo	-0.03	-0.44	0.06	0.17	-0.20	-0.31	-0.19	-0.13
pi_Ptpv_TP_all_Hi	0.18	0.48	0.08	-0.12	0.32	0.22	0.31	-0.35
pi_Ptpv_TP_all_Lo	-0.01	-0.16	0.03	0.23	-0.24	-0.61	-0.18	-0.28
x_Ptpv_RP_all	0.10	0.34	0.02	-0.30	0.37	0.62	0.30	0.00
x_Ptpv_RN_all	0.10	0.53	-0.01	-0.11	0.31	0.17	0.33	-0.08
x_Kelly_WMS	0.17	0.47	0.12	-0.19	0.39	0.09	0.47	-0.15
x_Kelly_TDI	0.17	0.47	0.12	-0.19	0.39	0.09	0.47	-0.15
x_Shan_e	0.01	-0.14	-0.06	0.23	0.08	-0.13	0.06	-0.23
wa_Poll_Class	0.02	-0.23	0.17	0.16	-0.21	-0.43	-0.13	0.29
wa_Poll_Tol	0.10	-0.17	0.18	0.28	-0.16	-0.36	0.01	-0.26
wa_Salinity	0.21	0.34	0.09	0.01	0.16	0.04	0.22	-0.55
wa_Saprobic	0.03	0.26	-0.10	0.08	0.33	-0.06	0.31	0.24
wa_Org_N	0.13	0.50	0.03	-0.09	0.31	0.20	0.34	-0.18
wa_OxyTol	0.01	0.48	-0.14	-0.05	0.32	0.17	0.31	0.21
wa_pH	-0.09	-0.25	0.05	-0.09	-0.12	0.02	-0.07	-0.04
wa_Moisture	0.03	0.15	0.05	-0.16	0.08	-0.18	0.07	-0.30
pi_TPReqMA97_0	-0.14	-0.16	-0.13	0.06	0.06	0.18	0.10	-0.32
pi_TPSENSMA97_0	-0.06	0.18	-0.04	-0.17	0.26	0.06	0.34	-0.29

Metric	TN				TP			
	All Grps	Flat	Moderate	Steep	All Grps	High Volcanic	TP Flat	TP Steep
pi_TPReqMA97_1	0.08	0.36	0.06	-0.25	0.34	-0.35	0.41	-0.11
pi_TPSENSMA97_1	-0.04	0.00	-0.08	0.06	-0.01	0.40	-0.11	0.05
pi_Trophic_12	-0.08	-0.22	-0.06	-0.09	-0.15	-0.37	-0.24	-0.22
pi_Trophic_56	0.11	0.50	0.03	-0.12	0.27	0.11	0.36	-0.28
wa_AVGTSIC	0.12	0.55	0.09	-0.22	0.33	0.02	0.35	0.05
wa_FTSIC	0.09	0.41	0.07	-0.18	0.30	-0.09	0.35	-0.09
wa_FTSIC2	0.09	0.42	0.06	-0.19	0.31	-0.09	0.35	-0.10
wa_FTSIC3	-0.07	-0.26	-0.03	-0.02	0.02	0.27	-0.05	0.36
wa_MAIATSIC	0.12	0.55	0.09	-0.22	0.33	0.02	0.35	0.05
wa_NEWTSIC	0.07	0.58	0.02	-0.13	0.25	0.20	0.28	0.05
wa_OptCat_DisTotMMI	0.24	0.42	0.12	0.13	0.23	0.44	0.18	-0.11
wa_OptCat_L1DisTot	0.27	0.39	0.15	0.17	0.12	0.49	0.10	-0.27
wa_OptCat_L1Ptl	0.18	0.47	0.06	0.00	0.34	0.34	0.28	-0.08
wa_OptCat_LCond	0.21	0.35	0.07	0.07	0.09	0.52	0.08	-0.28
wa_OptCat_LNtl	0.26	0.41	0.14	0.21	0.17	0.45	0.13	-0.11
wa_OptCat_NutMMI	0.22	0.45	0.09	0.11	0.27	0.38	0.22	-0.09
wa_OptCat_PctFN	0.17	0.39	0.01	0.26	0.15	0.42	0.08	-0.08
wa_OptCat_pH	0.03	0.02	-0.08	0.09	-0.07	0.55	-0.05	-0.25
wa_OptCat_XEMBED	0.18	0.11	0.04	0.26	0.12	0.51	0.03	-0.29
pi_Achnanthales	0.05	-0.12	0.13	0.24	-0.16	-0.33	-0.09	-0.15
pi_Centrales	-0.11	0.08	-0.06	-0.27	0.10	-0.23	0.14	-0.11
pi_Cymbellales	-0.08	0.10	-0.10	-0.01	-0.05	-0.14	-0.06	0.16
pi_Eunotiales	0.01	-0.12	0.09	-0.28	0.00	-0.26	-0.06	
pi_Fragilariales	-0.24	-0.64	-0.16	0.09	-0.06	0.04	-0.08	0.06
pi_Naviculales	0.09	0.05	-0.01	0.12	0.04	0.27	0.00	-0.42
pi_Pennales	0.00	0.13	-0.01	-0.17	0.20	-0.19	0.29	-0.22
pi_Surirellales	0.22	0.24	0.15	0.52	0.11	0.30	0.22	-0.03
pi_Tabellariales	0.19	0.08	0.09	0.41	-0.13		-0.06	-0.25
pi_Thalassiosirales	0.06	0.01	0.02	-0.26	0.11	0.22	-0.06	0.29
wa_KY_PTI	-0.14	0.12	-0.06	-0.15	-0.19	-0.86	-0.05	0.16
wa_MT_Tol	-0.01	-0.25	0.13	0.13	-0.23	-0.54	-0.14	0.31

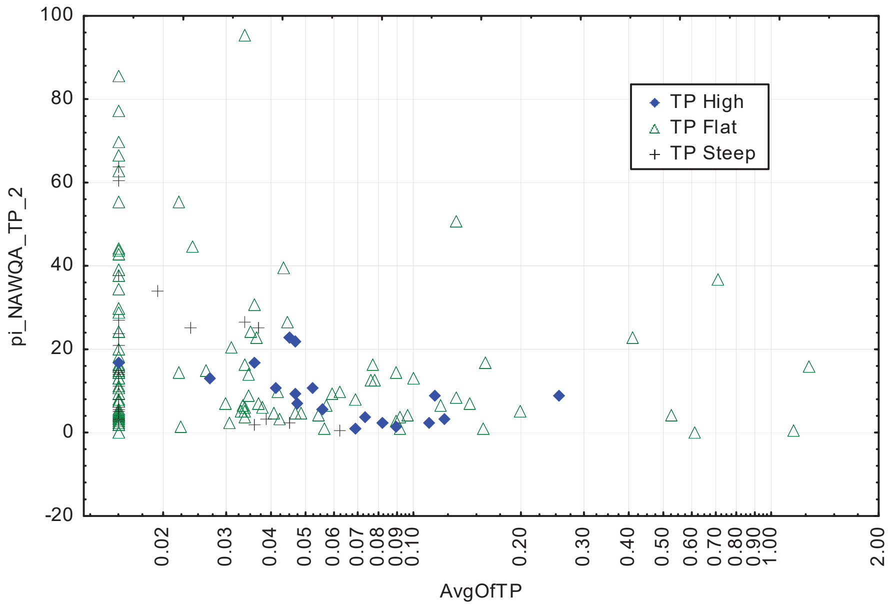

Figure I-2. Metric values (% NAWQA TP category 2 individuals) against TP concentrations, marked by site class.

A similar correlation analysis was conducted using the NRSA periphyton data with 48 valid samples. Almost all significant correlations were in the TN Flat site class for TN and in the TP Flat-Moderate class for TP (Table I-2). In general, correlations in the NRSA data set were stronger than those in the NMED data set. There were not enough TN Steep or TP Steep sites for meaningful correlation analysis. In plots with general disturbance metrics, patterns that are apparent in the whole data set are not necessarily obvious in the individual site classes (Figures I-3 and I-4). This might be due to ranges of nutrient concentrations that are broad over all sites and narrower in the individual site classes.

Table I-2. Spearman rank correlation coefficients for TN and TP against diatom metrics in all NRSA sites and by site class. Marked correlations are significant at p <0.05.

	TN			TP		
Metric	All Grps	TN Flat	TN Moderate	All Grps	High Volcanic	TP Flat-Moderate
N:	48	22	21	47	13	27
ni_total	-0.21	-0.40		-0.12	0.08	-0.28
nt_total	0.08	-0.07	0.04	0.27	0.14	0.12
pi_Ben_Ses_1	-0.30	-0.47	-0.08	-0.33	0.01	-0.39
pi_Ben_Ses_2	0.46	0.45	0.40	0.36	0.33	0.38
pi_Diat_CA_1	0.48	0.73	0.08	0.15	-0.32	0.36
pi_Diat_CA_2	-0.27	-0.46	-0.10	0.14	-0.36	-0.08
pi_Motility_1	0.60	0.68	0.15	0.42	0.49	0.47
pi_Motility_2	-0.59	-0.69	-0.17	-0.44	-0.37	-0.52
pi_NAWQA_CL_1	0.38	0.55	-0.09	0.15	-0.36	0.33
pi_NAWQA_CL_2	-0.54	-0.70	0.03	-0.42	-0.42	-0.48
pi_NAWQA_Cond_1	0.56	0.75	-0.05	0.13	-0.33	0.37
pi_NAWQA_Cond_2	0.05	-0.19	0.41	0.03	-0.27	0.07
pi_NAWQA_TN_1	0.29	0.31	-0.02	0.42	0.60	0.35
pi_NAWQA_TN_2	-0.51	-0.65	-0.01	-0.33	-0.50	-0.40
pi_NAWQA_TP_1	0.47	0.53	0.00	0.30	0.40	0.26
pi_NAWQA_TP_2	-0.42	-0.50	0.28	-0.28	0.05	-0.24
pi_NF_1	-0.32	-0.25	-0.40	-0.06	-0.09	-0.42
pi_NF_2	0.34	0.14	0.44	0.06	0.18	0.29
pi_Ptpv_TN_all_Hi	0.26	0.30	-0.05	0.45	0.59	0.38
pi_Ptpv_TN_all_Lo	-0.53	-0.73	-0.04	-0.34	-0.41	-0.48
pi_Ptpv_TP_all_Hi	0.49	0.56	0.03	0.36	0.49	0.33
pi_Ptpv_TP_all_Lo	-0.42	-0.46	0.30	-0.28	0.03	-0.22
x_Ptpv_RP_all	0.51	0.60	-0.21	0.34	0.24	0.29
x_Ptpv_RN_all	0.49	0.65	0.03	0.43	0.38	0.47
x_Kelly_WMS	0.27	0.34	-0.30	0.27	0.40	0.17
x_Kelly_TDI	0.27	0.34	-0.30	0.27	0.40	0.17
x_Shan_2	0.09	-0.01	-0.16	0.30	0.21	0.15
wa_Poll_Class	-0.60	-0.46	-0.31	-0.47	-0.38	-0.54
wa_Poll_Tol	-0.34	-0.29	0.04	-0.36	-0.59	-0.27
wa_Salinity	0.55	0.75	0.13	0.36	0.19	0.44
wa_Saprobic	0.28	0.22	0.07	0.56	0.37	0.53
wa_Org_N	0.23	0.36	0.10	0.50	0.72	0.58
wa_OxyTol	0.35	0.35	0.08	0.48	0.27	0.47
wa_pH	-0.37	0.02	-0.24	-0.27	0.08	-0.38
wa_Moisture	0.03	0.03	0.32	0.06	0.25	0.36
pi_TPReqMA97_0	0.18	0.37	-0.07	0.32	0.24	0.26
pi_TPSENSMA97_0	0.05	-0.07	-0.10	0.38	0.58	0.20

	TN			TP		
Metric	All Grps	TN Flat	TN Moderate	All Grps	High Volcanic	TP Flat-Moderate
pi_TPReqMA97_1	0.07	0.00	-0.21	0.38	0.42	0.14
pi_TPSENSMA97_1	0.36	0.41	-0.10	0.17	0.36	0.12
pi_Trophic_12	0.14	-0.03	0.14	0.02	0.55	-0.08
pi_Trophic_56	0.13	0.37	-0.12	0.12	0.07	-0.04
wa_AVGTSIC	-0.12	-0.15	-0.33	-0.07	-0.10	-0.30
wa_FTSIC	-0.16	-0.35	-0.17	-0.14	0.15	-0.26
wa_FTSIC2	-0.17	-0.36	-0.17	-0.14	0.15	-0.24
wa_FTSIC3	-0.21	-0.48	-0.06	-0.04	0.37	-0.06
wa_MAIATSIC	-0.12	-0.15	-0.33	-0.07	-0.10	-0.30
wa_NEWTSIC	0.04	0.20	-0.48	-0.01	-0.35	-0.10
wa_OptCat_DisTotMMI	0.61	0.82	-0.05	0.35	0.30	0.43
wa_OptCat_L1DisTot	0.64	0.84	0.14	0.31	-0.14	0.48
wa_OptCat_L1Ptl	0.58	0.80	-0.17	0.40	0.51	0.41
wa_OptCat_LCond	0.63	0.80	0.09	0.15	-0.41	0.32
wa_OptCat_LNtl	0.65	0.82	0.08	0.32	0.14	0.47
wa_OptCat_NutMMI	0.60	0.78	-0.07	0.36	0.40	0.42
wa_OptCat_PctFN	0.73	0.81	0.33	0.33	0.20	0.46
wa_OptCat_pH	0.24	0.44	-0.07	-0.17	-0.53	-0.31
wa_OptCat_XEMBED	0.65	0.75	0.04	0.34	0.18	0.41

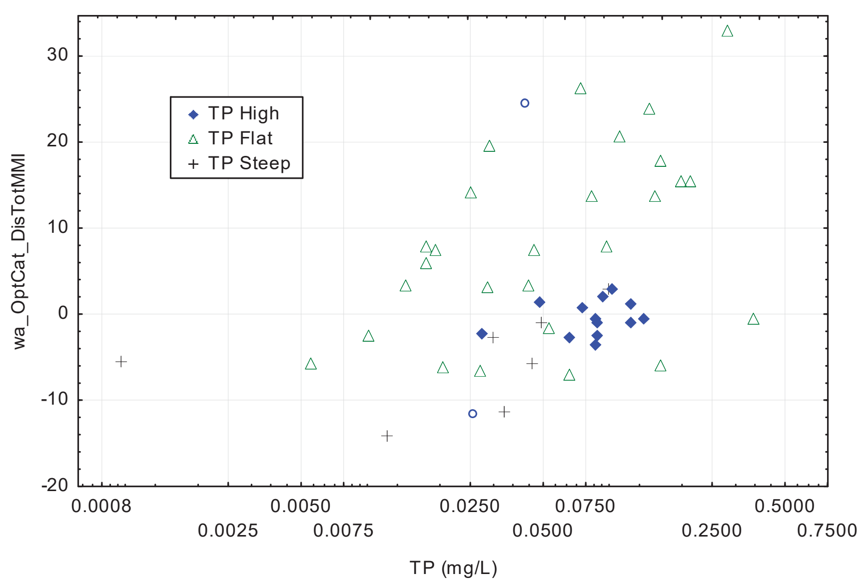

Figure I-3. Diatom metric values (weighted average total disturbance multimetric index) against TP concentrations, marked by site class; NRSA data.

NMED EXHIBIT 25

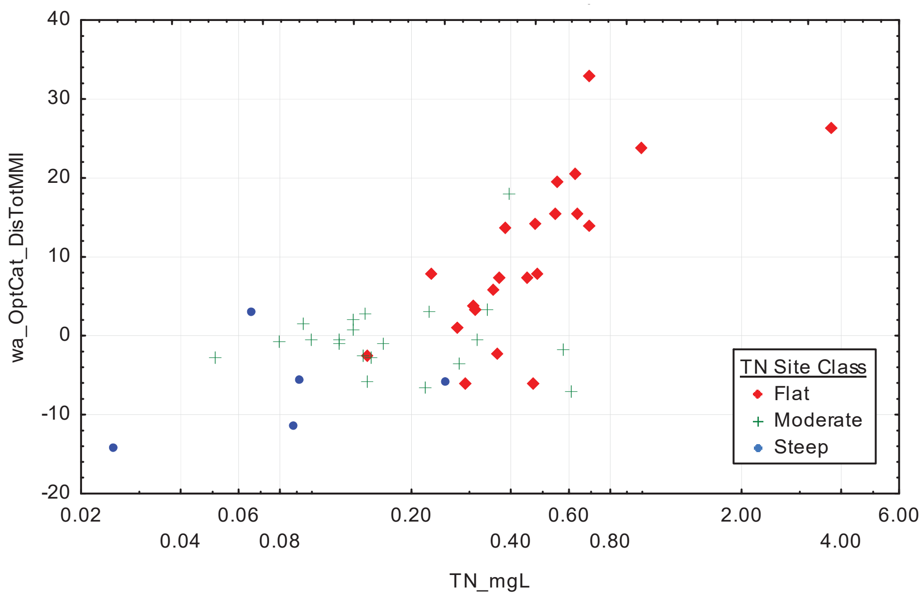

Figure I-4. Diatom metric values (weighted average total disturbance multimetric index) against TN concentrations, marked by site class; NRSA data.

To summarize the diatom data, another Spearman correlation analysis was conducted on the NMED and NRSA data combined, also combining the nutrient site classes. Significant correlations between diatoms, TN, TP, and chlorophyll were identified for 29 metrics (Table I-3). TP was significantly related to most of the metrics with significant correlations in more than one measure. The fewest significant correlations were with chlorophyll. Some of the chlorophyll correlations were opposite the nutrient correlations (e.g. nt_total, x_Shan_2, and wa_Saprobic). Not all sites had chlorophyll measurements, so the opposite responses might be related to the specific data subset. However, more diverse diatom taxa (nt_total, x_Shan_2) were observed with either low chlorophyll or high TP. This suggests that diatom communities associated with high chlorophyll might be composed mostly of a few dominant taxa. These might be taxa that can thrive among the soft algae that contribute to a higher chlorophyll concentration, but are not counted in the diatom metrics. In contrast, diatom communities in high TP sites had high diversity, suggesting that high TP favors several types of diatoms. TP and chlorophyll were negatively and non-significantly correlated (Spearman rho = -0.13, p>0.05).

Table I-3. Spearman correlation coefficients between diatom metrics and chlorophyll a, TN and TP in all stream sites. Marked correlations are significant at p <0.05.

	Chl_a	TN	TP	
Metric \ N	157	200	200	Metric description
nt_total	-0.25	-0.03	0.25	Number of diatom taxa
pi_Motility_1	0.01	0.27	0.27	% highly Motile
pi_NAWQA_CL_2	-0.07	-0.22	-0.34	% Chloride sensitive diatoms
pi_NAWQA_Cond_1	0.05	0.27	0.14	% conductivity tolerant diatoms
pi_NAWQA_Cond_2	-0.22	-0.04	-0.07	% conductivity sensitive diatoms
pi_NAWQA_TN_1	0.03	0.18	0.34	% TN tolerant diatoms
pi_NAWQA_TN_2	-0.16	-0.11	-0.24	% TN sensitive diatoms
pi_NAWQA_TP_1	-0.11	0.23	0.36	% TP tolerant diatoms
pi_NAWQA_TP_2	-0.19	-0.04	-0.28	% TP sensitive diatoms
pi_Ptpv_TN_all_Hi	0.07	0.17	0.38	% high TN all regions
pi_Ptpv_TN_all_Lo	-0.14	-0.16	-0.23	% low TN all regions
pi_Ptpv_TP_all_Hi	-0.07	0.23	0.37	% high TP all regions
pi_Ptpv_TP_all_Lo	-0.18	-0.08	-0.29	% low TP all regions
x_Ptpv_RP_all	0.09	0.17	0.40	Ratio of high TP to low TP (all regions)
x_Ptpv_RN_all	0.11	0.19	0.34	Ratio of high TN to low TN (all regions)
x_Kelly_TDI	0.11	0.19	0.38	Kelly's Index.
x_Shan_2	-0.21	-0.03	0.23	Shannon-Weiner Index
wa_Salinity	0.00	0.27	0.25	weighted average, Salinity
wa_Saprobic	-0.19	0.07	0.38	weighted average, Saprobic
wa_Org_N	-0.05	0.19	0.31	weighted average, organic N
wa_OptCat_DisTotMMI	0.12	0.29	0.31	weighted average, multi-metric index
wa_OptCat_L1DisTot	0.14	0.32	0.22	weighted average, disturbance index
wa_OptCat_L1Ptl	0.07	0.23	0.40	Western EMAP weighted average TP score
wa_OptCat_LCond	0.20	0.27	0.14	weighted average conductivity score
wa_OptCat_LNtl	0.15	0.31	0.26	Western EMAP weighted average TN score
wa_OptCat_NutMMI	0.11	0.27	0.34	Western EMAP multi-metric index of nutrients
wa_OptCat_PctFN	0.08	0.25	0.26	weighted average % fine score
wa_OptCat_XEMBED	0.13	0.23	0.25	weighted average embeddedness score
wa_OptCat_pH	0.28	0.06	-0.07	weighted average pH

The weighted average pH diatom metric was most strongly correlated with chlorophyll. Diatoms that are better suited to high pH were more common in sites with high benthic chlorophyll. The mechanism could be that sites with high chlorophyll are producing more oxygen, which increases pH and benefits the diatoms suited to higher pH. The mechanism is further supported by the relationship between chlorophyll and the saprobic metric, which indicates that taxa preferring high dissolved oxygen (low saprobic conditions) are in sites with high benthic chlorophyll. High TP is associated with sites with diatoms preferring low DO (high saprobic) conditions.

In addition, TP was positively correlated with diatom metrics that indicate other stressors, such as general disturbance, conductivity, and fine substrates (wa_OptCat_L1DisTot, wa_OptCat_LCond, wa_OptCat_PctFN, and wa_OptCat_XEMBED). If there are multiple covarying stressors in the sites with high nutrients, that might change the types of algal growth that occurs in the sites.

Most of the significant correlations with TP were also significant with TN, though in general, the correlations with TN were weaker. The only correlations that were somewhat stronger with TN were with conductivity (pi_NAWQA_Cond_1 and wa_OptCat_LCond). TN does not appear to have strong association with taxa diversity (nt_total and x_Shan_2) or the saprobic conditions (wa_Saprobic).

Based on the multiple correlation analyses, we selected responsive metrics to carry forward in analyses. These included wa_OptCat_DisTotMMI, wa_OptCat_L1DisTot, wa_OptCat_L1Ptl, wa_OptCat_LNtl, wa_OptCat_NutMMI pi_NAWQA_TN_1, pi_Ptpv_TP_all_Hi, and x_Shan_e.

In an investigation of possible confounding factors, the significance of the data source for predicting selected metrics was checked using multiple regressions with sample year, latitude, and longitude as predictors, in addition to nutrients. Sampling year was significant in regressions for some metrics (Figure I-5). In further investigations, we found that year was also related to latitude and longitude, with 2006 sites further north and east than in other years (Figure I-6). Year and location are apparently related to sampling design, which should not affect basic nutrient – diatom relationships. Data source (NMED or NRSA) was also significant in multiple regressions, cautioning against combining data sets in analysis.

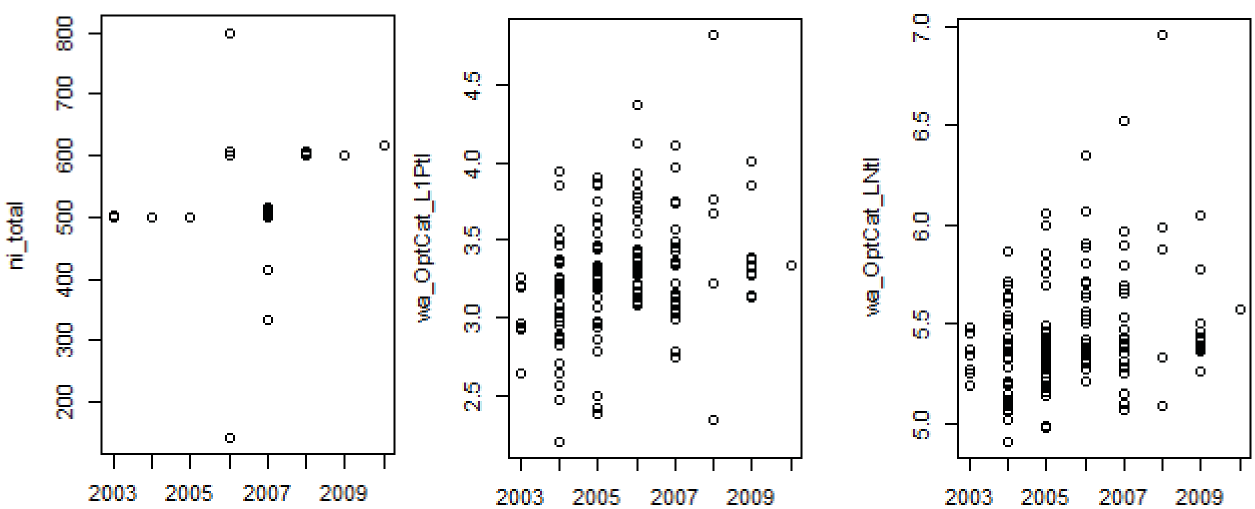

Figure I-5. Diatom metrics in NMED data over sampling years.

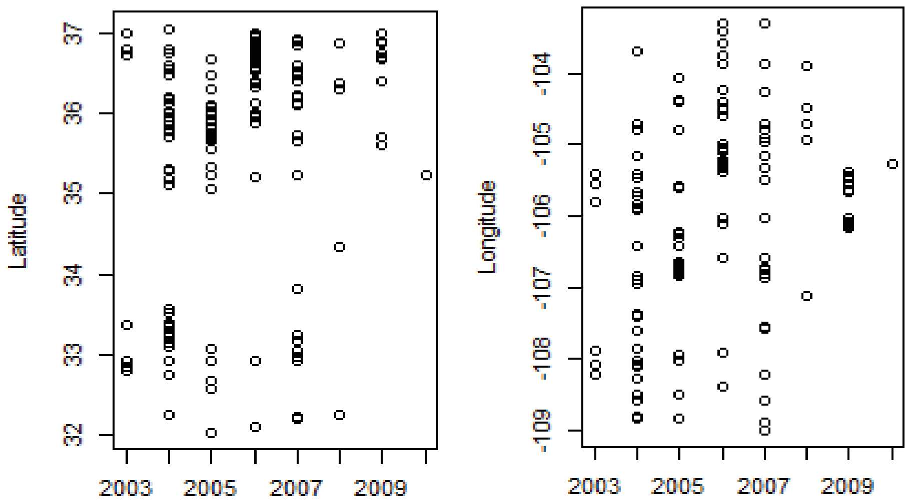

Figure I-6. Latitude and longitude in to relation to diatom sample years.

In multiple regression analyses, a single nutrient (either TN or TP) was first used in the equations. Then pH, conductivity, and turbidity were added in the models. Separate models for NMED and NRSA data sets were run. With a selection of general response metrics, TN was a good predictor of the weighted average metrics when regressed without other predictors (Table I-4). When other variables were allowed in the models, conductivity (EC) often became the dominant predictor, especially in the NMED data. TP regressions were also significant, though other variables entered in addition to TP when allowed.

Table I-4. Results of regression analyses on diatom metrics. The metrics were predicted using either TN or TP alone and then with either nutrient and turbidity, conductivity, and pH. Variables were not significant (ns) in the models or significant at p levels <0.001 (***), <0.01 (**), <0.05 (*), or <0.10 (.).

Data Source	NMED				NRSA			
Nutrient	TN		TP		TN		TP	
Predicted: nt_total								
log10(TN_Calc) or log10(AvgOfTP)	ns	ns	ns	ns	ns	ns	*	*
log10(AvgOfturbidity		ns		ns		ns		ns
log10(AvgOfEC)		ns		ns		ns		ns
AvgOfpH		ns		ns		ns		ns
Predicted: x_Shan_e								
log10(TN_Calc) or log10(AvgOfTP)	ns	ns	ns	ns	ns	ns	**	*
log10(AvgOfturbidity		ns		ns		ns		ns
log10(AvgOfEC)		ns		ns		ns		ns
AvgOfpH		*		*		ns		ns
Predicted: wa_OptCat_DisTotMMI								
log10(TN_Calc) or log10(AvgOfTP)	***	ns	**	***	***	ns	**	*
log10(AvgOfturbidity		ns		ns		.		.
log10(AvgOfEC)		***		***		.		***
AvgOfpH		ns		ns		ns		ns
Predicted: wa_OptCat_L1DisTot								
log10(TN_Calc) or log10(AvgOfTP)	***	ns	.	ns	***	ns	*	*
log10(AvgOfturbidity		ns		ns		*		.
log10(AvgOfEC)		***		***		*		***
AvgOfpH		ns		ns		ns		ns
Predicted: wa_OptCat_LNtl								
log10(TN_Calc) or log10(AvgOfTP)	***	ns	**	**	***	ns	*	*
log10(AvgOfturbidity		ns		ns		.		.
log10(AvgOfEC)		***		***		*		***
AvgOfpH		ns		ns		ns		ns
Predicted: wa_OptCat_L1Ptl								
log10(TN_Calc) or log10(AvgOfTP)	***	ns	***	***	***	ns	**	**
log10(AvgOfturbidity		ns		ns		.		ns
log10(AvgOfEC)		***		***		ns		*
AvgOfpH		.		.		ns		ns

Correlations among the water quality variables in the diatom data set were calculated to see if the predictors were correlated (Table I-5). TN and TP were correlated at a Spearman rho of 0.31. Both TP and TN were correlated strongly and positively with turbidity. TN was positively correlated with conductivity (Figure I-7). TP was not strongly correlated with conductivity, though both were significant in predictive models of diatom metrics. The correlations with nutrients and other water quality measures are not unexpected. These might help in interpreting stressor-response relationships and multiple stressor effects should be considered. However, given relatively strong correlations with the metrics and nutrients without the interacting predictors, adjustments for additional predictors might not increase our ability to identify nutrient criteria.

Table I-5. Spearman rank correlation coefficients for TN, TP, and possible modifying factors in diatom relationships.

		TP	TN	3	4	5	6	7	8	9	10
1	AvgOfTP										
2	TN_Calc	**0.31**									
3	Latitude	0.09	0.16								
4	Longitude	-0.08	**0.32**	**0.28**							
5	AvgOfChl_a	0.05	-0.05	-0.01	0.22						
6	AvgOfpH	0.03	-0.05	**0.38**	-0.02	0.02					
7	AvgOfEC	-0.10	**0.30**	-0.19	**0.37**	**0.46**	-0.05				
8	AvgOftemperature	**0.28**	0.16	-0.09	0.00	0.01	-0.01	0.05			
9	AvgOfDOsat	-0.02	0.03	0.18	-0.04	0.13	**0.32**	0.10	**0.26**		
10	AvgOfturbidity	**0.48**	**0.41**	0.17	0.17	0.15	0.02	0.15	**0.26**	0.07	
11	AvgOfSalinity	-0.06	**0.30**	**-0.27**	**0.41**	**0.45**	-0.13	**0.93**	0.05	0.03	0.11

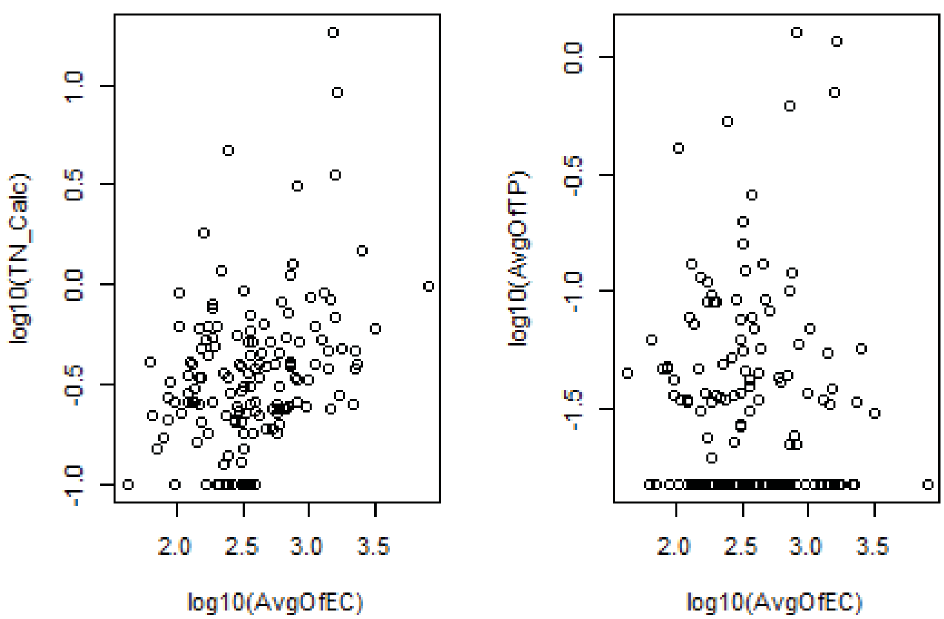

Figure I-7. Nutrient concentrations in relation to conductivity (NMED data).

NMED EXHIBIT 25

We combined NMED and NRSA data in future analyses because the data sets were indiscernible in some plots of nutrients and metric values (Figure I-8). For this important metric, regression equations were similar for the two data sets and a regression line on the combined data set would give a comprehensive estimate for all data.

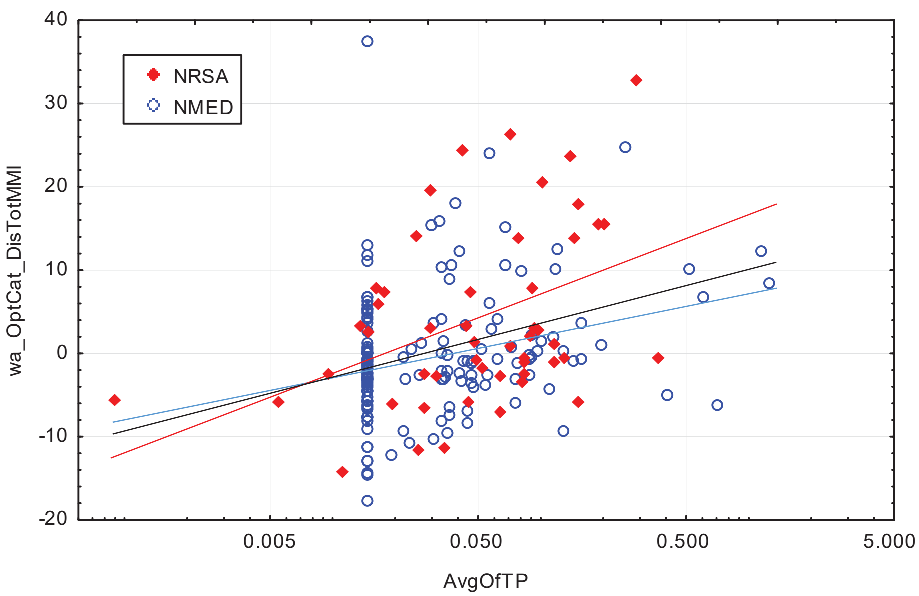

Figure I-8. Diatom metric in relation to TP showing the two data sources with regression lines of matching colors for the separate data sets and a black regression line for the combined data set.

NMED EXHIBIT 25

Appendix J Benthic Macroinvertebrate Correlations

Table J-1. Spearman Correlation coefficients for benthic metrics and diel DO statistics in all sites and by TP site class.

	All Sites (N = 77)					High-Volcanic (N= 20)				Flat-Mod (N = 41)				Steep (N = 16)			
Statistic Metric	GPP	ER	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr
TotalInd	0.04	0.00	-0.05	0.05	0.06	-0.09	0.24	-0.12	-0.14	0.03	-0.25	0.10	0.13	0.14	0.01	0.15	0.01
TotalTax	-0.03	-0.06	0.06	-0.01	0.03	-0.04	-0.01	-0.10	0.05	0.28	-0.10	0.15	0.20	0.28	-0.28	-0.17	0.14
InsectTax	-0.05	-0.09	0.09	-0.02	-0.01	0.21	-0.11	0.15	0.24	0.13	0.04	0.03	0.04	0.33	-0.16	-0.13	0.08
EPTTax	-0.07	-0.12	0.27	-0.16	-0.19	0.23	0.28	-0.31	-0.19	-0.16	0.30	-0.23	-0.27	0.08	-0.06	-0.19	-0.03
EphemTax	-0.08	0.00	0.30	-0.13	-0.14	-0.08	0.39	-0.47	-0.36	-0.01	0.16	-0.08	-0.13	0.26	0.16	-0.19	0.00
PlecoTax	-0.20	-0.20	0.24	-0.28	-0.38	0.28	0.41	-0.01	-0.04	-0.56	0.29	-0.39	-0.49	0.14	0.19	-0.30	-0.51
TrichTax	0.04	-0.11	0.08	-0.02	-0.03	0.25	-0.05	-0.12	-0.08	0.03	0.16	-0.17	-0.11	0.11	-0.26	0.10	0.21
DipTax	0.06	-0.14	-0.08	0.07	0.06	0.27	-0.08	0.40	0.40	0.24	-0.19	0.16	0.16	-0.02	-0.08	-0.42	-0.24
ChiroTax	0.13	-0.14	-0.10	0.13	0.14	0.28	-0.09	0.42	0.43	0.37	-0.28	0.29	0.32	0.05	0.00	-0.42	-0.27
ColeoTax	-0.14	0.01	0.16	-0.02	-0.02	-0.06	-0.14	-0.03	0.11	-0.16	0.22	-0.08	-0.13	-0.08	0.08	0.27	0.42
CrMolTax	0.06	0.08	-0.25	0.16	0.22	-0.67	-0.29	-0.32	-0.30	0.30	-0.23	0.24	0.32	-0.11	-0.41	0.41	0.46
OligoTax	0.15	-0.11	-0.04	-0.12	-0.03	-0.38	0.40	-0.52	-0.52	0.18	-0.19	-0.05	0.02	0.62	-0.03	-0.15	0.03
Shan_2	-0.02	-0.04	0.03	0.00	-0.02	-0.23	0.19	-0.33	-0.31	0.28	-0.06	0.14	0.12	-0.12	-0.48	-0.29	-0.02
Dom01Pct	0.14	-0.11	-0.17	0.08	0.14	0.42	-0.43	0.73	0.71	-0.08	-0.21	-0.02	0.02	0.59	0.35	0.23	0.11
D	0.07	0.00	-0.06	0.05	0.10	0.33	-0.29	0.55	0.54	-0.20	-0.03	-0.08	-0.05	0.38	0.44	0.31	0.10
Evenness	-0.01	-0.05	0.06	-0.02	-0.05	-0.22	0.18	-0.37	-0.35	0.20	0.00	0.09	0.07	-0.19	-0.39	-0.38	-0.12
D_Mg	0.04	-0.07	0.05	0.04	0.06	-0.05	0.06	-0.09	0.05	0.34	-0.08	0.19	0.23	0.28	-0.20	-0.24	0.07
EPTPct	-0.06	0.09	0.12	-0.01	-0.05	0.38	0.09	0.10	-0.01	-0.38	0.13	-0.26	-0.33	0.22	0.10	0.41	0.44
EphemPct	-0.08	0.12	0.14	-0.01	-0.04	-0.01	0.23	-0.01	-0.08	-0.18	0.23	-0.15	-0.23	-0.01	-0.26	0.15	0.29
PlecoPct	-0.24	-0.16	0.31	-0.32	-0.42	0.25	0.44	-0.05	-0.07	-0.63	0.32	-0.44	-0.53	0.17	0.32	-0.35	-0.62
TrichPct	0.18	-0.08	-0.14	0.09	0.12	0.74	-0.18	0.28	0.25	-0.18	-0.10	-0.24	-0.20	0.14	-0.10	0.73	0.68
NonInPct	0.18	-0.11	-0.18	0.10	0.16	-0.36	-0.10	-0.07	0.09	0.30	-0.15	0.11	0.17	-0.15	-0.70	-0.22	-0.03
AmphPct	0.07	0.32	0.11	0.18	0.21	0.09	0.39	0.14	0.17	0.12	0.06	0.24	0.21	-0.18	0.10	-0.01	0.10

NMED EXHIBIT 25

	All Sites (N = 77)					High-Volcanic (N= 20)				Flat-Mod (N = 41)				Steep (N = 16)			
Statistic Metric	GPP	ER	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr
BivalPct	-0.03	0.13	-0.03	0.02	0.04	-0.37	0.04	-0.23	-0.19	0.04	-0.03	0.08	0.07	-0.14	0.13	0.02	0.05
ChiroPct	0.10	-0.11	-0.10	0.11	0.06	-0.06	-0.25	0.40	0.29	0.34	-0.12	0.23	0.21	-0.06	-0.16	-0.47	-0.47
ColeoPct	-0.14	0.00	0.12	-0.09	-0.11	-0.32	-0.10	-0.52	-0.35	-0.08	0.22	-0.10	-0.14	-0.49	0.07	0.43	0.32
CrMolPct	-0.04	0.21	-0.20	0.20	0.24	-0.69	-0.09	-0.09	-0.07	0.24	-0.20	0.25	0.30	-0.28	-0.40	0.27	0.39
DipPct	0.06	0.01	-0.03	0.09	0.05	0.13	-0.03	0.35	0.29	0.17	0.04	0.24	0.20	0.15	-0.20	-0.44	-0.50
GastrPct	0.09	0.04	-0.30	0.26	0.30	-0.74	-0.42	-0.09	-0.07	0.35	-0.28	0.34	0.41	-0.24	-0.39	0.30	0.40
OdonPct	-0.04	0.14	0.00	-0.06	0.00	-0.38	0.23	-0.54	-0.50	0.03	-0.02	0.06	0.08	0.35	-0.62	0.06	0.31
OligoPct	0.03	-0.01	0.13	-0.15	-0.11	-0.18	0.67	-0.63	-0.47	0.11	-0.01	0.01	0.02	0.00	-0.29	-0.40	-0.33
HBI	0.16	0.06	-0.30	0.26	0.27	-0.11	-0.47	0.39	0.55	0.37	-0.33	0.43	0.41	0.16	-0.40	-0.32	-0.23
BeckBI	-0.22	-0.11	0.30	-0.30	-0.37	0.16	0.27	-0.21	-0.17	-0.39	0.34	-0.43	-0.49	0.01	-0.03	-0.09	-0.09
IntolPct	-0.08	-0.24	0.30	-0.25	-0.28	0.03	0.26	-0.12	-0.18	-0.25	0.37	-0.45	-0.44	0.11	0.37	0.27	0.11
TolerPct	0.20	0.00	-0.25	0.23	0.24	-0.08	-0.38	0.32	0.43	0.33	-0.20	0.33	0.31	-0.24	-0.24	-0.32	-0.09
IntolTax	-0.24	-0.09	0.29	-0.31	-0.37	0.13	0.27	-0.24	-0.15	-0.43	0.36	-0.46	-0.50	0.03	-0.09	0.02	0.02
TolerTax	0.01	0.07	-0.08	0.08	0.14	-0.27	-0.04	-0.04	0.08	0.34	-0.26	0.27	0.32	0.11	-0.34	-0.13	0.08
Baet2EphPct	-0.18	0.00	0.06	-0.22	-0.30	-0.04	0.20	-0.33	-0.56	-0.06	0.11	-0.13	-0.15	-0.59	-0.22	-0.42	-0.57
Hyd2EPTPct	0.00	0.16	0.03	0.09	0.00	0.40	-0.19	0.19	0.06	-0.27	0.09	-0.06	-0.13	0.21	0.04	0.19	0.04
Hyd2TriPct	-0.11	0.25	0.15	0.02	-0.07	0.13	0.05	0.11	0.00	-0.30	0.21	-0.09	-0.19	0.22	0.19	0.03	-0.17
CllctPct	-0.08	0.03	0.01	-0.06	-0.07	-0.13	0.19	0.04	0.13	-0.02	0.00	0.13	0.06	0.43	-0.15	-0.47	-0.45
FiltrPct	0.02	0.13	-0.04	0.05	-0.02	0.51	-0.08	0.19	0.02	-0.26	-0.05	-0.15	-0.22	-0.13	0.00	0.22	0.15
PredPct	0.06	-0.11	-0.15	0.10	0.11	-0.06	-0.22	0.18	0.15	0.05	0.02	0.05	0.05	0.13	-0.70	0.10	0.33
ScrapPct	0.05	-0.19	-0.01	-0.02	0.01	-0.38	0.18	-0.56	-0.49	0.05	-0.01	-0.14	-0.09	-0.28	0.05	0.58	0.55
ShredPct	-0.17	-0.19	0.34	-0.19	-0.23	-0.08	0.47	-0.15	-0.08	-0.03	0.27	-0.08	-0.13	-0.28	0.29	-0.53	-0.63
CllctTax	0.10	-0.14	-0.04	0.06	0.08	0.41	-0.19	0.42	0.47	0.23	-0.10	0.16	0.18	0.45	-0.26	-0.24	-0.07
FiltrTax	0.06	-0.01	0.01	0.09	0.08	-0.16	-0.01	-0.09	-0.03	0.34	-0.12	0.07	0.15	0.13	-0.16	0.19	0.03
PredTax	-0.06	-0.02	-0.01	0.09	0.10	-0.02	-0.24	0.33	0.34	0.01	0.11	0.11	0.06	0.21	-0.25	-0.11	0.20
ScrapTax	0.06	-0.04	0.01	0.06	0.08	-0.14	0.03	-0.37	-0.42	0.05	0.05	0.04	0.09	0.00	-0.14	0.44	0.56

	All Sites (N = 77)					High-Volcanic (N= 20)				Flat-Mod (N = 41)				Steep (N = 16)			
Statistic Metric	GPP	ER	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr	GPP	DO min	Delta DO	Prod 4hr
ShredTax	-0.32	-0.02	0.39	-0.25	-0.28	-0.11	0.36	-0.11	-0.06	-0.17	0.32	-0.24	-0.27	-0.18	0.34	-0.38	-0.44
BrrwrPct	0.19	-0.09	-0.05	0.09	0.11	-0.29	0.17	-0.39	-0.33	0.30	-0.13	0.19	0.21	0.25	-0.17	0.04	0.01
ClmbrPct	0.23	-0.23	-0.26	0.12	0.14	0.10	-0.51	0.39	0.49	0.46	-0.22	0.20	0.28	-0.04	-0.30	-0.25	-0.32
ClngrPct	-0.17	0.14	0.14	-0.11	-0.15	0.37	-0.11	-0.07	-0.04	-0.41	0.14	-0.12	-0.19	-0.06	0.49	0.10	-0.04
SprwlPct	0.17	-0.14	-0.08	0.21	0.24	0.20	0.25	0.31	0.28	0.31	-0.14	0.37	0.33	0.33	-0.21	0.22	0.32
SwmmrPct	-0.29	0.04	0.26	-0.26	-0.32	0.21	0.31	0.13	0.10	-0.49	0.48	-0.47	-0.54	-0.26	-0.22	-0.18	-0.19
BrrwrTax	0.15	-0.14	-0.07	0.03	0.13	-0.32	-0.04	-0.06	0.12	0.43	-0.17	0.12	0.26	0.22	0.09	-0.14	-0.12
ClmbrTax	0.10	-0.17	-0.11	0.10	0.12	-0.10	-0.27	0.08	0.14	0.48	-0.13	0.28	0.38	0.16	-0.51	-0.05	0.10
ClngrTax	0.01	-0.04	0.03	0.03	0.02	0.17	-0.14	0.01	0.09	-0.04	0.08	-0.08	-0.10	0.17	-0.15	0.20	0.33
SprwlTax	-0.01	0.01	-0.01	0.08	0.05	0.13	0.21	0.21	0.15	0.14	-0.05	0.22	0.17	-0.16	-0.19	-0.37	-0.11
SwmmrTax	-0.11	-0.06	0.28	-0.12	-0.11	0.24	0.05	0.18	0.35	-0.21	0.39	-0.30	-0.32	0.22	0.32	-0.06	-0.11

NMED EXHIBIT 25

Table J-2. Spearman rank correlation coefficients for TN, TP, and chlorophyll against macroinvertebrate metrics in all sites and by site class. Marked correlations are significant at p <.05.

	TN				TP				Benthic Chlorophyll				Sestonic
	All Sites	Flat	Moderate	Steep	All Sites	High Volc	Flat	Steep	All Sites	High Volc	TP Flat	TP Steep	All Sites
N	440	88	259	93	436	102	243	91	193	47	111	35	35
TotalTax	-0.25	-0.37	-0.22	0.06	-0.02	-0.20	-0.11	-0.04	0.12	0.16	0.14	0.16	-0.36
InsectTax	-0.23	-0.32	-0.20	0.10	-0.01	-0.11	-0.07	-0.03	0.08	0.05	0.17	0.16	-0.36
EPTTax	-0.40	-0.32	-0.39	-0.01	-0.12	-0.29	-0.15	-0.08	0.00	0.10	0.06	-0.14	-0.21
EphemTax	-0.29	-0.27	-0.28	0.01	-0.04	-0.15	-0.16	-0.03	-0.12	0.01	-0.09	-0.27	-0.41
PlecoTax	-0.30	-0.26	-0.25	0.00	-0.20	-0.07	-0.13	0.04	-0.18	-0.07	-0.10	-0.34	-0.22
TrichTax	-0.30	-0.24	-0.23	-0.01	-0.05	-0.29	-0.07	-0.11	0.18	0.12	0.24	0.16	-0.34
DipTax	0.02	-0.13	0.13	0.05	0.05	0.11	0.03	-0.04	0.15	0.17	0.22	0.15	
ChiroTax	0.07	-0.10	0.09	0.09	0.11	0.11	0.06	0.00	0.08	0.08	0.07	0.22	-0.10
ColeoTax	-0.16	-0.28	-0.13	0.00	-0.06	-0.08	-0.09	-0.19	0.10	0.26	0.01	0.27	
CrMolTax	0.11	-0.10	0.11	-0.08	-0.10	-0.20	-0.09	-0.04	-0.02	-0.28	-0.01	0.29	
OligoTax	0.07	0.10	0.04	0.10	0.11	0.03	0.08	0.31	-0.01	-0.01	-0.06	0.02	
Shan_2	-0.11	-0.22	-0.02	0.14	-0.11	-0.24	-0.12	0.02	0.37	0.42	0.38	0.38	-0.12
Dom01Pct	0.16	0.25	0.16	0.10	0.02	0.17	0.06	-0.02	-0.09	-0.23	-0.05	-0.15	-0.05
D	0.11	0.30	0.10	0.02	0.03	0.19	0.06	-0.05	-0.17	-0.20	-0.15	-0.36	
Evenness	-0.12	-0.27	-0.06	-0.12	-0.01	-0.16	-0.03	0.03	0.16	0.18	0.16	0.23	
D_Mg	-0.15	-0.19	-0.09	-0.07	0.02	-0.12	-0.01	-0.04	0.14	0.13	0.21	0.15	
EPTPct	-0.14	-0.22	-0.12	0.09	-0.02	0.06	-0.02	-0.02	0.09	0.01	0.09	0.25	-0.12
EphemPct	-0.05	-0.24	0.00	0.20	0.06	0.14	0.02	0.03	-0.06	-0.04	-0.09	0.01	-0.29
PlecoPct	-0.28	-0.28	-0.22	0.02	-0.17	-0.03	-0.14	0.11	-0.21	-0.12	-0.11	-0.59	-0.43
TrichPct	-0.15	-0.10	-0.07	-0.11	-0.11	-0.17	-0.08	-0.17	0.29	0.32	0.22	0.55	0.06
NonInPct	0.15	0.10	0.05	0.02	0.07	0.08	0.04	0.00	0.11	0.23	-0.02	0.26	-0.01
AmphPct	0.23	0.07	0.16	0.19	-0.03	0.27	-0.06	-0.03	0.20	0.19	0.18	0.11	

	TN				TP				Benthic Chlorophyll				Sestonic
	All Sites	Flat	Moderate	Steep	All Sites	High Volc	Flat	Steep	All Sites	High Volc	TP Flat	TP Steep	All Sites
BivalPct	0.09	-0.12	0.09	-0.02	-0.12	-0.13	-0.03	-0.18	0.01		-0.07	0.20	
ChiroPct	0.07	0.07	0.07	-0.09	0.10	0.24	0.07	0.04	-0.01	0.03	-0.03	-0.02	0.22
ColeoPct	-0.19	-0.22	-0.13	-0.20	-0.15	-0.40	-0.10	-0.22	0.05	-0.02	-0.06	0.43	
CorbPct	0.02	-0.07	0.10	-0.17	-0.04		0.00	-0.09	0.04		-0.02	0.18	
CrMolPct	0.16	0.01	0.07	-0.01	-0.08	-0.02	-0.10	-0.02	0.11	-0.04	0.04	0.33	
DipPct	0.11	0.11	0.16	0.04	0.03	0.08	-0.02	0.09	-0.13	0.07	-0.02	-0.58	
GastrPct	0.12	-0.09	0.09	-0.06	-0.08	-0.15	-0.16	0.06	0.04	-0.25	0.07	0.26	
IsoPct	-0.08		-0.10		0.03			0.16					
OdonPct	0.08	-0.27	0.10	-0.13	0.03	-0.25	-0.03	0.06	0.12	-0.23	0.23	0.16	
OligoPct	0.13	0.15	0.10	0.17	0.17	0.01	0.15	0.41	0.05	0.03	0.02	0.07	
HBI	0.30	0.32	0.28	0.07	0.11	0.02	0.03	0.14	-0.03	-0.05	0.00	-0.02	
BeckBI	-0.39	-0.32	-0.41	0.02	-0.15	-0.30	-0.10	-0.07	-0.18	-0.06	-0.18	-0.14	
IntolPct	-0.32	-0.31	-0.30	-0.04	-0.17	-0.14	-0.12	-0.07	-0.09	-0.01	-0.08	-0.14	-0.24
TolerPct	0.20	0.08	0.14	0.03	0.06	0.08	0.06	-0.05	0.08	0.26	-0.05	0.11	0.16
IntolTax	-0.36	-0.27	-0.38	-0.09	-0.09	-0.29	-0.10	-0.04	-0.34	-0.10	-0.12	-0.16	-0.41
TolerTax	0.10	-0.07	0.05	0.04	0.07	0.01	0.01	0.07	0.10	0.17	0.02	0.22	0.03
Baet2EphPct	0.14	-0.06	0.21	0.14	0.05	0.02	0.08	0.25	-0.15	-0.61	0.05	-0.21	
Hyd2EPTPct	-0.02	-0.03	0.01	-0.12	0.03	0.00	-0.02	0.10	0.08	-0.03	0.05	0.08	
Hyd2TriPct	0.05	0.03	0.06	0.02	0.11	0.18	0.04	0.16	-0.02	0.04	-0.02	-0.15	
CllctPct	0.20	0.13	0.16	0.23	0.17	0.29	0.14	0.17	-0.28	-0.24	-0.23	-0.48	-0.03
FiltrPct	0.00	-0.03	-0.03	-0.11	0.05	0.10	0.02	0.07	0.00	-0.14	-0.05	0.26	0.28
PredPct	-0.15	-0.33	-0.15	-0.26	-0.02	-0.06	-0.06	-0.10	-0.03	0.14	-0.11	0.10	-0.14
ScrapPct	-0.18	-0.03	-0.11	-0.17	-0.23	-0.30	-0.18	-0.23	0.16	0.09	0.14	0.35	-0.14
ShredPct	-0.23	-0.29	-0.24	-0.12	-0.08	0.17	-0.12	0.05	-0.08	0.26	-0.20	-0.05	-0.01
CllctTax	-0.03	-0.21	-0.08	0.08	0.06	0.18	0.00	-0.01	-0.08	-0.06	-0.14	0.08	-0.18
FiltrTax	-0.02	-0.04	-0.16	0.09	0.12	-0.06	0.07	0.15	0.04	-0.07	0.04	0.10	0.04
PredTax	-0.23	-0.44	-0.15	-0.25	-0.04	0.02	-0.08	-0.14	-0.11	-0.12	-0.09	-0.06	-0.25

NMED EXHIBIT 25

	TN				TP				Benthic Chlorophyll				Sestonic
	All Sites	Flat	Moderate	Steep	All Sites	High Volc	Flat	Steep	All Sites	High Volc	TP Flat	TP Steep	All Sites
ScrapTax	-0.20	-0.23	-0.11	-0.03	-0.14	-0.26	-0.11	-0.22	0.17	-0.05	0.28	0.18	-0.25
ShredTax	-0.32	-0.30	-0.37	0.19	-0.07	-0.02	-0.14	0.16	-0.18	0.09	-0.25	-0.07	-0.17
BrrwrPct	0.12	0.20	0.01	-0.03	0.20	0.06	0.28	0.00	-0.14	-0.29	-0.12	-0.02	0.14
ClmbrPct	-0.02	-0.04	-0.03	-0.23	-0.02	-0.09	-0.05	0.13	-0.07	0.03	-0.14	0.01	0.17
ClngrPct	-0.19	-0.13	-0.10	-0.28	-0.07	-0.18	-0.04	0.04	-0.08	-0.29	0.04	-0.16	-0.22
SprwlPct	0.06	-0.27	0.06	0.09	0.03	0.27	-0.02	0.03	-0.02	0.15	-0.17	0.08	-0.14
SwmmrPct	0.04	-0.21	0.12	0.26	0.02	0.11	0.01	0.04	0.09	0.11	0.06	0.12	0.04
BrrwrTax	0.04	0.05	-0.04	0.07	0.12	0.01	0.14	0.09	-0.11	-0.10	-0.16	0.04	0.10
ClmbrTax	-0.01	-0.13	-0.03	-0.11	0.06	-0.20	0.02	0.11	-0.08	-0.14	-0.08	0.08	0.03
ClngrTax	-0.35	-0.40	-0.29	-0.14	-0.05	-0.22	-0.08	-0.13	0.04	0.07	0.10	0.02	-0.34
SprwlTax	0.00	-0.28	0.01	0.05	0.03	0.23	-0.06	0.03	-0.05	-0.10	-0.08	0.11	-0.32
SwmmrTax	-0.10	-0.40	-0.09	0.14	-0.03	0.07	-0.19	-0.08	0.03	0.05	0.02	0.07	-0.11
HSMMCI*	-0.25	-0.68	-0.32	0.19	-0.16		-0.10	-0.05			0.02	0.41	

NM_BenthicMetrics, MD pairwise deleted, Include condition: ValidSamp='Yes'.
* Correlations with the high small index were limited to high small sites only.

NMED EXHIBIT 25

Variability introduced by sample collection method might result in some weaker correlation coefficients. Therefore, the Spearman correlation analysis was run within method-based subsets and within site classes. Canton Hess, Jacobi Hess, and Surber methods were grouped because they were all based on a delimited area of substrate in flowing water. Kicknet and Targeted Riffle samples were not combined, though they are conceptually similar techniques. Reachwide samples were also analyzed as a separate group. Sample sizes were too small for reliable analyses in some site classes (e.g., all but reachwide methods in the WestFlat class) (Table J-3). The correlations for the method and site class subsets were weaker than correlations for data sets with combined methods. Considerable overlap was apparent for samples with different methods in plots of nutrients and metrics (Figures J-1 and J-2). Therefore, the data were analyzed with all methods pooled.

Table J-3. Sample size for benthic macroinvertebrate analysis.

Site Class	Canton Hess	Jacobi Hess	Surber	Kicknet	Reachwide	Targeted Riffle	Unknown
EFltWStp	47	24	4	60	103	27	8
EastSteep	15	22	4	27	21	6	1
WestFlat	5	3	0	7	43	7	0
Flat	12	5	1	9	52	7	2
Moderate	41	26	2	61	93	27	6
Steep	14	18	5	24	24	6	1

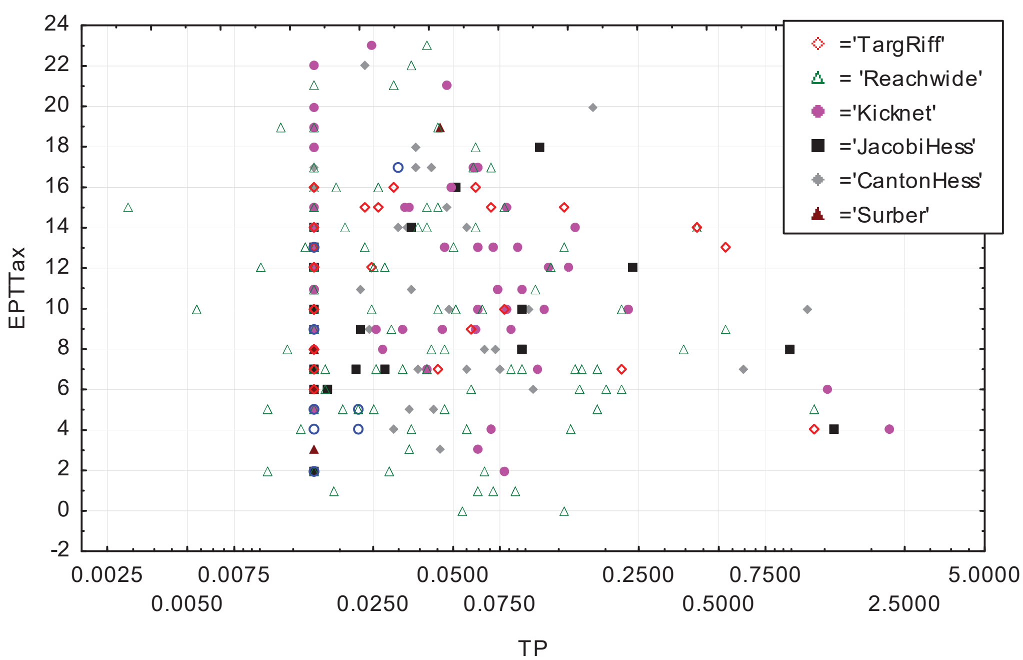

Figure J-1. Relationship between TP and EPT taxa in the EastFlat –WestSteep sites, showing macroinvertebrate sampling methods.

NMED EXHIBIT 25

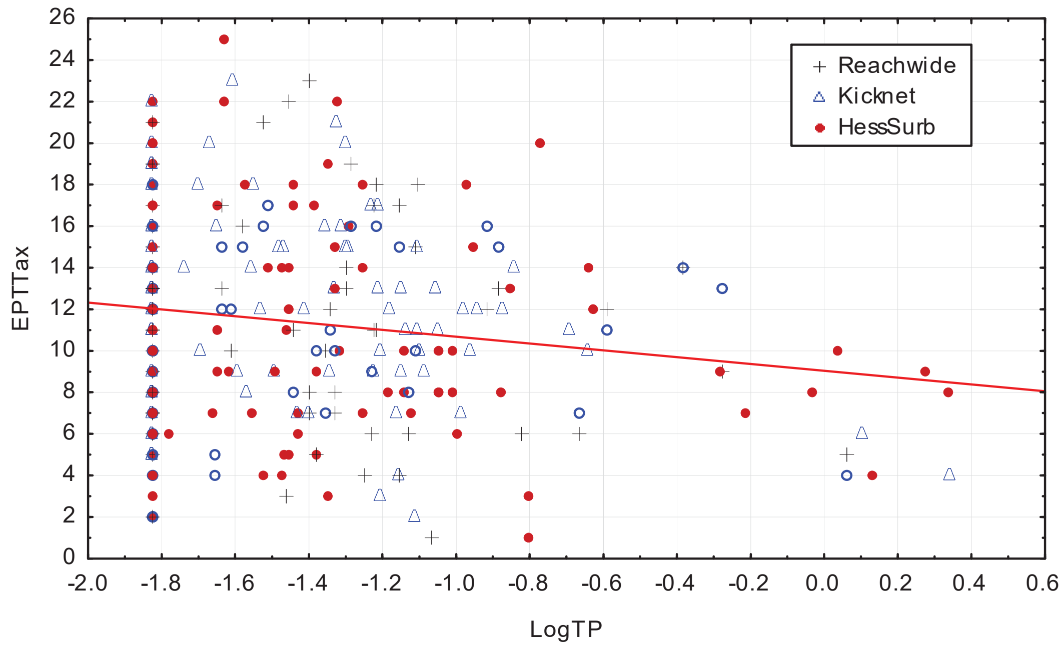

Figure J-2. Relationship between EPT richness and TP, showing collection methods (NMED data).

NMED EXHIBIT 25

Table J-4. TP Spearman correlation coefficients for selected metrics within site classes and methods.

TPSiteClass	High-Volcanic				Flat-Moderate				Steep			
Method / Metric	REACHWIDE	CantJacoSurb	KICKNET	TargRiff	REACHWIDE	CantJacoSurb	KICKNET	TargRiff	REACHWIDE	CantJacoSurb	KICKNET	TargRiff
TotalTax	-0.25	0.06	-0.07	-0.40	-0.22	-0.19	0.08	0.28	-0.04	-0.08	0.00	0.51
InsectTax	-0.12	0.04	-0.03	-0.30	-0.05	-0.18	-0.01	0.24	0.07	-0.13	0.04	0.27
EPTTax	-0.35	-0.11	-0.52	-0.08	-0.16	-0.13	-0.31	0.05	-0.01	-0.14	-0.13	0.10
EphemTax	-0.22	0.19	-0.33	-0.25	-0.10	-0.22	-0.39	-0.05	0.06	-0.01	-0.29	0.07
PlecoTax	-0.02	-0.13	-0.20	0.25	-0.09	-0.05	-0.21	-0.22	0.15	0.07	-0.15	-0.22
TrichTax	-0.37	-0.29	-0.28	-0.23	-0.14	0.03	-0.21	0.26	-0.19	-0.22	0.17	0.16
ChiroTax	0.17	0.16	0.33	0.10	0.05	-0.24	0.30	0.50	0.04	-0.24	0.27	0.78
Shan_2	-0.45	-0.02	-0.08	-0.09	-0.16	-0.12	0.06	0.19	-0.14	-0.10	0.24	0.17
BeckBI	-0.18	-0.19	-0.61	-0.36	-0.12	-0.05	-0.28	0.03	-0.52	-0.13	-0.13	0.27
HBI	-0.22	0.15	0.27	0.10	0.05	-0.14	0.21	0.22	0.00	0.27	0.27	0.85
TolerPct	-0.15	0.49	0.09	0.14	0.03	-0.18	0.43	0.32	-0.41	0.18	0.18	0.10
IntolTax	-0.35	-0.21	-0.51	0.02	-0.08	-0.05	-0.24	-0.04	-0.04	-0.09	-0.10	-0.02
PlecoPct	-0.10	0.09	0.04	0.15	-0.01	0.11	-0.18	-0.15	-0.04	-0.04	-0.03	-0.78
TrichPct	-0.02	0.25	0.17	0.33	-0.05	0.03	0.24	-0.08	0.03	0.01	0.13	-0.78
NonInPct	0.00	0.10	-0.17	0.15	-0.10	0.00	-0.15	-0.32	0.26	0.12	-0.14	-0.10
ChiroPct	-0.19	-0.33	-0.29	0.10	-0.04	0.05	-0.46	0.13	-0.07	-0.37	0.07	-0.37
ColeoPct	0.19	0.19	-0.06	-0.09	-0.09	-0.09	0.34	0.15	-0.22	0.12	0.17	0.51
DipPct	0.26	0.18	0.42	0.15	0.11	-0.21	0.27	0.59	0.01	-0.11	0.22	0.03
GastrPct	-0.55	-0.08	-0.32	-0.84	-0.22	0.12	-0.18	-0.38	-0.60	-0.29	-0.05	-0.54
OdonPct	-0.11	-0.07	0.31	0.04	-0.09	-0.14	0.22	0.23	0.59	0.11	0.07	0.78
OligoPct	-0.45	-0.05	0.04	-0.41	-0.22	-0.23	-0.14	-0.07	-0.28	0.23	-0.06	0.50
CllctPct	-0.25	-0.05	-0.06	-0.38	-0.10	-0.14	0.28	-0.13	0.35	0.15	-0.08	0.22
FiltrPct	-0.11	0.25	-0.08	-0.29	0.02	0.12	0.29	0.44	0.44	0.54	0.41	0.90
ScrapPct	0.30	0.19	0.49	0.28	0.04	0.13	0.43	0.15	0.01	0.31	0.29	0.07
ShredPct	0.29	-0.17	-0.11	0.31	0.20	-0.01	-0.35	-0.15	0.18	-0.05	0.15	0.03
FiltrTax	-0.16	0.11	-0.27	0.28	-0.05	-0.21	0.26	-0.05	-0.21	-0.06	-0.21	-0.07
ScrapTax	-0.25	-0.07	-0.47	-0.47	-0.22	0.02	-0.50	-0.14	-0.08	-0.54	-0.05	-0.78
ShredTax	0.04	0.41	0.31	0.14	-0.02	-0.25	-0.17	-0.11	0.03	0.24	-0.37	0.78
BrrwrPct	0.19	0.24	0.35	-0.08	-0.11	-0.09	0.10	0.29	-0.10	-0.09	0.28	0.68
ClngrPct	0.04	-0.21	-0.16	0.09	0.09	-0.06	-0.07	0.24	0.34	-0.12	0.22	0.22
SwmmrPct	-0.14	0.16	0.18	0.01	-0.19	-0.10	0.03	0.22	-0.29	-0.02	-0.26	0.51
BrrwrTax	-0.30	0.00	-0.51	-0.30	-0.22	-0.05	-0.22	0.08	-0.34	-0.35	-0.14	-0.19
ClmbrTax	-0.15	0.13	0.35	-0.29	-0.21	-0.12	-0.19	-0.05	0.06	0.27	0.04	-0.07
ClngrTax	0.17	0.17	0.01	-0.42	0.21	0.25	0.46	0.75	-0.17	0.35	-0.17	0.37
SprwlTax	-0.36	-0.05	0.42	-0.41	-0.05	-0.28	0.00	0.17	-0.04	0.23	0.20	0.44
HSMMCI	-0.11	-0.20	-0.26	-0.04	-0.03	0.12	-0.25	-0.34	0.46	-0.19	-0.18	0.07

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Table J-5. TN Spearman correlation coefficients for selected metrics within site classes and methods.

TNSiteClass	TN Flat				TN Moderate				TN Steep			
Method / Metric	REACHWIDE	CantJacoSurb	KICKNET	TargRiff	REACHWIDE	CantJacoSurb	KICKNET	TargRiff	REACHWIDE	CantJacoSurb	KICKNET	TargRiff
TotalTax	-0.46	-0.38	-0.32	0.07	-0.32	-0.22	0.05	-0.08	0.24	0.18	0.06	-0.93
InsectTax	-0.23	-0.60	-0.45	0.16	-0.28	-0.23	0.01	-0.15	0.18	0.15	0.17	-0.52
EPTTax	-0.38	-0.37	-0.24	-0.41	-0.30	-0.37	-0.40	-0.30	-0.17	0.08	0.18	-0.49
EphemTax	-0.34	-0.11	-0.41	0.00	-0.31	-0.16	-0.30	-0.34	0.02	0.16	0.05	-0.60
PlecoTax	-0.30	-0.22	-0.40	0.18	-0.08	-0.25	-0.39	-0.27	-0.42	0.24	0.12	-0.03
TrichTax	-0.31	-0.33	0.15	-0.65	-0.20	-0.34	-0.09	0.15	0.21	-0.19	0.21	-0.53
ChiroTax	-0.17	-0.23	-0.14	0.37	0.03	-0.02	0.31	0.00	0.31	0.06	0.25	0.31
Shan_2	-0.26	-0.09	-0.34	-0.50	0.04	-0.21	-0.03	0.13	0.31	0.02	0.25	-0.89
BeckBI	-0.55	-0.31	-0.30	-0.21	-0.36	-0.30	-0.53	-0.16	0.17	0.05	0.20	-0.43
HBI	0.56	0.22	-0.17	0.57	0.23	0.09	0.41	0.19	0.19	0.03	-0.02	-0.43
TolerPct	0.22	-0.07	-0.15	0.29	0.02	-0.04	0.32	0.39	-0.02	0.10	0.06	-0.49
IntolTax	-0.29	-0.29	-0.24	-0.18	-0.31	-0.29	-0.45	-0.15	-0.46	0.06	0.17	-0.46
EPTPct	-0.46	0.17	0.02	-0.71	-0.03	0.00	-0.21	-0.29	-0.12	0.17	0.22	0.14
EphemPct	-0.52	0.32	-0.10	-0.11	-0.03	0.15	0.04	-0.39	0.00	0.38	0.34	0.14
PlecoPct	-0.32	-0.24	-0.40	0.18	-0.08	-0.18	-0.33	-0.36	-0.17	0.23	-0.01	0.17
TrichPct	-0.17	-0.04	0.24	-0.75	-0.05	-0.12	-0.20	0.19	-0.17	-0.43	0.01	-0.26
NonInPct	0.04	0.37	0.20	-0.07	-0.08	-0.11	0.28	0.38	-0.10	0.18	0.11	-0.60
ChiroPct	0.21	-0.06	-0.38	0.29	-0.04	-0.11	0.34	0.14	-0.12	-0.10	0.17	-0.43
ColeoPct	-0.38	-0.13	0.30	-0.79	-0.14	0.12	-0.40	0.21	0.05	-0.18	-0.25	-0.43
DipPct	0.31	0.05	-0.58	0.89	0.18	-0.06	0.27	-0.10	-0.03	0.09	0.00	0.03
CllctPct	0.05	0.19	0.23	0.71	0.09	0.29	0.26	-0.08	0.04	0.43	0.24	0.14
FiltrPct	0.04	-0.17	-0.09	-0.79	0.00	0.01	-0.13	0.15	-0.12	-0.24	0.08	-0.60
PredPct	-0.34	-0.28	-0.35	-0.43	-0.25	-0.10	0.08	0.05	-0.51	0.03	-0.06	-0.31
ScrapPct	-0.07	0.04	0.08	-0.64	-0.10	-0.05	-0.35	0.12	-0.13	-0.33	-0.10	-0.03
ShredPct	-0.23	-0.29	-0.76	-0.50	-0.16	-0.27	-0.27	-0.19	-0.10	0.07	-0.30	0.14
CllctTax	-0.31	-0.23	-0.52	0.49	-0.28	0.08	0.16	-0.04	0.02	0.10	0.23	0.32
FiltrTax	-0.08	-0.18	0.27	-0.30	-0.07	-0.29	-0.02	-0.01	0.11	-0.12	0.46	-0.17
PredTax	-0.55	-0.34	-0.40	-0.32	-0.28	-0.17	0.16	0.22	-0.48	0.16	-0.25	-0.52
ScrapTax	-0.26	-0.07	-0.01	-0.68	-0.09	-0.26	-0.12	0.32	-0.14	-0.06	0.06	-0.44
ShredTax	-0.39	-0.47	-0.37	-0.32	-0.35	-0.23	-0.42	-0.41	0.33	0.33	-0.03	0.33
BrrwrPct	0.33	0.20	-0.03	0.96	0.00	0.03	0.09	0.28	-0.20	0.09	0.02	0.60
ClngrPct	-0.25	-0.10	-0.23	-0.29	-0.14	0.01	-0.29	-0.09	-0.45	-0.32	-0.18	0.20
SprwlPct	-0.28	-0.28	-0.28	0.18	0.03	0.11	0.21	0.07	0.17	0.48	-0.07	0.60
BrrwrTax	0.17	0.11	-0.38	0.86	-0.01	0.03	-0.01	0.12	0.09	0.18	0.00	0.00
ClngrTax	-0.56	-0.31	-0.22	-0.74	-0.35	-0.25	-0.16	-0.04	-0.19	-0.15	0.15	-0.64
SprwlTax	-0.44	-0.27	-0.19	0.31	-0.22	0.01	0.35	0.03	-0.09	0.25	0.06	0.03
SwmmrTax	-0.36	-0.41	-0.53	-0.81	-0.13	-0.11	0.01	-0.15	0.35	0.12	-0.20	0.88

Table J-6. Benthic chlorophyll Spearman correlation coefficients for selected macroinvertebrate metrics within site classes and methods.

TPSiteClass	High-Volcanic				Flat-Moderate				Steep			
Method / Metric	REACHWIDE	CantJacoSurb	KICKNET	TargRiff	REACHWIDE	CantJacoSurb	KICKNET	TargRiff	REACHWIDE	CantJacoSurb	KICKNET	TargRiff
TotalTax	0.22	0.43	-0.10	0.18	0.27	0.34	0.34	0.08	0.22	0.03	0.05	0.50
InsectTax	0.29	0.49	-0.12	0.07	0.13	0.26	0.33	0.01	0.80	0.25	0.10	0.50
EPTTax	0.41	0.71	-0.70	0.52	0.06	0.11	0.03	-0.04	-0.08	-0.24	-0.12	0.50
ChiroTax	-0.18	0.36	0.47	0.16	0.07	0.42	0.47	-0.11	0.21	0.50	0.18	-0.50
Shan_2	0.48	0.31	0.12	0.50	0.51	0.22	0.55	0.04	0.13	0.02	-0.13	1.00
IntolTax	-0.01	0.35	-0.59	0.71	-0.13	-0.14	0.28	-0.19	-0.12	-0.36	-0.41	0.00
PlecoPct	-0.20	0.26	-0.03	-0.11	-0.01	-0.32	0.12	-0.33	-0.78	-0.44	-0.33	-1.00
TrichPct	0.66	0.50	-0.54	0.71	0.09	0.32	0.09	0.31	0.38	0.59	0.38	1.00
OdonPct	0.04	-0.29	-0.27	-0.22	0.45	-0.04	-0.17	0.51	0.40	-0.02	-0.14	0.87
FiltrPct	-0.02	0.14	-0.77	0.64	-0.33	0.19	0.17	0.01	0.03	0.54	0.38	-0.50
PredPct	0.46	-0.05	-0.18	0.29	-0.05	-0.15	0.53	0.00	0.38	-0.10	-0.07	1.00
ShredPct	0.34	-0.05	0.80	0.21	-0.50	0.17	0.15	-0.20	0.03	-0.23	0.48	-0.50
ScrapTax	-0.12	0.14	-0.50	0.33	0.33	0.34	0.09	0.30	0.13	0.18	-0.60	1.00
ClmbrTax	-0.04	-0.59	0.27	-0.62	-0.10	0.28	0.10	-0.10	0.63	-0.30	0.14	0.50
SwmmrTax	0.30	-0.32	-0.27	0.35	0.29	-0.19	-0.10	-0.18	0.03	0.13	0.82	
HSMMCI			-0.30		-0.94	0.60		-0.71		1.00		

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Table J-7. Summary/interpretation of benthic macroinvertebrate responses to nutrients and chlorophyll – all site classes combined, by macroinvertebrate sample collection method.

	TP				TN				Chlorophyll				DO			
	RW	KN	TR	HS	RW	KN	TR	HS	RW	KN	TR	HS	Pr	GPP	Rp	min
TotalTax	-	+	+	-	—	+	-	—	+	+	+	+	+	-	+	+
EPTTax	-	—	+	-	—	—	—	—	+	-	+	+	-	-	+++	+++
EphemTax	-	-	+	-	—	—	—	-	-	-	-	+	-	-	+++	+++
PlecoTax	—	—	-	-	—	—	-	—	-	+	-	—	—	-	+++	+++
TrichTax	-	-	+	-	—	-	-	—	+	-	+++	+	-	+	+	+
Shan_2	—	+	+	-	—	+	-	—	+++	+	+	+	-	-	+	+
EPTPct	+	-	-	+	—	-	-	+	-	-	+	+	-	-	+	+
EphemPct	+	+	-	+	—	+	-	+	-	+	+	+	-	-	+	+
PlecoPct	-	—	-	-	—	—	-	-	-	+	---	-	—	—	+++	+++
TrichPct	-	—	+	-	—	-	+	-	+	-	+++	+++	+	+	-	-
NonInPct	-	+++	+	-	+	+++	+	+	+++	+	+++	-	+	+	-	-
IntolTax	-	—	-	-	—	—	-	—	—	-	+	-	—	—	+++	+++
TolerPct	-	+++	+	+	+++	+++	+	+	+++	+	+++	+	+++	+	—	—
CllctPct	+	+++	+	+++	+	+++	+	+++	-	+	-	-	-	-	+	+
ScrapPct	—	—	-	-	—	—	+	-	+	-	+	+	+	+	+	-
ShredPct	+	—	+	-	-	—	—	—	—	+++	-	+	—	-	+	+
ShredTax	-	-	+	-	—	—	—	—	-	+	-	-	—	—	+++	+++
BrrwrPct	+	+++	+++	+++	+++	+	+	+	-	-	+	-	+	+	-	-
ClngrPct	+	—	-	-	—	—	-	-	—	-	+	+	-	-	+	+

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Appendix K Regression Interpolation

Table K-1. Regression equations for interpolating candidate TP thresholds from diatom metrics. The x and y axes are log10 nutrient concentrations and diatom metrics, respectively.

LogTP	TPClass	TP High-Volcanic	TP Flat-Moderate	TP Steep
wa_OptCat_DisTotMMI				
y = 10.0781 + 6.416*x;	Metric ref75th	1.220	5.113	0.111
r = 0.3097, p = 0.00001; r2 = 0.0959	Interp TP	0.042	0.168	0.028
wa_OptCat_L1DisTot				
y = 1.315 + 0.2154*x;	Metric ref75th	0.967	1.219	0.979
r = 0.2423, p = 0.0006; r2 = 0.0587	Interp TP	0.024	0.358	0.027
wa_OptCat_L1Ptl				
y = 3.8471 + 0.3727*x;	Metric ref75th	3.412	3.535	3.275
r = 0.3817, p = 0.00000; r2 = 0.1457	Interp TP	0.068	0.145	0.029
wa_OptCat_LNtl				
y = 5.815 + 0.219*x;	Metric ref75th	5.470	5.675	5.465
r = 0.2767, p = 0.00008; r2 = 0.0766	Interp TP	0.057	0.311	0.054
wa_OptCat_NutMMI				
y = 11.3888 + 7.1011*x;	Metric ref75th	1.970	6.320	0.072
r = 0.3368, p = 0.00000; r2 = 0.1134	Interp TP	0.047	0.193	0.025
pi_NAWQA_TN_1				
y = 51.8677 + 16.0564*x;	Metric ref75th	46.400	37.600	19.717
r = 0.3622, p = 0.00000; r2 = 0.1312	Interp TP	0.457	0.129	0.010
pi_Ptpv_TP_all_Hi				
y = 44.4493 + 17.4269*x;	Metric ref75th	25.600	30.200	10.636
r = 0.4082, p = 0.00000; r2 = 0.1666	Interp TP	0.083	0.152	0.011
x_Shan_e				
y = 3.0411 + 0.2395*x;	Metric ref75th	3.273	3.247	2.581
r = 0.1623, p = 0.0227; r2 = 0.0264	Interp TP	9.272	7.272	0.012
	Max TP in site class	0.22	1.82	0.12

Table J-2. Regression equations for interpolating candidate TN Thresholds from diatom metrics. The x and y axes are log10 nutrient concentrations and diatom metrics, respectively.

LogTN	TNClass	Flat	Moderate	Steep
wa_OptCat_DisTotMMI				
y = 4.797 + 8.0487*x;	Metric ref75th	12.965	1.202	-1.058
r = 0.3495, p = 0.00000; r2 = 0.1222	Interp TN	10.348	0.358	0.187
wa_OptCat_L1DisTot				
y = 1.1728 + 0.3427*x;	Metric ref75th	1.605	0.993	0.925
r = 0.3470, p = 0.00000; r2 = 0.1204	Interp TN	18.260	0.299	0.189
wa_OptCat_L1Ptl				
y = 3.4775 + 0.3385*x;	Metric ref75th	3.773	3.353	3.298
r = 0.3107, p = 0.00001; r2 = 0.0965	Interp TN	7.449	0.430	0.294
wa_OptCat_LNtl				
y = 5.6551 + 0.3166*x;	Metric ref75th	5.978	5.503	5.416
r = 0.3599, p = 0.00000; r2 = 0.1295	Interp TN	10.487	0.330	0.176
wa_OptCat_NutMMI				
y = 5.1327 + 8.0596*x;	Metric ref75th	12.923	1.171	0.006
r = 0.3436, p = 0.00000; r2 = 0.1181	Interp TN	9.260	0.322	0.231
pi_NAWQA_TN_1				
y = 34.9485 + 12.9021*x;	Metric ref75th	36.333	43.200	44.311
r = 0.2595, p = 0.0002; r2 = 0.0673	Interp TN	1.280	4.361	5.317
pi_Ptpv_TP_all_Hi				
y = 28.5578 + 18.5995*x;	Metric ref75th	45.333	17.333	25.600
r = 0.3917, p = 0.00000; r2 = 0.1534	Interp TN	7.979	0.249	0.693
x_Shan_e				
y = 2.6258 - 0.1407*x;	Metric ref25th	2.576	2.454	1.893
r = -0.0850, p = 0.2312; r2 = 0.0072	Interp TN	2.264	16.633	>100,000
	Max TN in site class	3.44	2.63	0.75

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Table K-3. Regression equations for interpolating candidate TP Thresholds from macroinvertebrate metrics. The x and y axes are log10 nutrient concentrations and macroinvertebrate metrics, respectively.

	TPClass	TP High-Volcanic	TP Flat-Moderate	TP Steep
EPTTax				
y = 8.0624 - 2.0045*x;	Metric ref25th	10	7	10
r = -0.1784, p = 0.0002; r2 = 0.0318	Interp TP	0.11	3.39	0.11
EphemTax				
y = 3.9984 - 0.427*x; r = -0.0874, p = 0.0727;	Metric ref25th	4	3	4
r = -0.0874, p = 0.0727; r2 = 0.0076	Interp TP	1.00	211.63	1.00
PlecoTax				
y = 0.2028 - 0.9833*x;	Metric ref25th	0	0	1
r = -0.2123, p = 0.00001; r2 = 0.0451	Interp TP	1.61	1.61	0.15
IntolTax				
y = 3.8737 - 2.3646*x;	Metric ref25th	4	2	5
r = -0.2008, p = 0.00003; r2 = 0.0403	Interp TP	0.88	6.22	0.33
TolerPct				
y = 19.4567 + 3.3253*x;	Metric ref75th	17.3	21.1	13.6
r = 0.0868, p = 0.0746; r2 = 0.0075	Interp TP	0.22	3.11	0.02
EPTPct				
y = 43.7178 - 3.043*x;	Metric ref25th	29.2	39.1	26.4
r = -0.0547, p = 0.2639; r2 = 0.0030	Interp TP	59102.65	31.91	491758.14
PlecoPct				
y = 0.5496 - 2.2279*x;	Metric ref25th	0	0.0	0.8
r = -0.1344, p = 0.0056; r2 = 0.0181	Interp TP	1.74	1.74	0.80
NonInPct				
y = 13.8075 + 2.3764*x;	Metric ref75th	14.2	12.5	7.8
r = 0.0743, p = 0.1273; r2 = 0.0055	Interp TP	1.46	0.28	0.00
ShredTax				
y = 2.8879 - 0.5069*x;	Metric ref25th	2	2	3
r = -0.1069, p = 0.0279; r2 = 0.0114	Interp TP	56.47	56.47	0.60
ClngrPct				
y = 37.9857 - 5.6993*x;	Metric ref25th	31.6	34.0	39.7
r = -0.1200, p = 0.0136; r2 = 0.0144	Interp TP	13.22	5.01	0.50
	Max TP in site class	0.22	1.82	0.12

NMED EXHIBIT 25

Table K-4. Regression equations for interpolating candidate TN Thresholds from macroinvertebrate metrics. The x and y axes are log10 nutrient concentrations and macroinvertebrate metrics, respectively.

	TN Class	Flat	Moderate	Steep
EPTTax				
y = 8.0307 - 5.3365*x	Metric ref25th	5	12	10
r = -0.389, p < 0.001, r2 = 0.151	Interp TN	3.70	0.18	0.43
EphemTax				
LogTN:EphemTax: y = 3.6345 - 1.7854*x;	Metric ref25th	3	4	4
r = -0.3001, p < 0.001, r2 = 0.0901	Interp TN	2.266	0.624	0.624
PlecoTax				
LogTN:PlecoTax: y = 0.7837 - 1.529*x;	Metric ref25th	0	0	0
r = -0.2720, p < 0.001, r2 = 0.0740	Interp TN	3.257	3.257	3.257
IntolTax				
LogTN:IntolTax: y = 4.648 - 4.8895*x;	Metric ref25th	2	6	5
r = -0.3418, p < 0.001, r2 = 0.1169	Interp TN	3.479	0.529	0.847
TolerPct				
LogTN:TolerPct: y = 21.6082 + 12.5247*x;	Metric ref75th	55.40984	14.8	15.5
r = 0.2647, p < 0.001, r2 = 0.0701	Interp TN	500.804	0.288	0.326
EPTPct				
LogTN:EPTPct: y = 40.9242 - 12.5266*x;	Metric ref25th	8.333333	51.9	24.2
r = -0.1832, p < 0.001, r2 = 0.0336	Interp TN	398.742	0.134	21.470
PlecoPct				
LogTN:PlecoPct: y = 1.3505 - 4.4002*x;	Metric ref25th	0	0.0	0
r = -0.2187, p < 0.001, r2 = 0.0478	Interp TN	0.493	0.493	0.493
NonInPct				
LogTN:NonInPct: y = 15.779 + 9.3338*x;	Metric ref75th	29.33	9.5	11.77346
r = 0.2289,p < 0.001, r2 = 0.0524	Interp TN	28.334	0.213	0.372
ShredTax				
LogTN:ShredTax: y = 2.6543 - 1.8224*x;	Metric ref25th	2	2	3
r = -0.3164, p < 0.001, r2 = 0.1001	Interp TN	2.276	2.276	0.642
ClngrPct				
LogTN:ClngrPct: y = 38.5364 - 13.685*x;	Metric ref25th	10.67	39.3	33.22508
r = -0.2341, p < 0.001, r2 = 0.0548	Interp TN	108.591	0.876	2.445
	Max TN in site class	3.44	2.63	0.75

Table K-5. Regression equations for interpolating candidate DO Thresholds from nutrient reference 90th quantiles.

	TP Class	High-Vol	TP Flat	TP Steep
DeltaDO by TN (Log-Log)				
y = -0.54 + 0.3119*x	TN ref 90th	0.69	0.42	0.30
r = 0.2300; p = 0.0090; r2 = 0.0529	Interpolated Delta DO	16.39	3.34	1.13
DeltaDO by TP (Log-Log)				
y = -1.5055 + 0.4782*x	TP ref 90th	0.105	0.061	0.030
r = 0.3254; p = 0.0002; r2 = 0.1059	Interpolated Delta DO	12.63	4.06	0.92
Prod4hr by TN (Log-Log)				
y = -0.2919 + 0.2568*x	TN ref 90th	0.69	0.42	0.30
r = 0.2427; p = 0.0062; r2 = 0.0589	Interpolated Prod4hr	3.23	0.47	0.13
Prod4hr by TP (Log-Log)				
y = -1.1191 + 0.3764*x	TP ref 90th	0.105	0.061	0.030
r = 0.3309; p = 0.0002; r2 = 0.1095	Interpolated Prod4hr	2.36	0.56	0.08

Appendix L Change-point graphs and evaluations

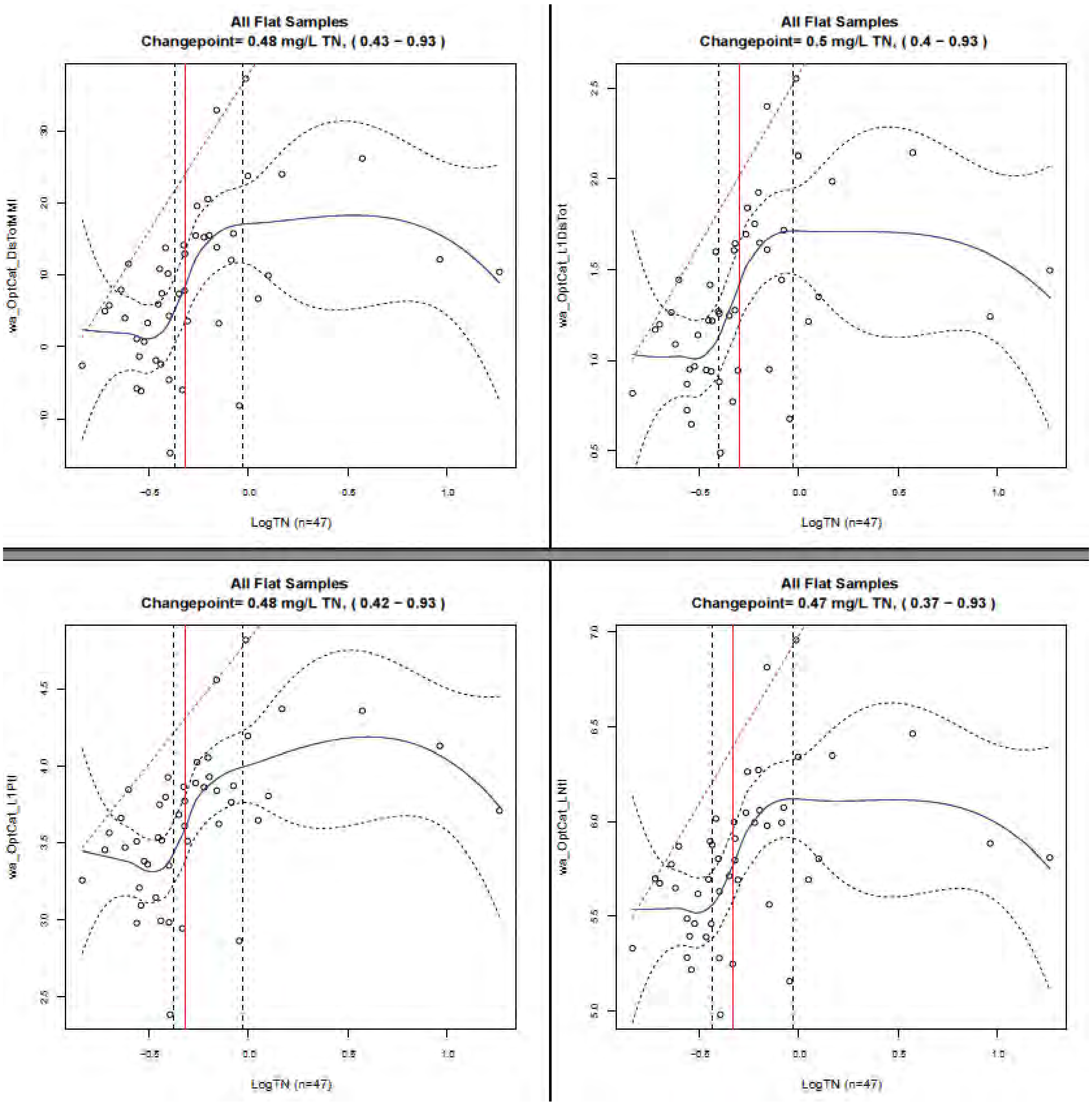

Figure L-1. Change-point graphs for **TN** and **diatom** metrics in the **Flat** site class.

Table L-1. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_DisTotMMI	0.48	Good	Narrrow	Midslope	Retain
wa_OptCat_L1DisTot	0.5	Good	Narrrow	Midslope	Retain
wa_OptCat_L1Ptl	0.48	Good	Narrrow	Midslope	Retain
wa_OptCat_LNtl	0.47	Good	Narrrow	Midslope	Retain

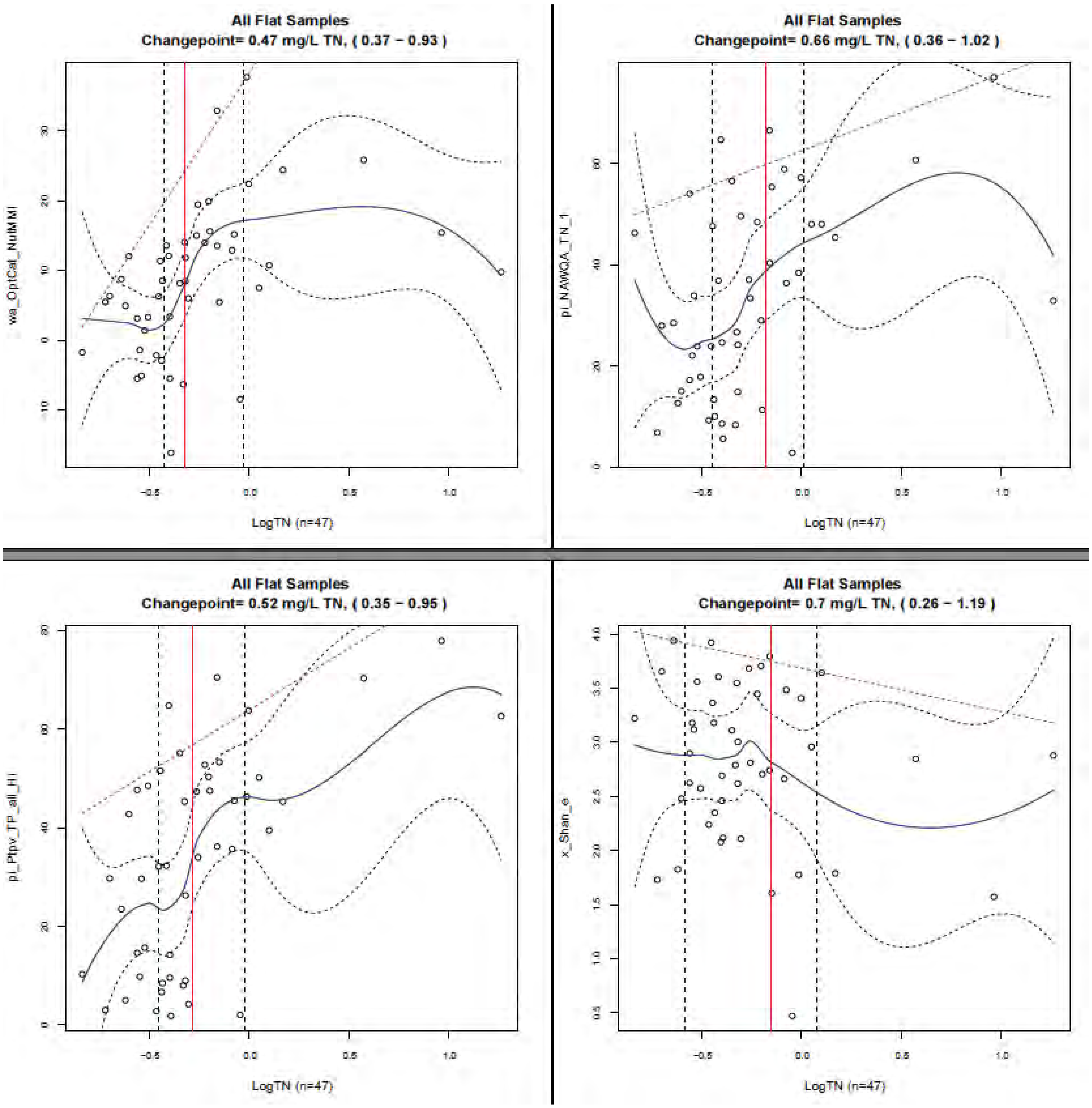

Figure L-2. Change-point graphs for **TN** and **diatom** metrics in the **Flat** site class.

Table L-2. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_NutMMI	0.47	Good	Narrrow	Midslope	Retain
pi_NAWQA_TN_1	0.66	Good	Narrrow	Midslope	Retain
pi_Ptpv_TP_all_Hi	0.52	Good	Narrrow	Midslope	Retain
x_Shan_e	0.7	Fair	Moderate	Midslope	Retain

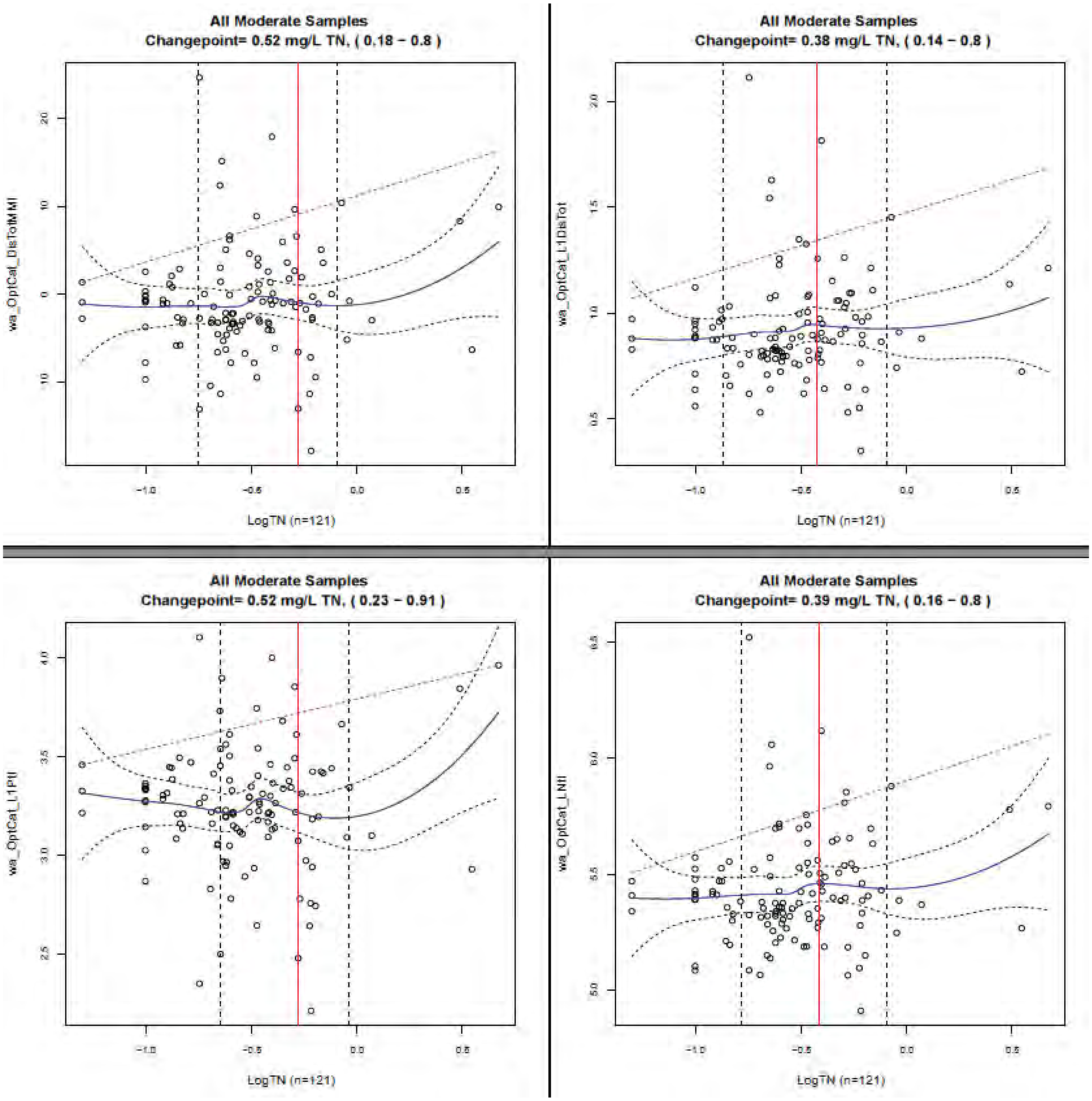

Figure L-3. Change-point graphs for **TN** and **diatom** metrics in the **Moderate** class.

Table L-3. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_DisTotMMI	0.52	Good	Moderate	Poor	Remove
wa_OptCat_L1DisTot	0.38	Good	Moderate	Fair	Retain
wa_OptCat_L1Ptl	0.52	Good	Moderate	Poor	Remove
wa_OptCat_LNtl	0.39	Good	Moderate	Fair	Retain

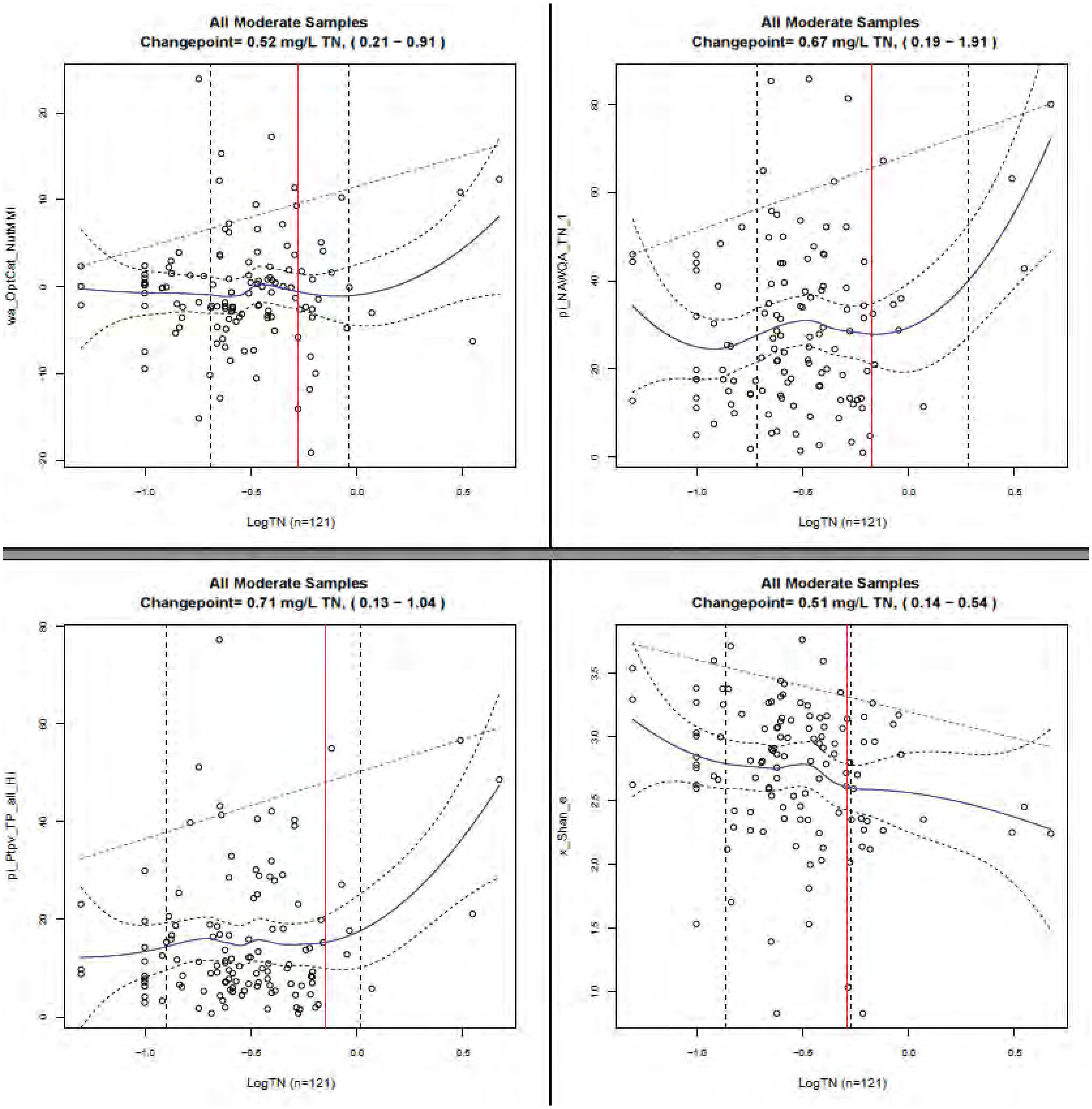

Figure L-4. Change-point graphs for **TN** and **diatom** metrics in the **Moderate** class.

Table L-4. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_NutMMI	0.52	Good	Moderate	Poor	Remove
pi_NAWQA_TN_1	0.67	Good	Wide	Poor	Remove
pi_Ptpv_TP_all_Hi	0.71	Good	Wide	Fair	Retain
x_Shan_e	0.51	Good	Moderate	Fair	Retain

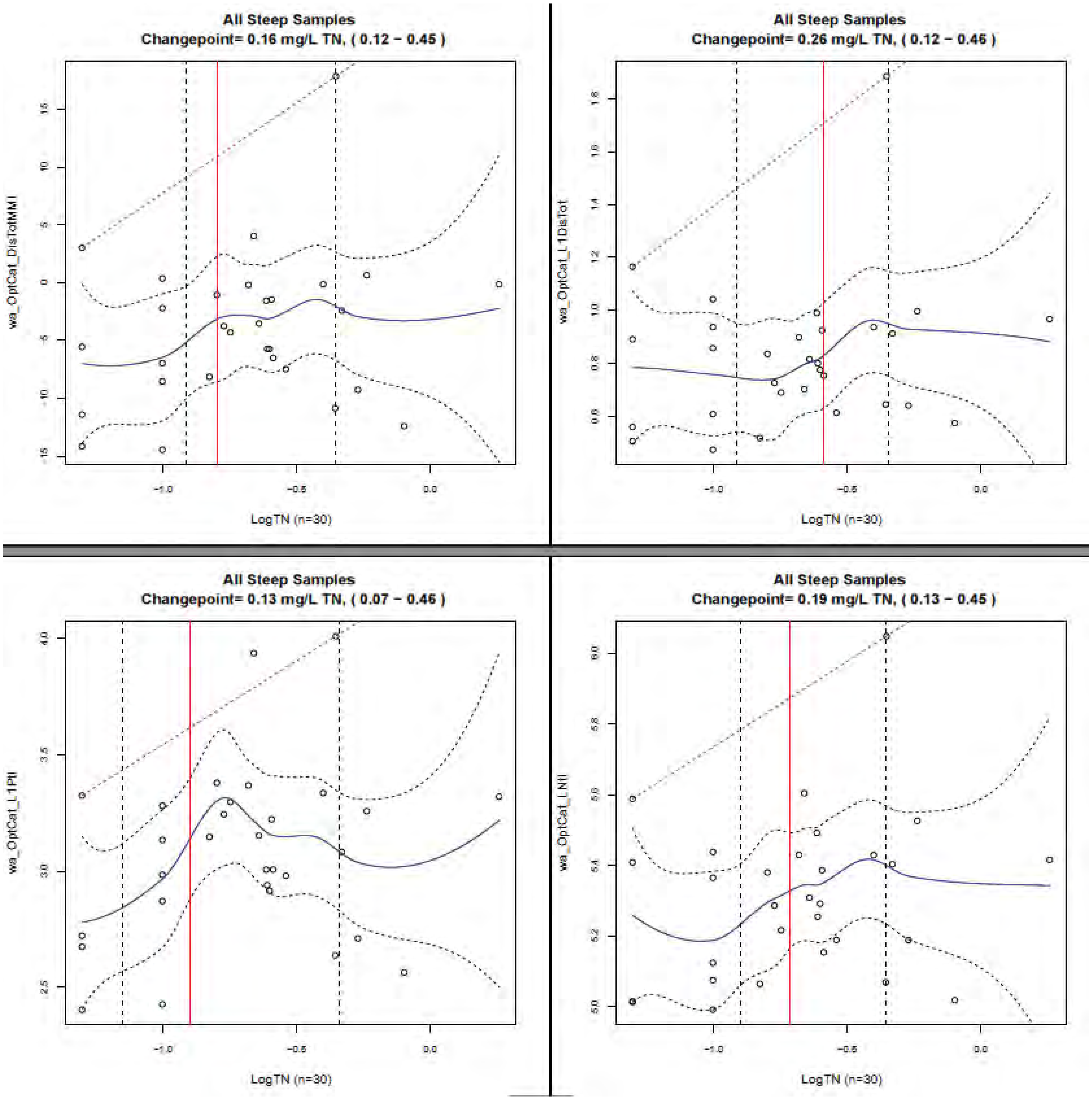

Figure L-5. Change-point graphs for **TN** and **diatom** metrics in the **Steep** class.

Table L-5. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_DisTotMMI	0.16	Good	Moderate	Topofslope	Retain
wa_OptCat_L1DisTot	0.26	Good	Moderate	Midslope	Retain
wa_OptCat_L1Ptl	0.13	Good	Wide	Midslope	Retain
wa_OptCat_LNtl	0.19	Good	Moderate	Midslope	Retain

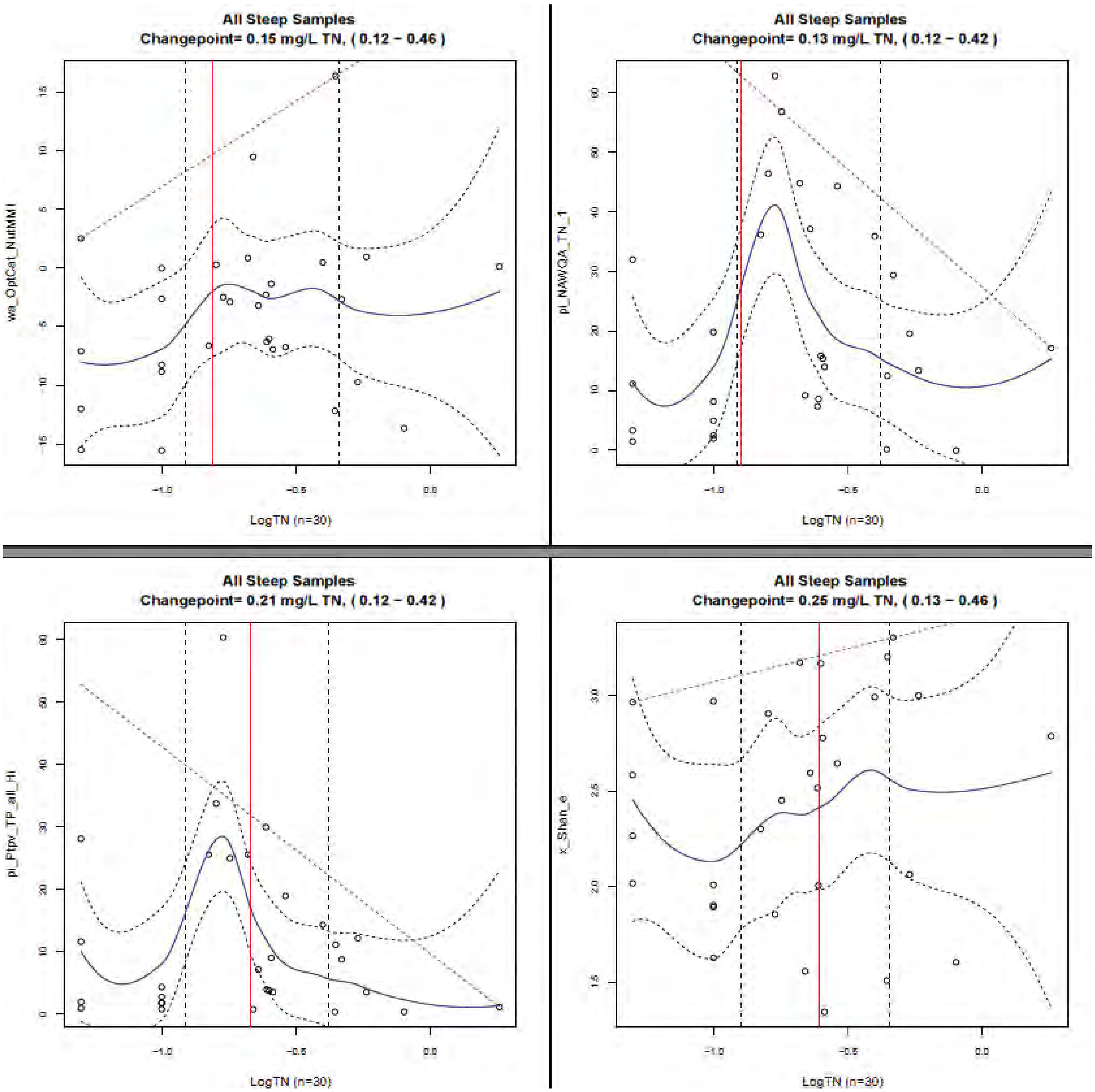

Figure L-6. Change-point graphs for **TN** and **diatom** metrics in the **Steep** class.

Table L-6. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_NutMMI	0.15	Good	Moderate	Topofslope	Retain
pi_NAWQA_TN_1	0.13	Decreaser	Moderate	Midslope	Remove
pi_Ptpv_TP_all_Hi	0.21	Decreaser	Moderate	Midslope	Remove
x_Shan_e	0.25	Increaser	Moderate	Midslope	Retain

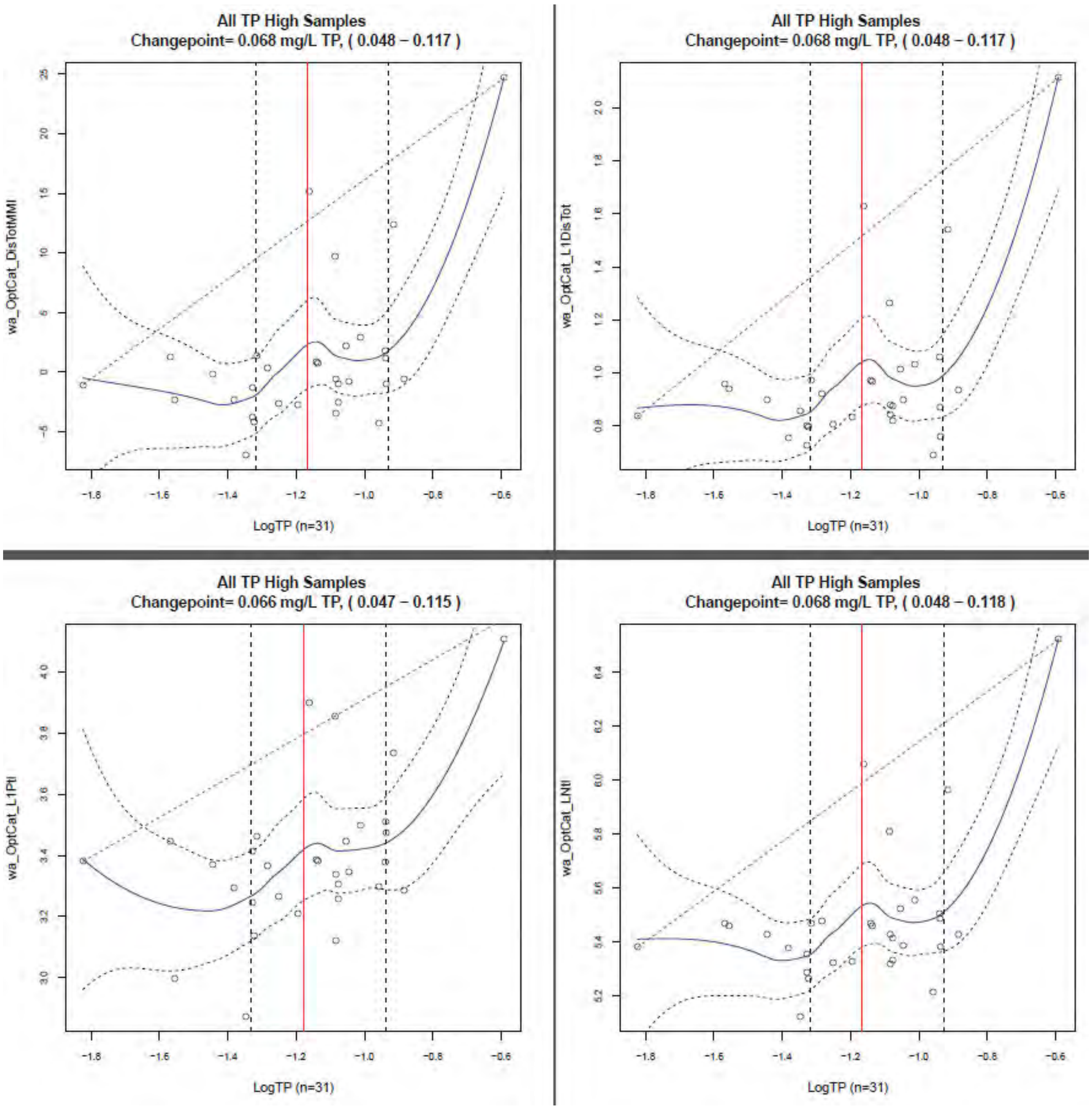

Figure L-7. Change-point graphs for **TP** and **diatom** metrics in the **TP High-Volcanic** class.

Table L-7. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_DisTotMMI	0.068	Good	Moderate	Topofslope	Retain
wa_OptCat_L1DisTot	0.068	Good	Moderate	Topofslope	Retain
wa_OptCat_L1Ptl	0.066	Good	Moderate	Topofslope	Retain
wa_OptCat_LNtl	0.068	Good	Moderate	Topofslope	Retain

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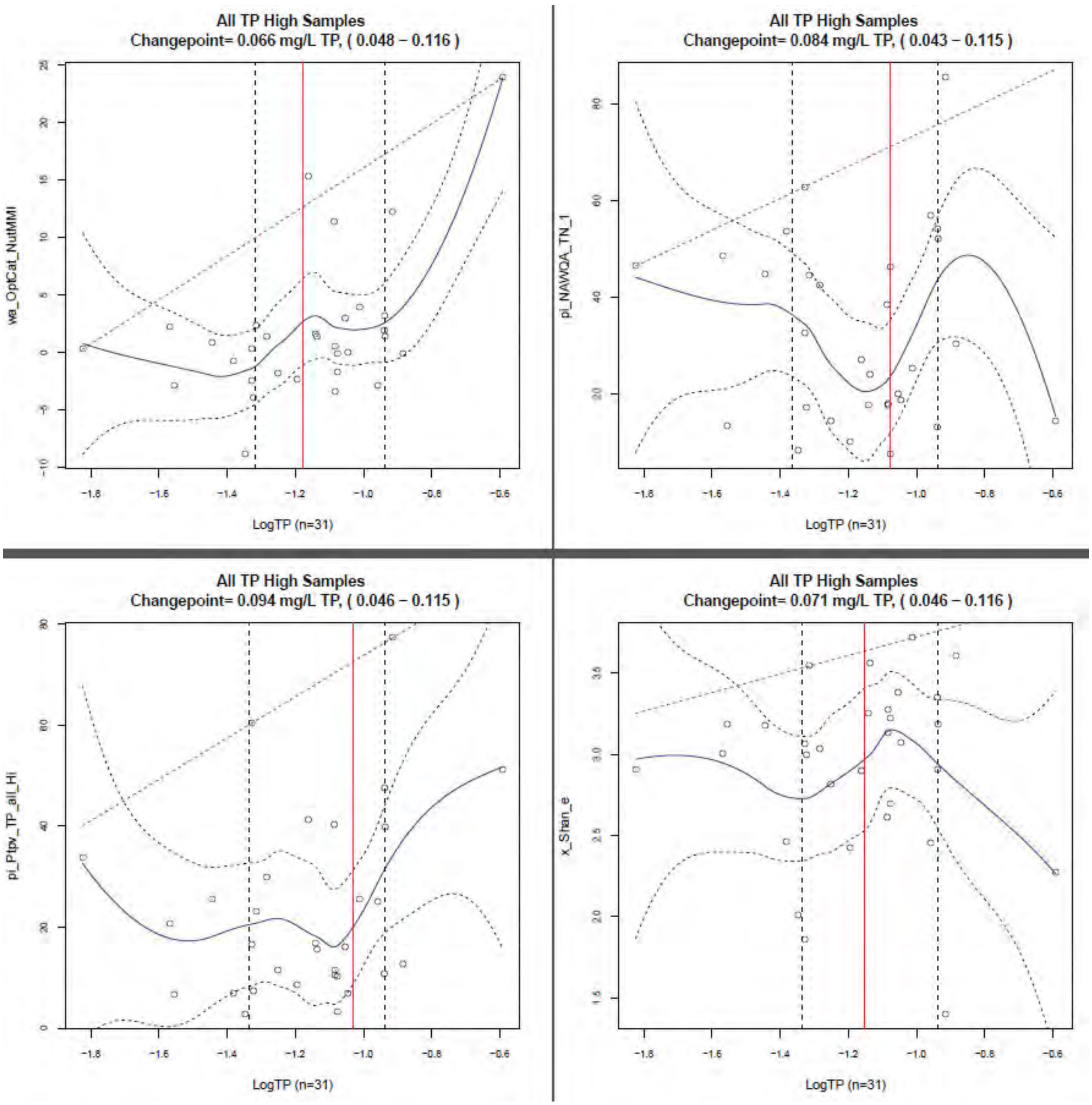

Figure L-8. Change-point graphs for **TP** and **diatom** metrics in the **WestFlat** class.

Table L-8. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_NutMMI	0.066	Good	Moderate	Topofslope	Retain
pi_NAWQA_TN_1	0.084	Good	Moderate	Inconsistent	Remove
pi_Ptpv_TP_all_Hi	0.094	Good	Moderate	Midslope	Retain
x_Shan_e	0.071	Good	Moderate	Midslope	Retain

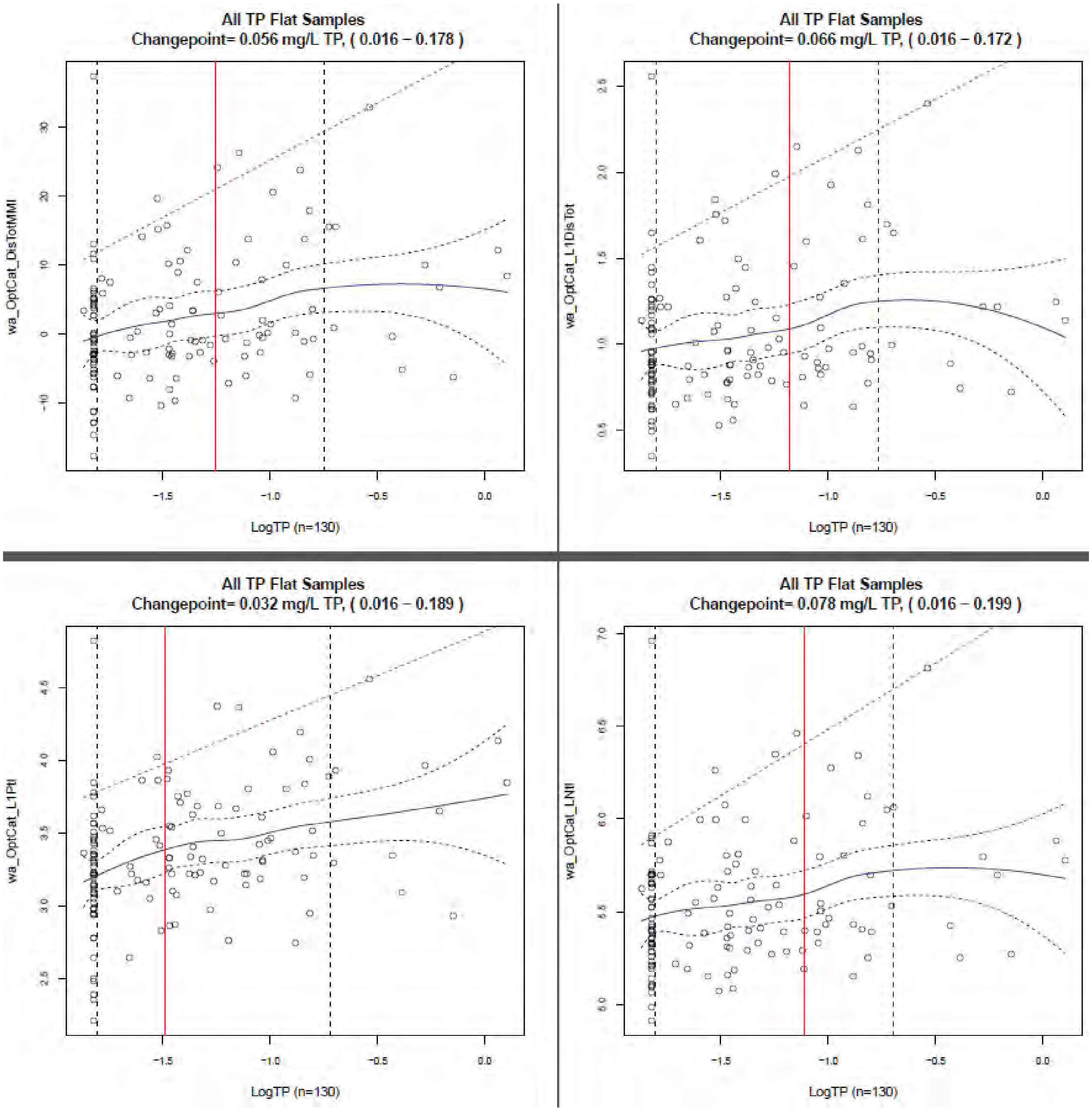

Figure L-9. Change-point graphs for **TP** and **diatom** metrics in the **TP Flat-Moderate** class.

Table L-9. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_DisTotMMI	0.056	Good	Wide	Midslope	Retain
wa_OptCat_L1DisTot	0.066	Good	Wide	Midslope	Retain
wa_OptCat_L1Ptl	0.032	Good	Wide	Midslope	Retain
wa_OptCat_LNtl	0.078	Good	Wide	Midslope	Retain

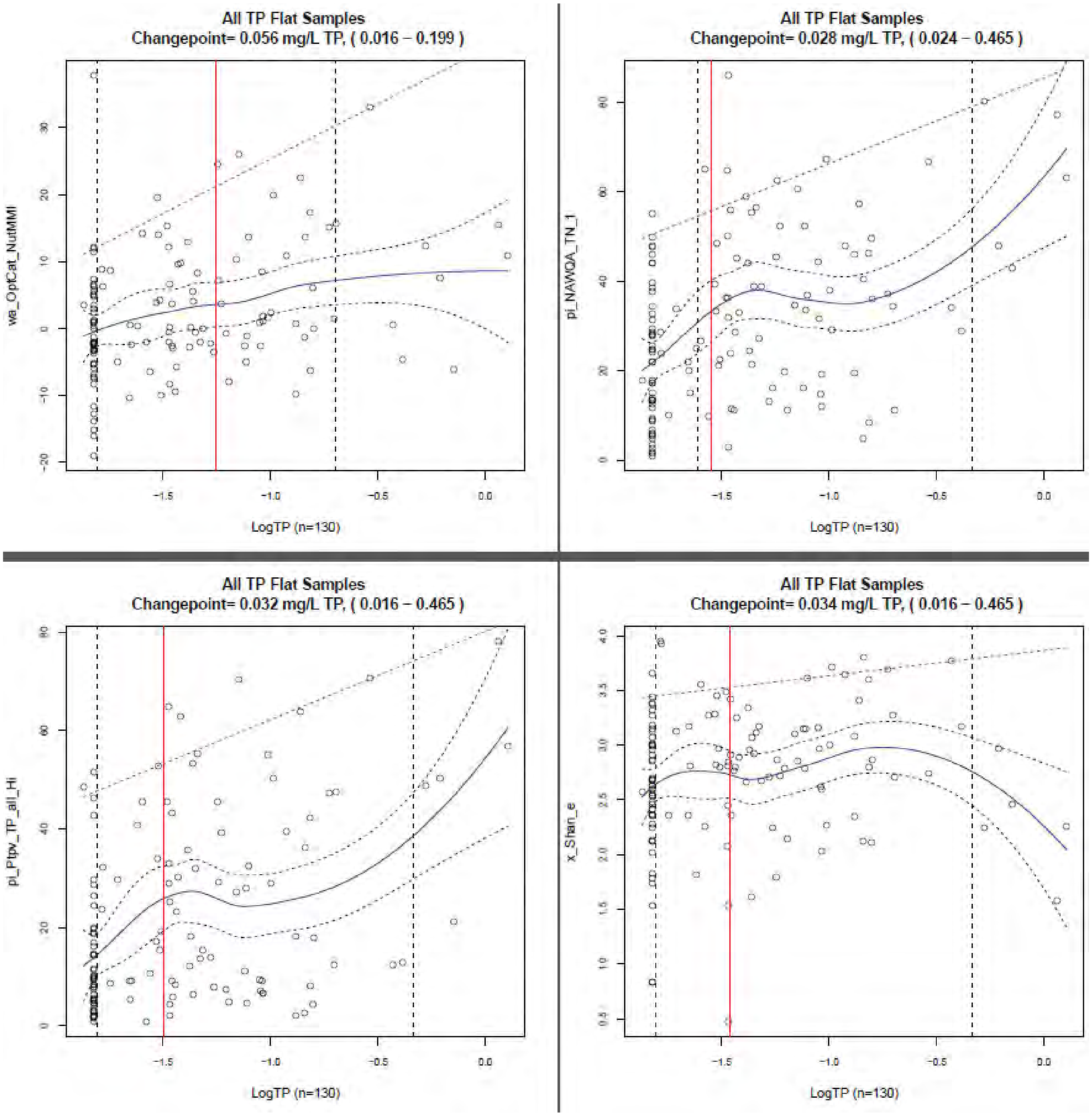

Figure L-10. Change-point graphs for **TP** and **diatom** metrics in the **TP Flat** class.

Table L-10. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_NutMMI	0.056	Good	Wide	Midslope	Retain
pi_NAWQA_TN_1	0.028	Good	Wide	Midslope	Retain
pi_Ptpv_TP_all_Hi	0.032	Good	Wide	Midslope	Retain
x_Shan_e	0.034	Good	Wide	Inconsistent	Remove

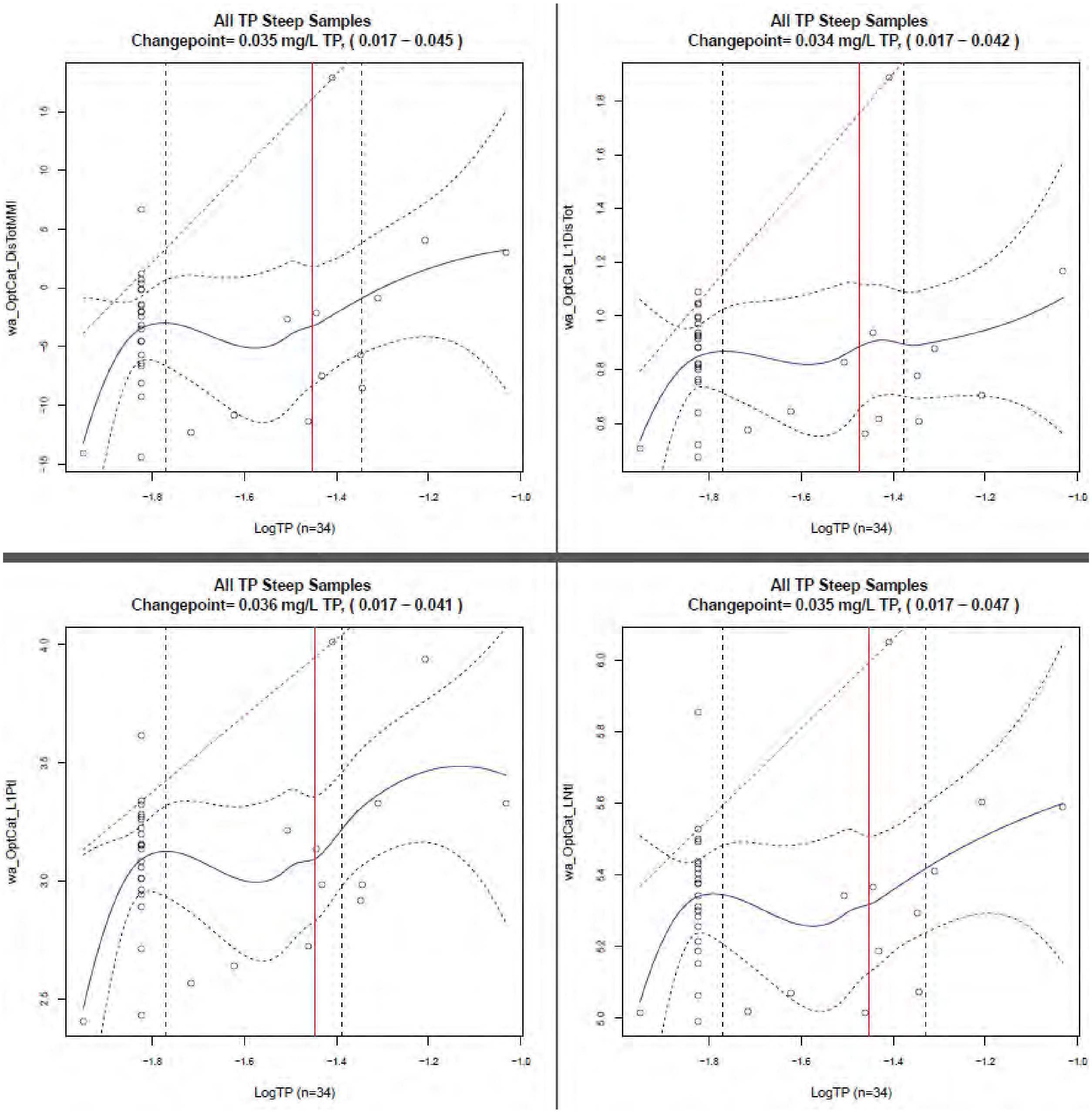

Figure L-11. Change-point graphs for **TP** and **diatom** metrics in the **TP Steep** class.

Table L-11. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_DisTotMMI	0.035	Good	Moderate	Midslope	Retain
wa_OptCat_L1DisTot	0.034	Good	Moderate	Midslope	Retain
wa_OptCat_L1Ptl	0.036	Good	Moderate	Midslope	Retain
wa_OptCat_LNtl	0.035	Good	Moderate	Midslope	Retain

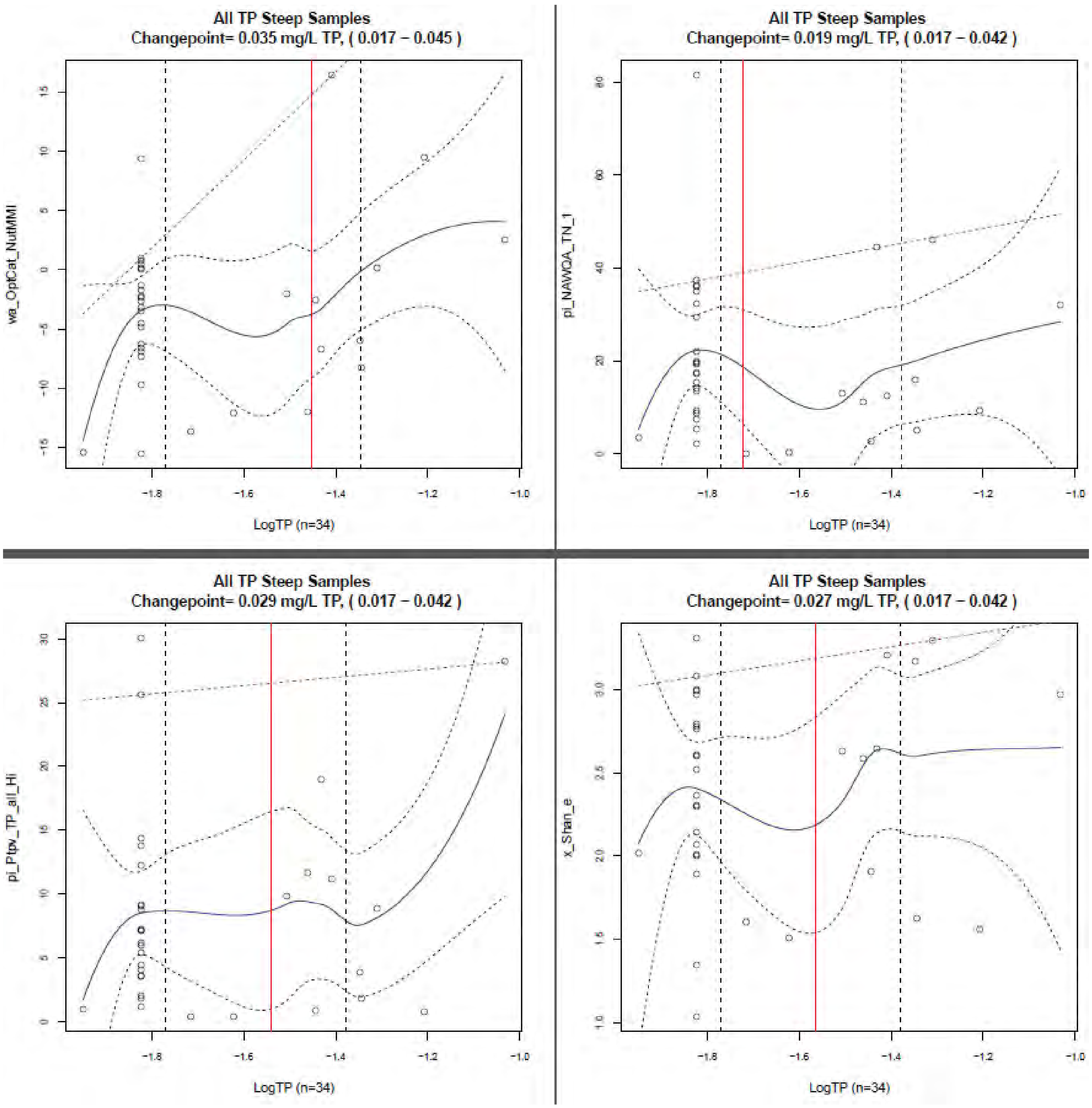

Figure L-12. Change-point graphs for **TP** and **diatom** metrics in the **TP Steep** class.

Table L-12. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
wa_OptCat_NutMMI	0.035	Good	Moderate	Midslope	Retain
pi_NAWQA_TN_1	0.019	Good	Moderate	Inconsistent	Remove
pi_Ptpv_TP_all_Hi	0.029	Good	Moderate	Flat	Remove
x_Shan_e	0.027	Good	Moderate	Inconsistent	Remove

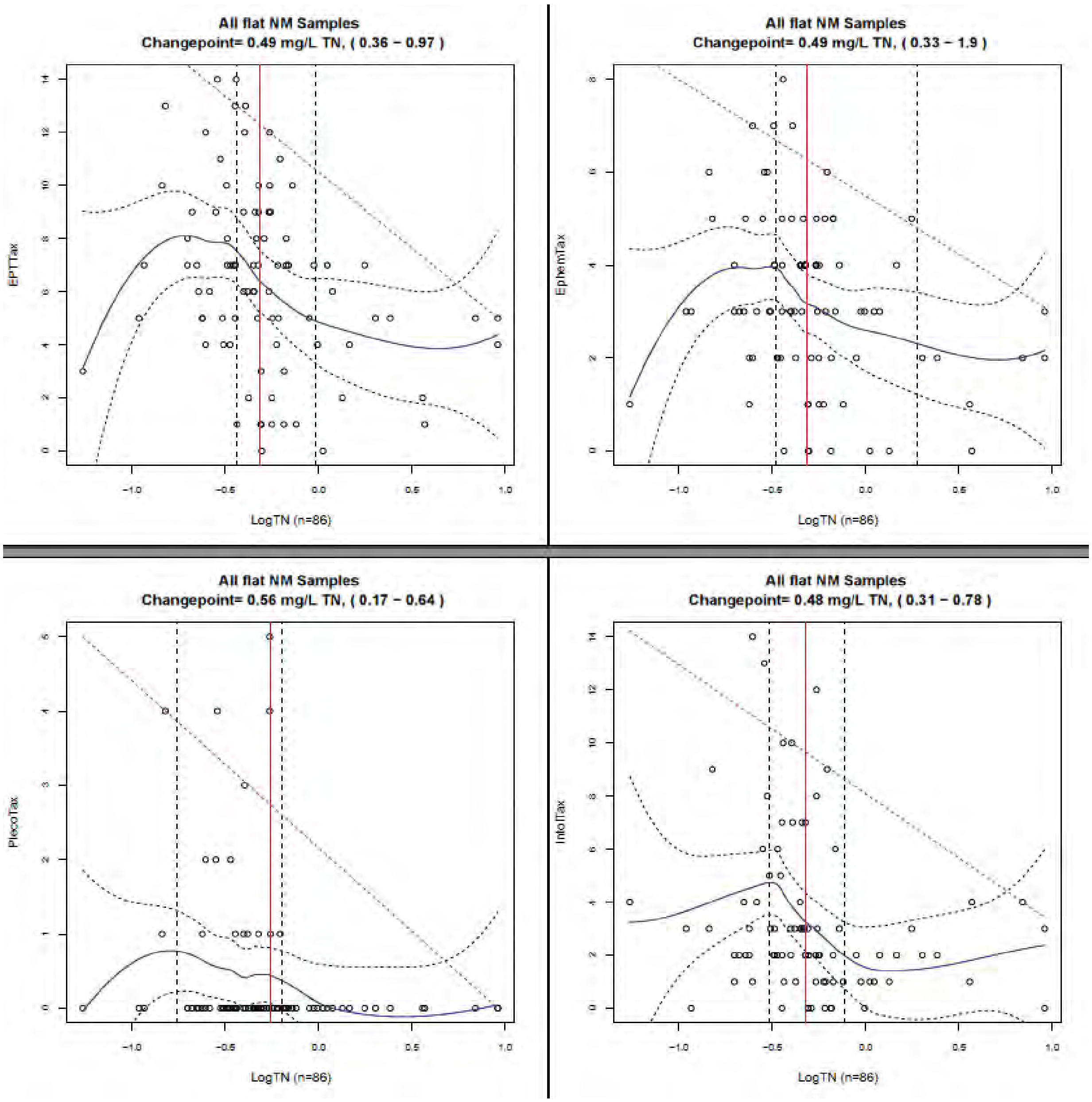

Figure L-13. Change-points graphs for **TN** and **macroinvertebrates** in the **TN Flat** class.

Table L-13. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.49	good	narrow	midslope	Retain
EphemTax	0.49	good	moderate	midslope	Retain
PlecoTax	0.56	good	moderate	midslope	Retain
IntolTax	0.48	good	narrow	midslope	Retain

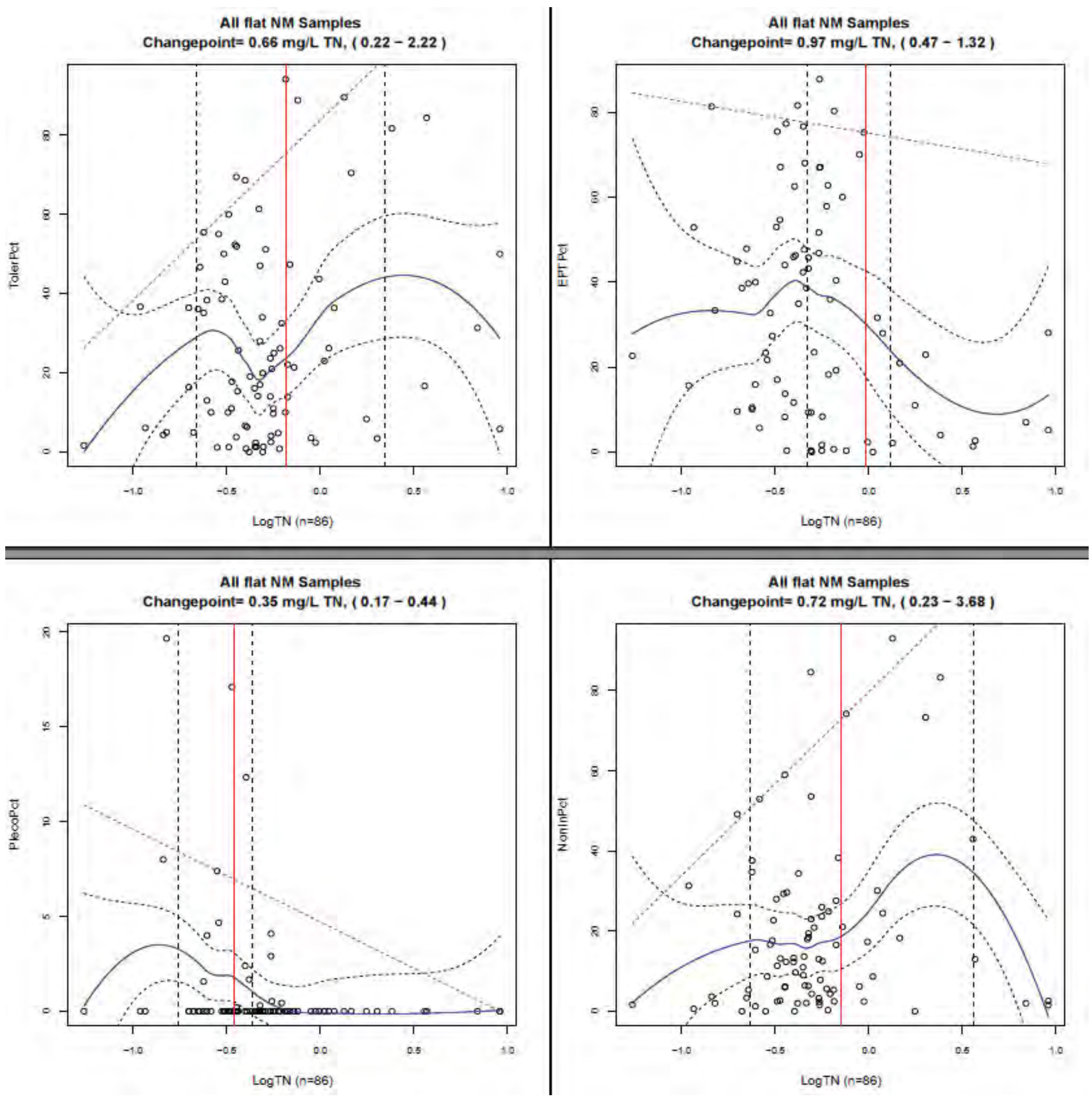

Figure L-14. Change-points graphs for **TN** and **macroinvertebrates** in the **TN Flat** class.

Table L-14. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.66	good	wide	midslope	Retain
EPTPct	0.97	good	narrow	midslope	Retain
PlecoPct	0.35	good	narrow	midslope	Retain
NonInPct	0.72	good	wide	earlyslope	Retain

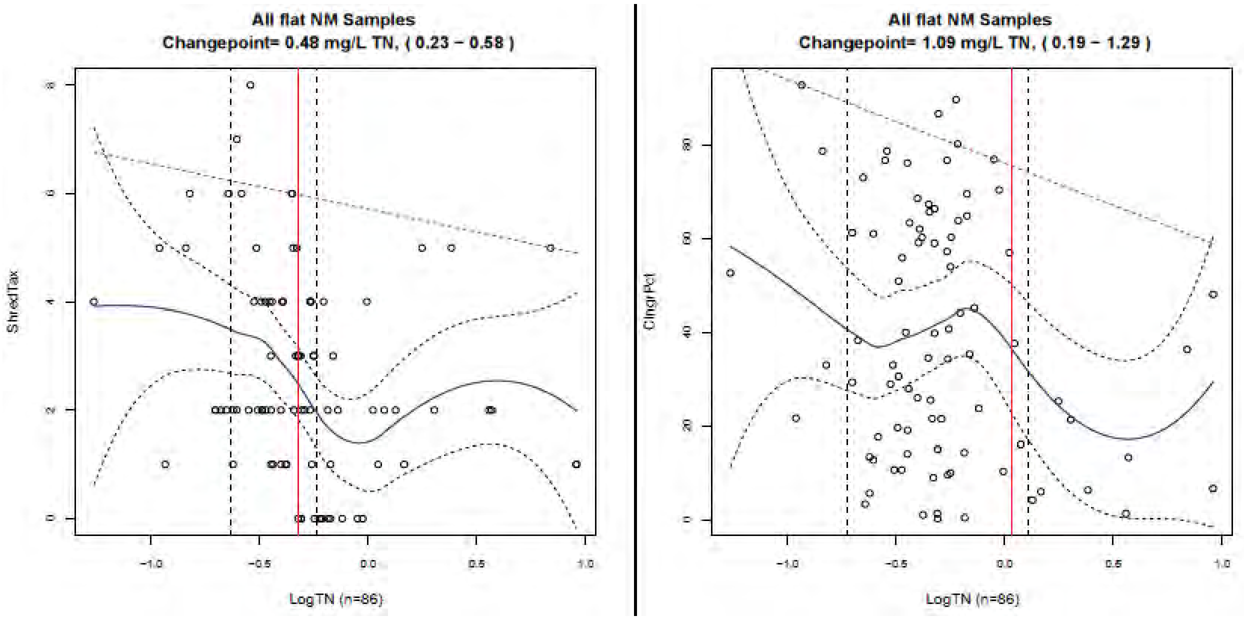

Figure L-15. Change-points graphs for **TN** and **macroinvertebrates** in the **TN Flat** class.

Table L-15. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.48	good	narrow	midslope	Retain
ClngrPct	1.09	good	moderate	midslope	Retain

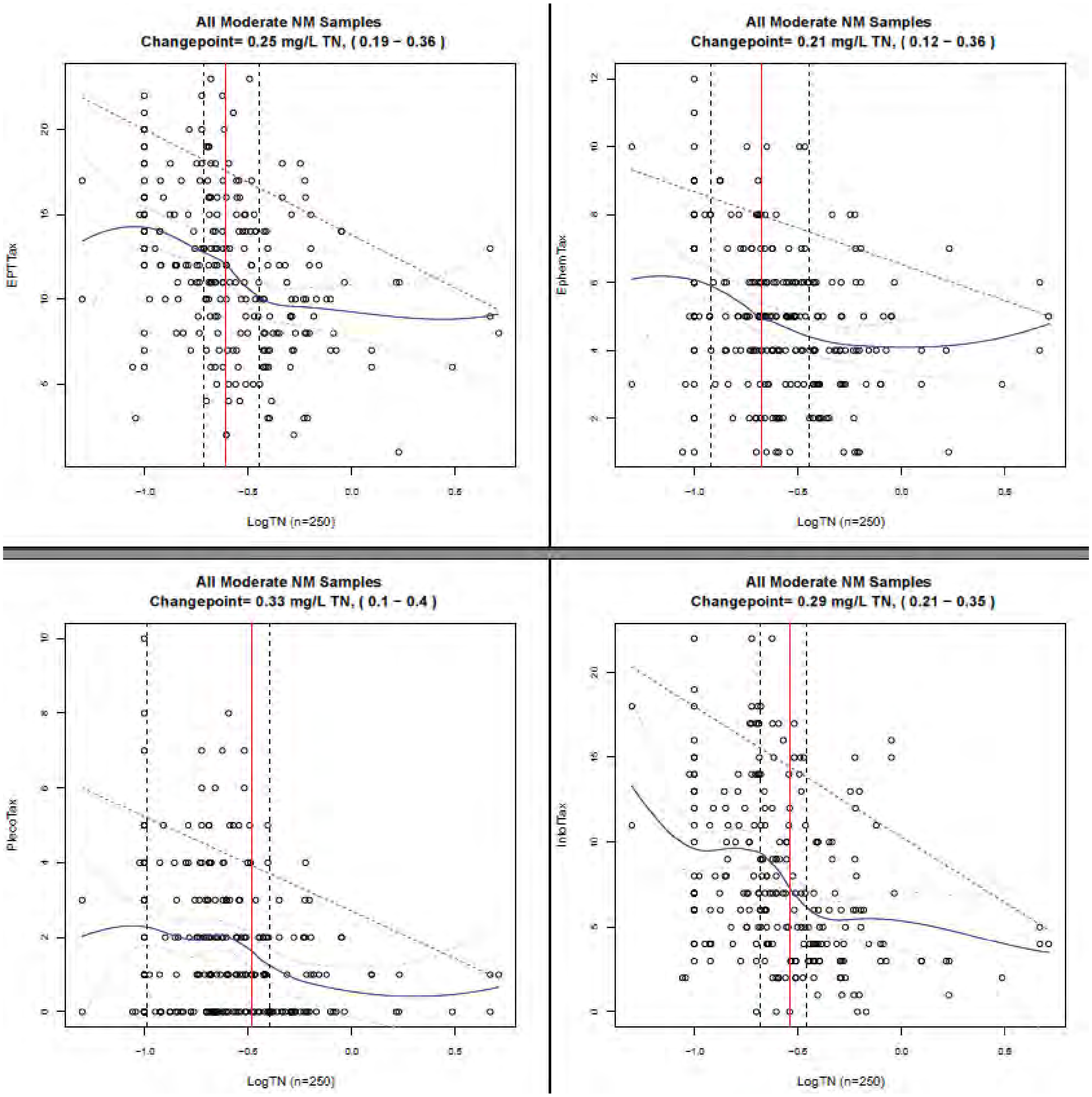

Figure L-16. Change-points for **TN** and **macroinvertebrates** in the **TN Moderate** class.

Table L-16. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.25	good	narrow	midslope	Retain
EphemTax	0.21	good	moderate	midslope	Retain
PlecoTax	0.33	good	moderate	midslope	Retain
IntolTax	0.29	good	narrow	midslope	Retain

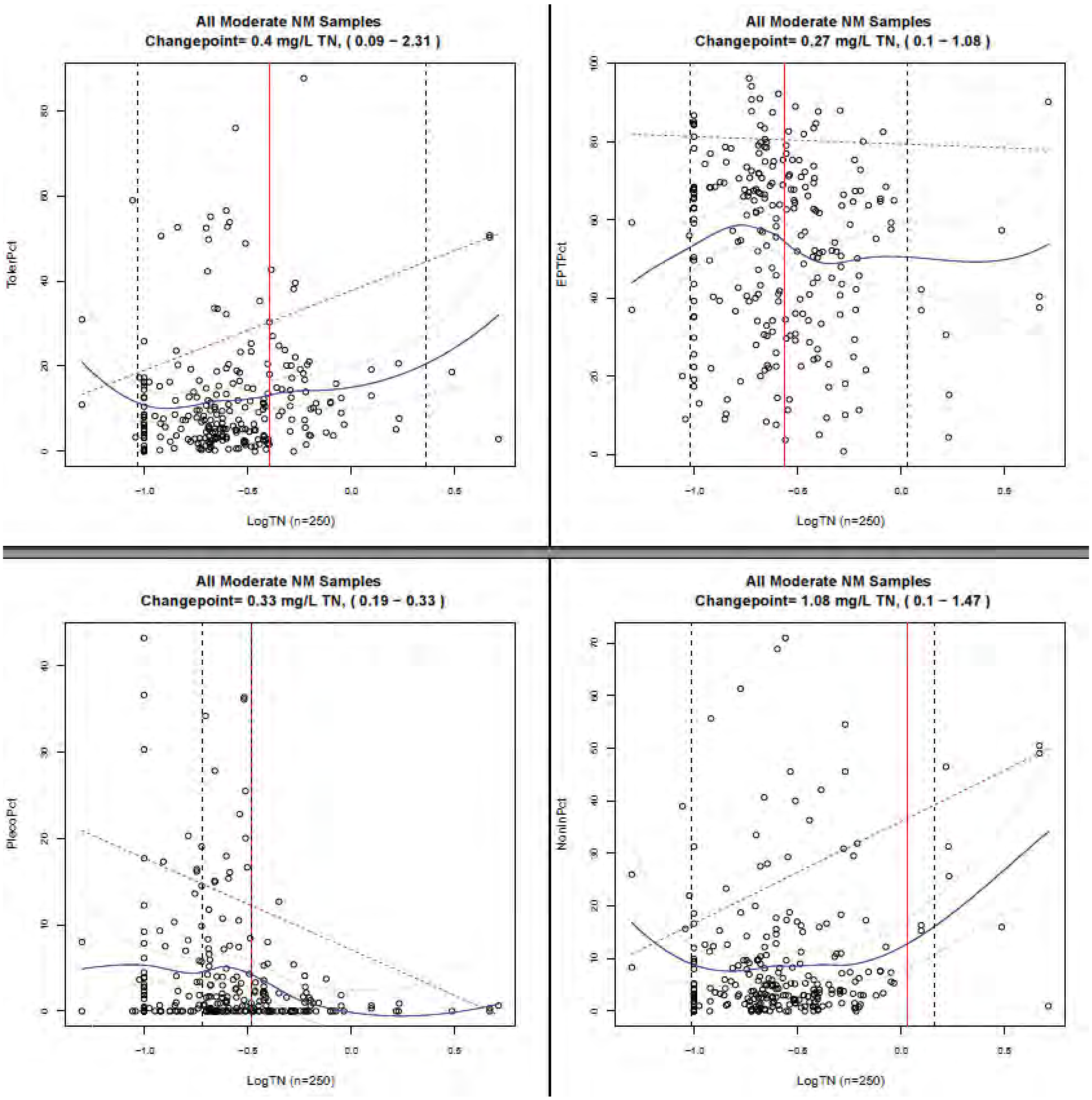

Figure L-17. Change-points for **TN** and **macroinvertebrates** in the **TN Moderate** class.

Table L-17. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.4	good	wide	longslope	Retain
EPTPct	0.27	flat	wide	midslope	Remove
PlecoPct	0.33	good	narrow	earlyslope	Retain
NonInPct	1.08	good	wide	midslope	Retain

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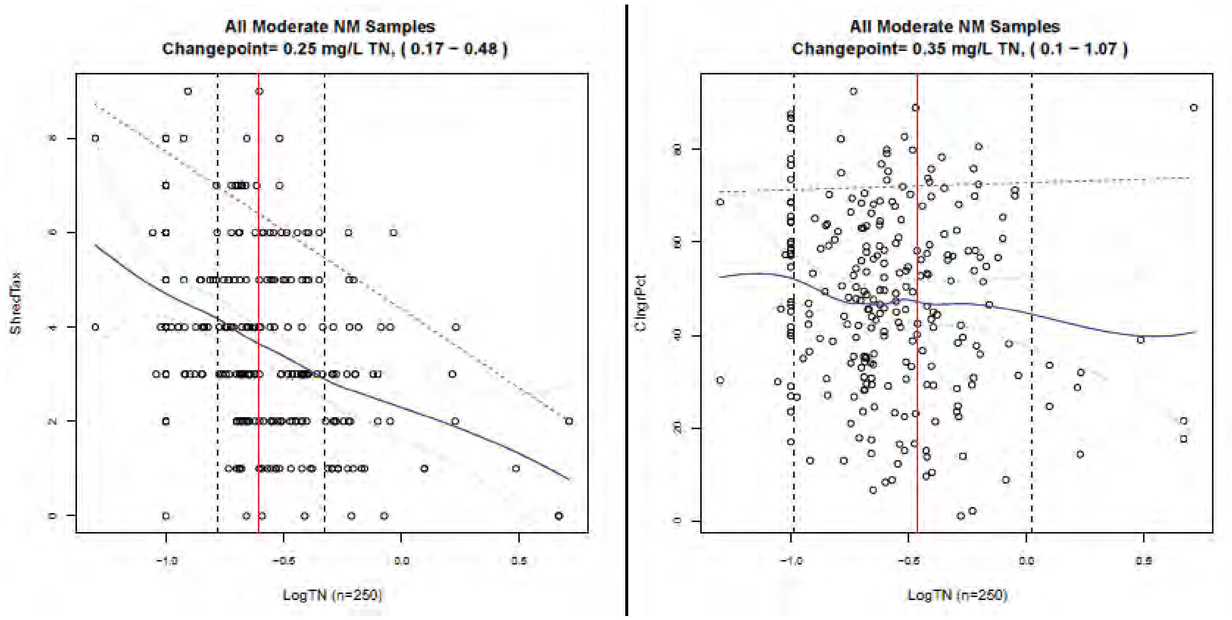

Figure L-18. Change-points for **TN** and **macroinvertebrates** in the **Moderate** class.

Table L-18. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.25	good	moderate	longslope	Retain
ClngrPct	0.35	flat	wide	flat	Remove

NMED EXHIBIT 25

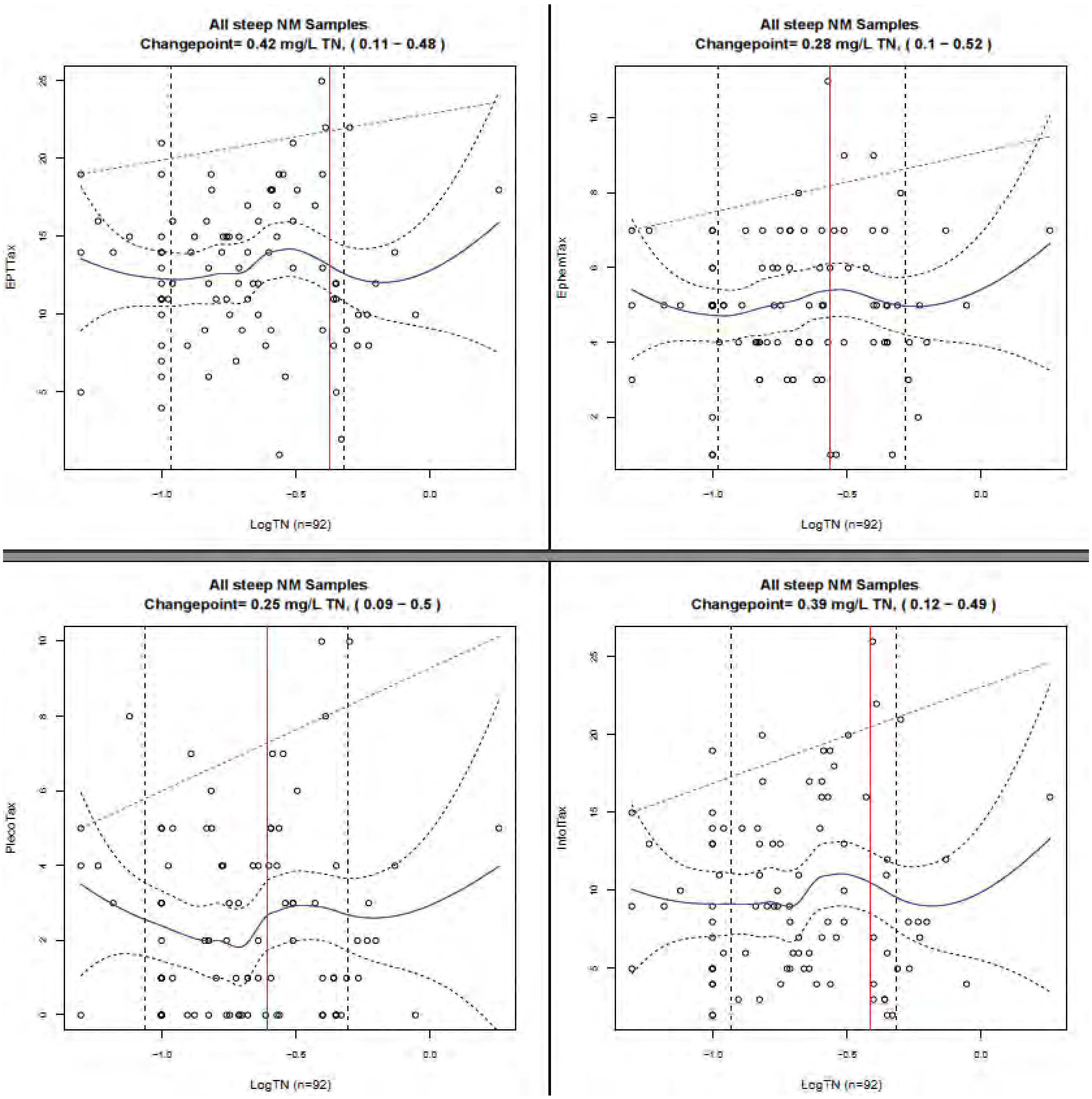

Figure L-19. Change-point graphs for **TN** and **macroinvertebrates** in the **TN Steep** class.

Table L-19. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.42	wrong trend	wide	inconsistent	Remove
EphemTax	0.28	wrong trend	wide	peak	Remove
PlecoTax	0.25	wrong trend	wide	wrong trend	Remove
IntolTax	0.39	wrong trend	wide	inconsistent	Remove

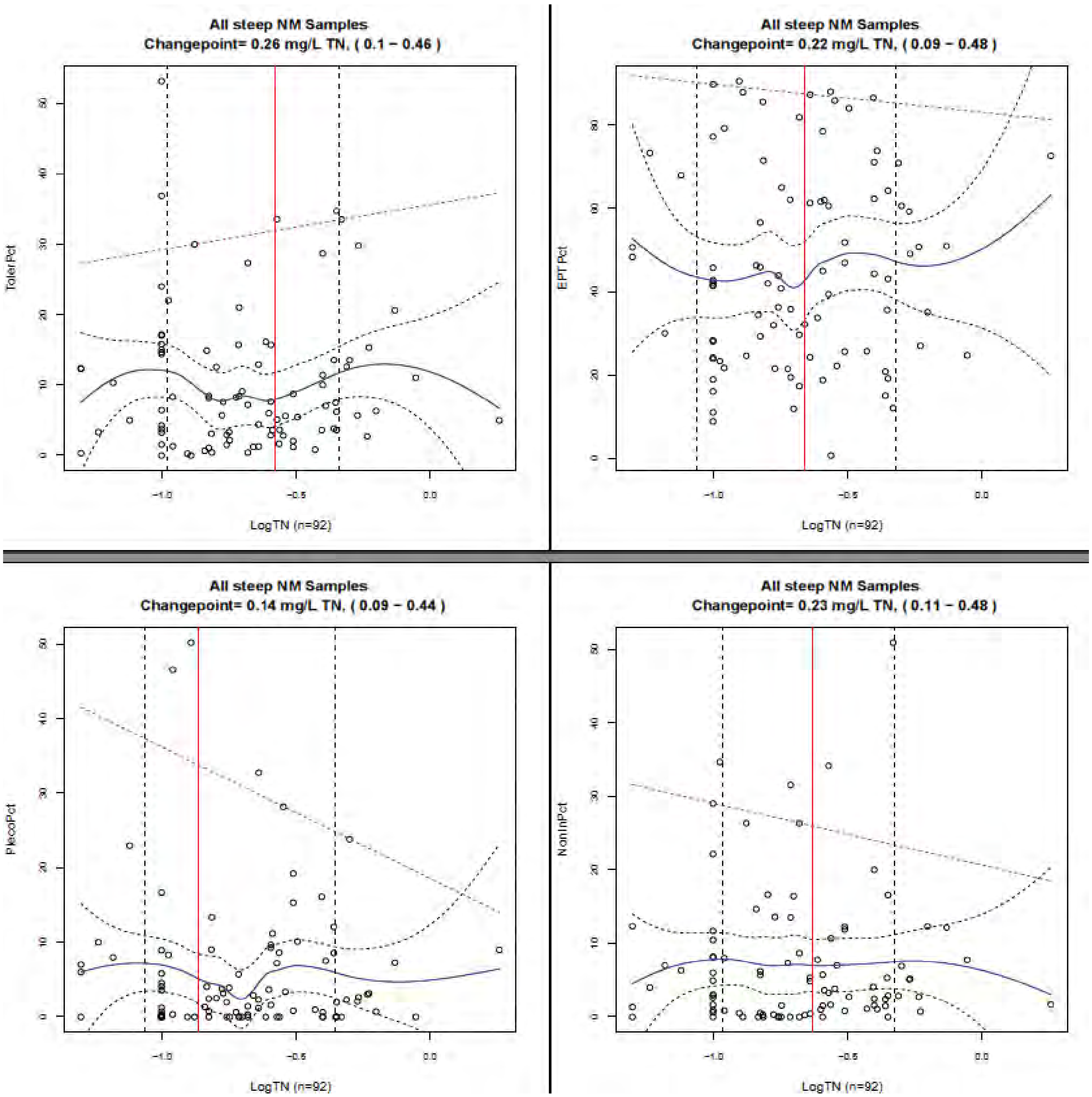

Figure L-20. Change-point graphs for **TN** and **macroinvertebrates** in the **TN Steep** class.

Table L-20. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.26	good	wide	inconsistent	Remove
EPTPct	0.22	shallow	wide	inconsistent	Remove
PlecoPct	0.14	good	wide	midslope	Remove
NonInPct	0.23	wrong trend	wide	flat	Remove

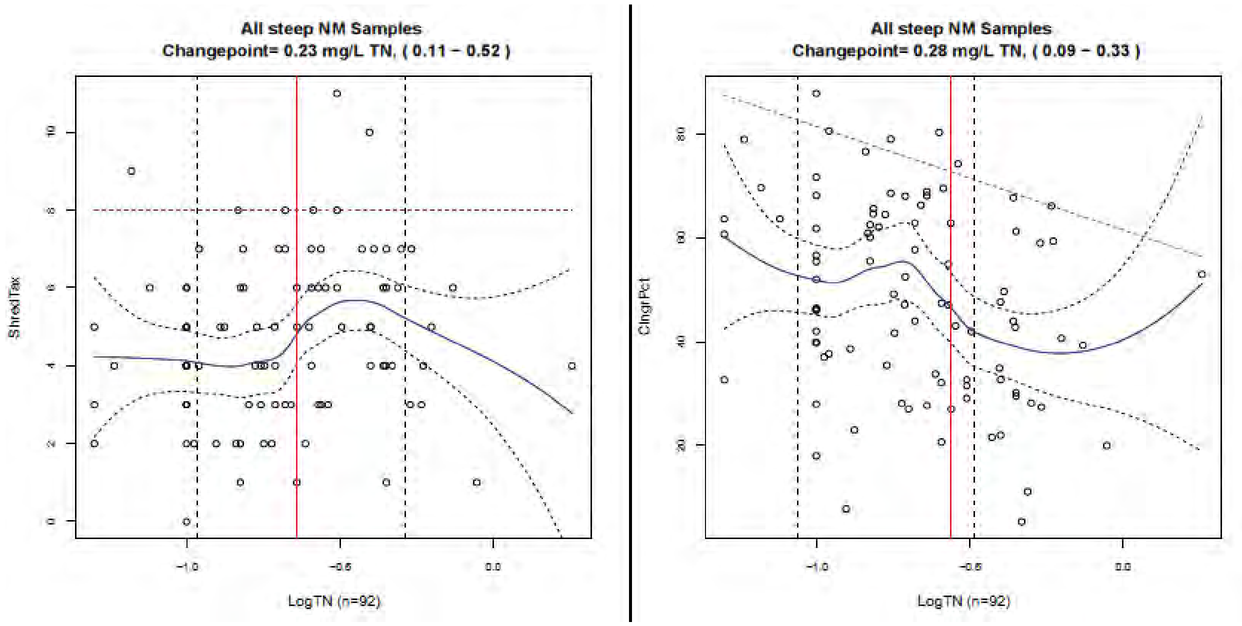

Figure L-21. Change-point graphs for **TN** and **macroinvertebrates** in the **TN Steep** class.

Table L-21. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.23	flat	wide	wrong trend	Remove
ClngrPct	0.28	good	moderate	midslope	Retain

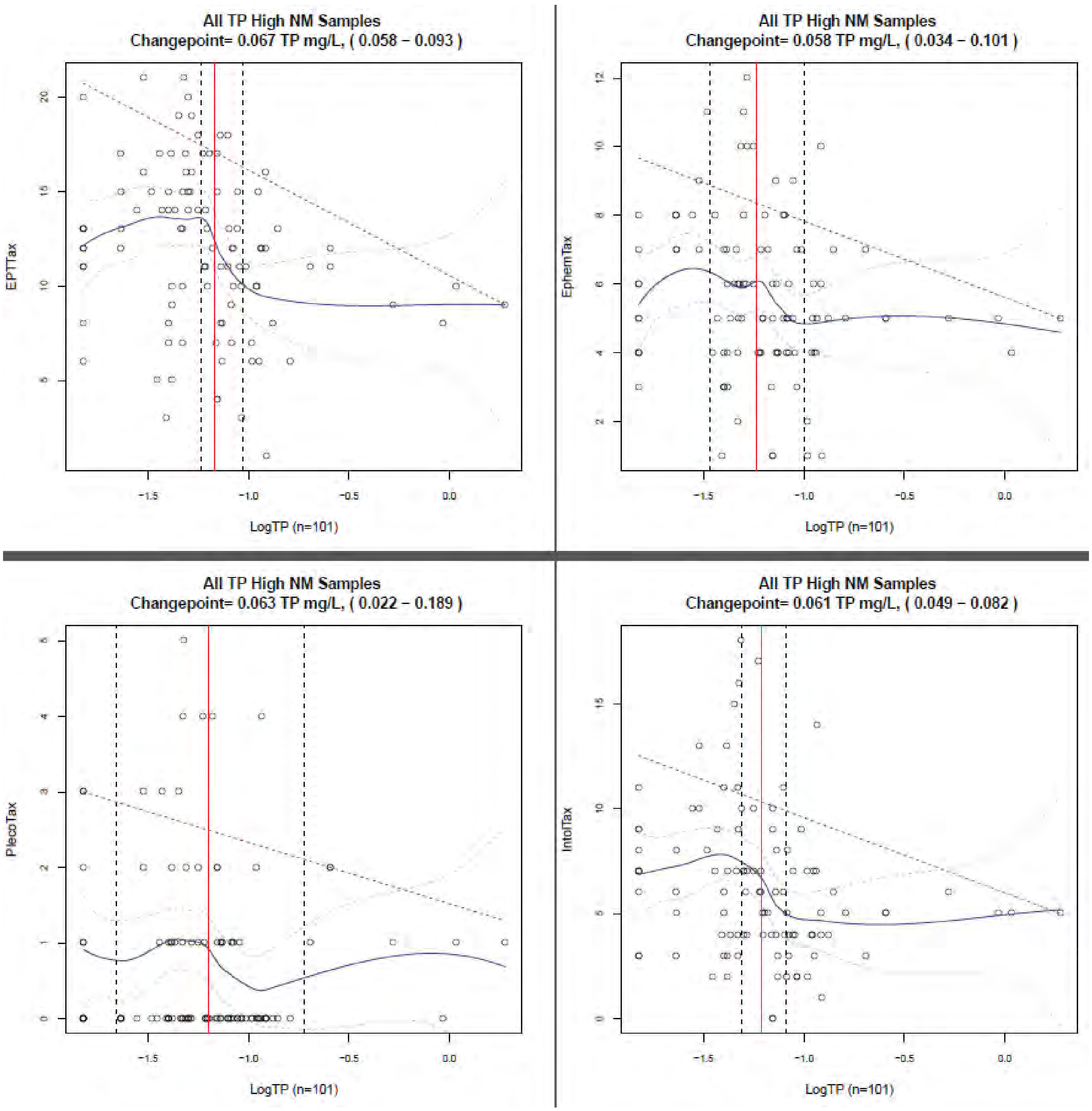

Figure L-22. Change-points for **TP** and **macroinvertebrates** in the **TP High-Volcanic** class.

Table L-22. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.067	good	narrow	midslope	Retain
EphemTax	0.058	good	narrow	top of slope	Retain
PlecoTax	0.063	good	broad	top of slope	Retain
IntolTax	0.061	good	narrow	midslope	Retain

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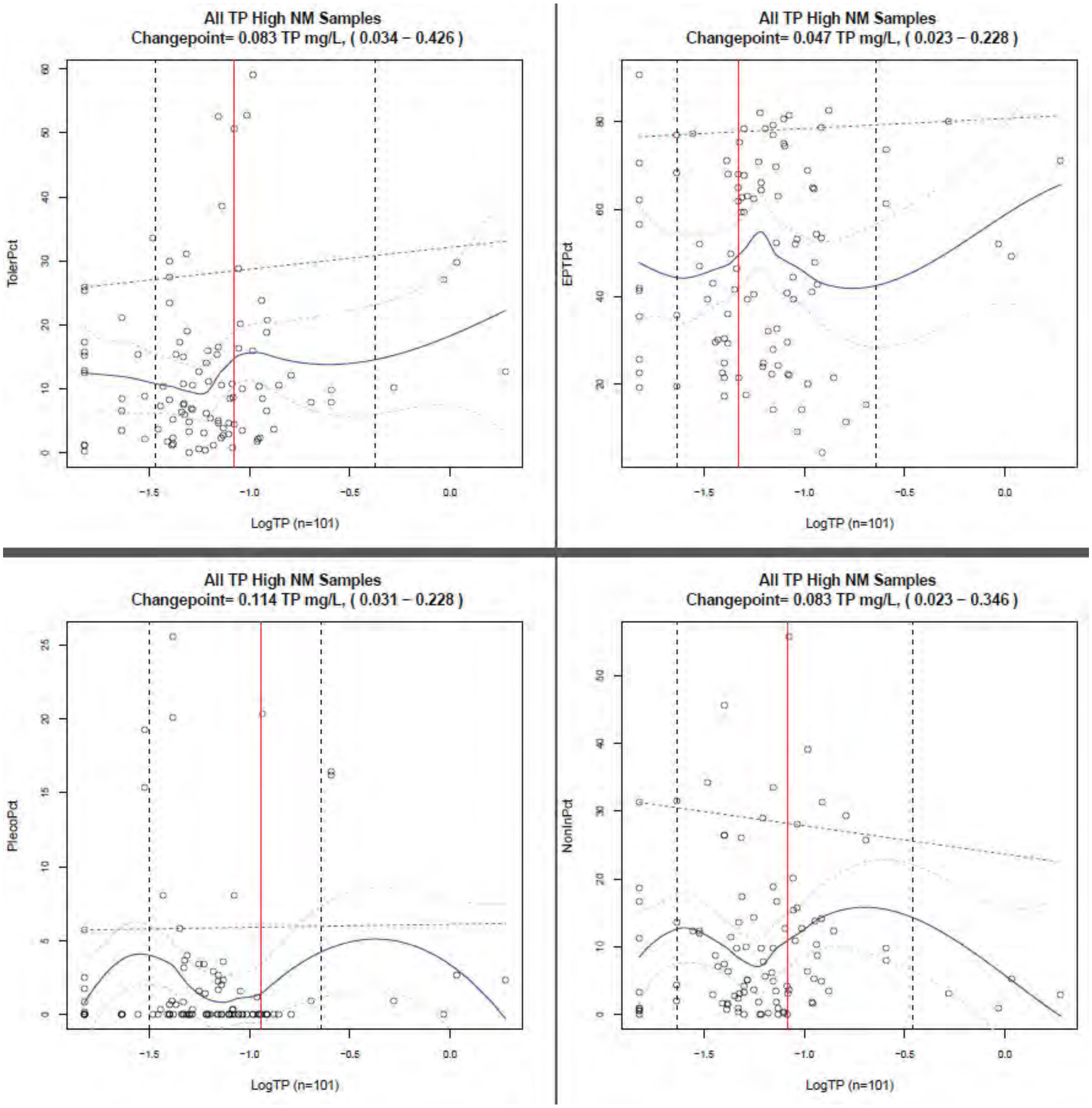

Figure L-23. Change-points for **TP** and **macroinvertebrates** in the **TP High-Volcanic** class.

Table L-23. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.083	good	moderate	midslope	Retain
EPTPct	0.047	shallow	broad	midslope	Retain
PlecoPct	0.114	flat	moderate	inconsistent	Remove
NonInPct	0.083	good	broad	inconsistent	Remove

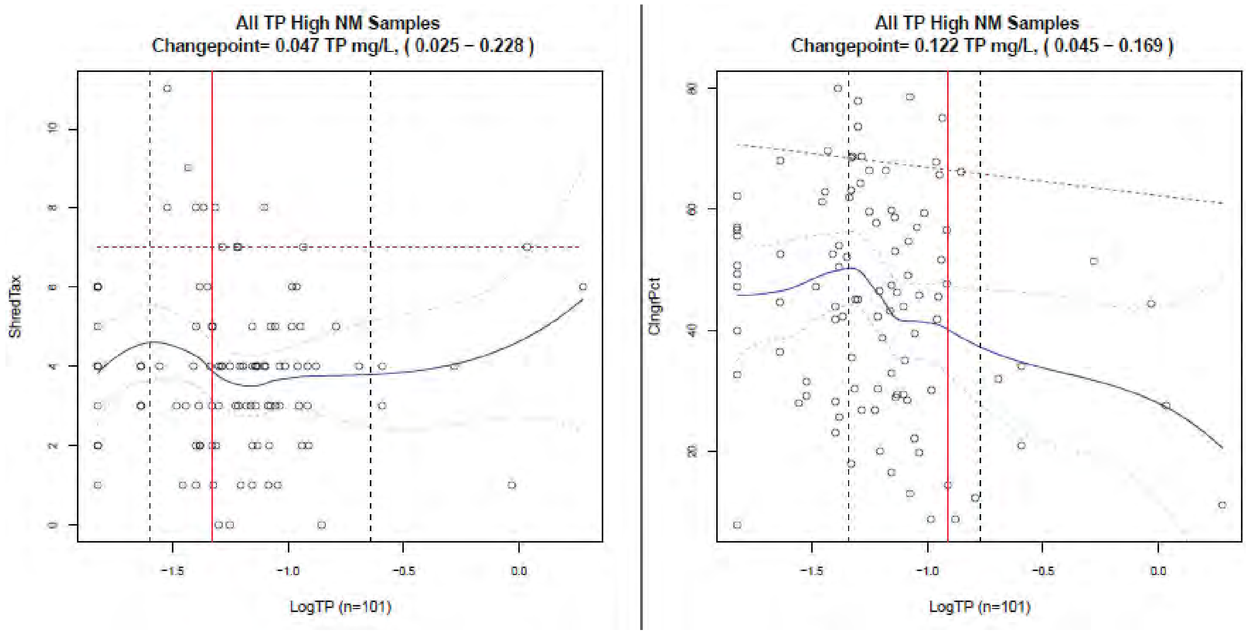

Figure L-24. Change-points for **TP** and **macroinvertebrates** in the **TP High-Volcanic** class.

Table L-24. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.047	flat	broad	midslope	Remove
ClngrPct	0.122	good	moderate	midslope	Retain

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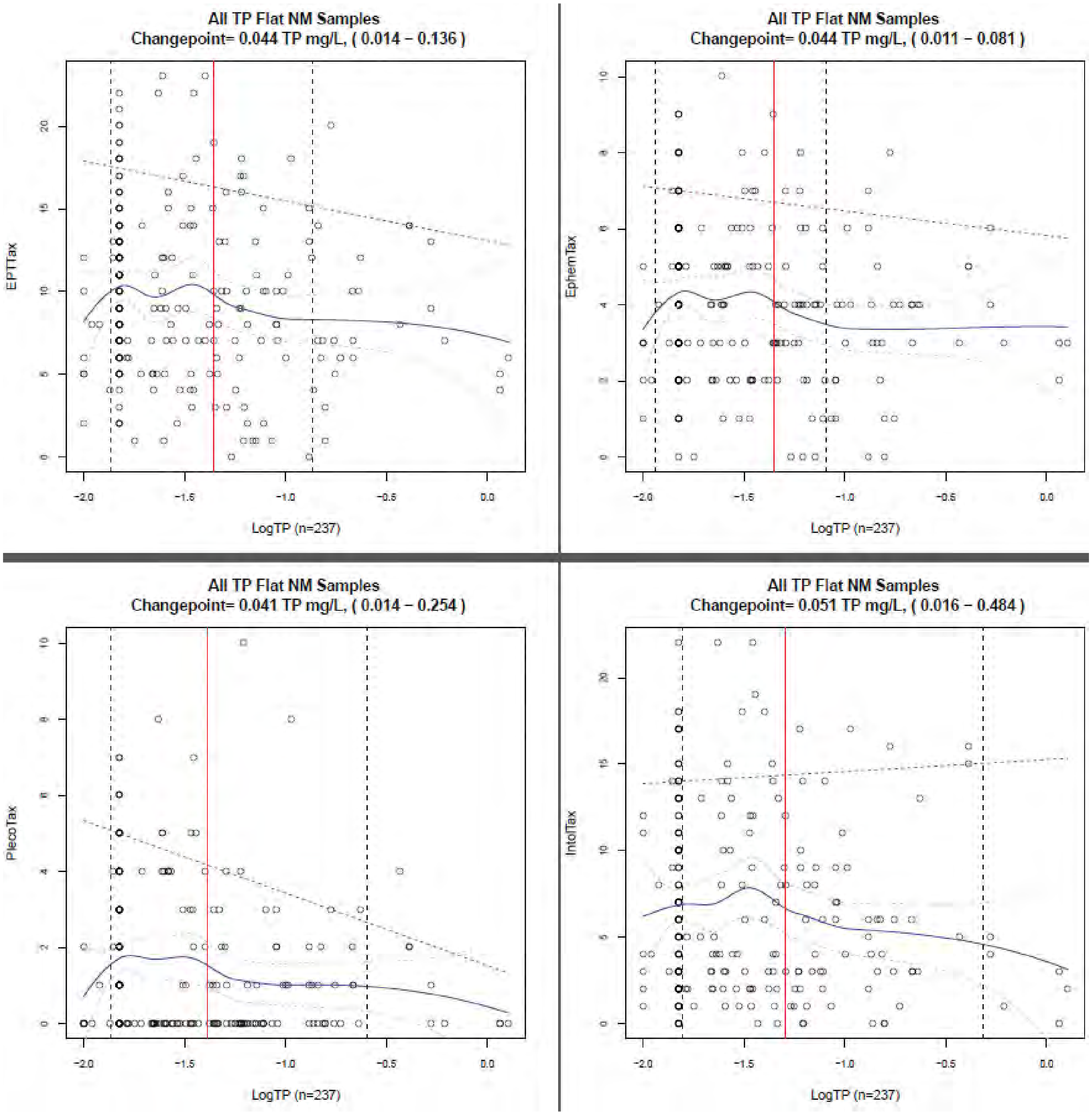

Figure L-25. Change-points for **TP** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-25. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.044	good	broad	midslope	Retain
EphemTax	0.044	good	broad	midslope	Retain
PlecoTax	0.041	good	narrow	midslope	Retain
IntolTax	0.051	good	broad	inconsistent	Remove

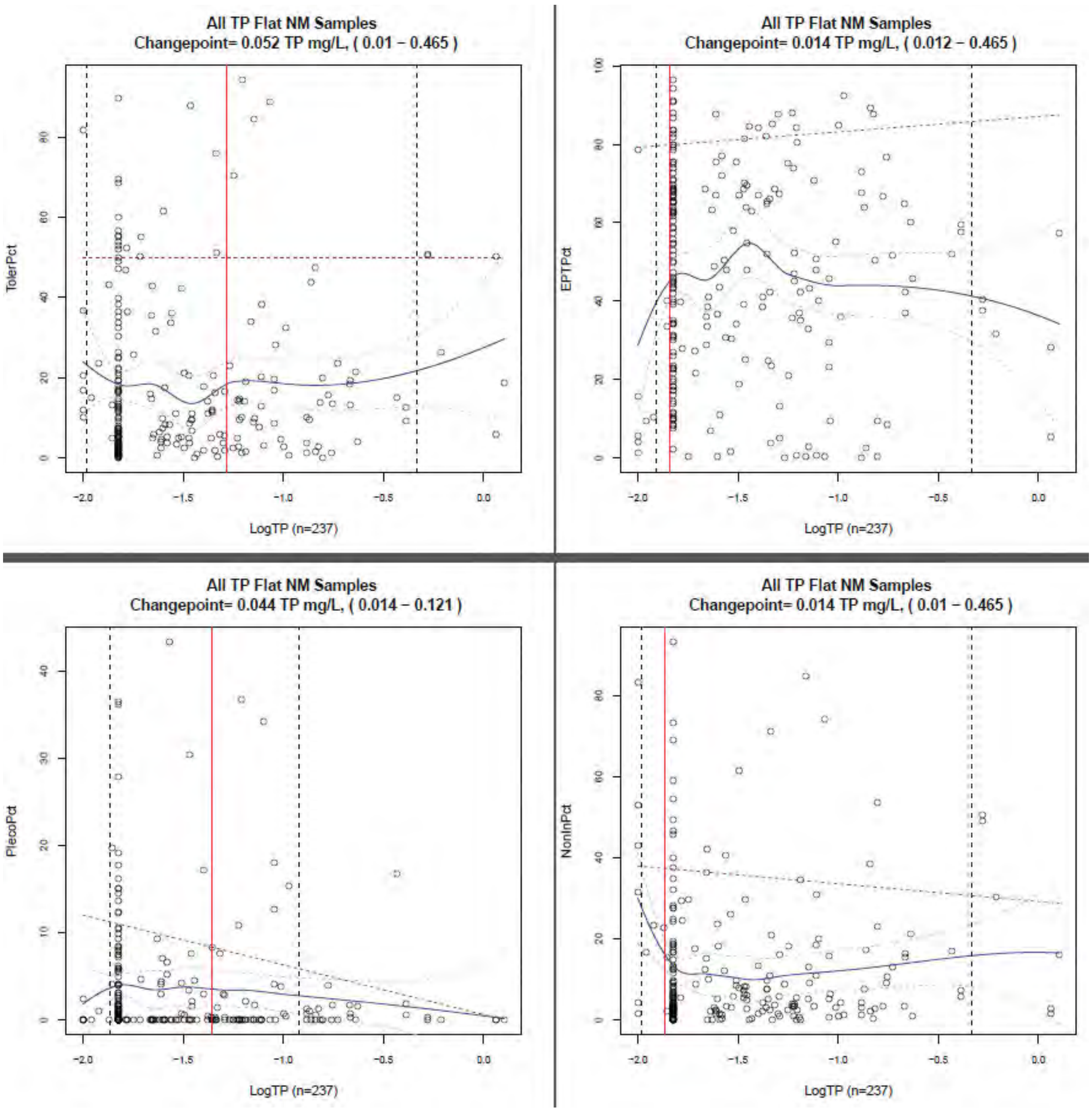

Figure L-26. Change-points for **TP** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-26. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.052	flat	broad	midslope	Remove
EPTPct	0.014	wrong trend	broad	midslope	Remove
PlecoPct	0.044	good	moderate	shallow	Retain
NonInPct	0.014	wrong trend	moderate	midslope	Remove

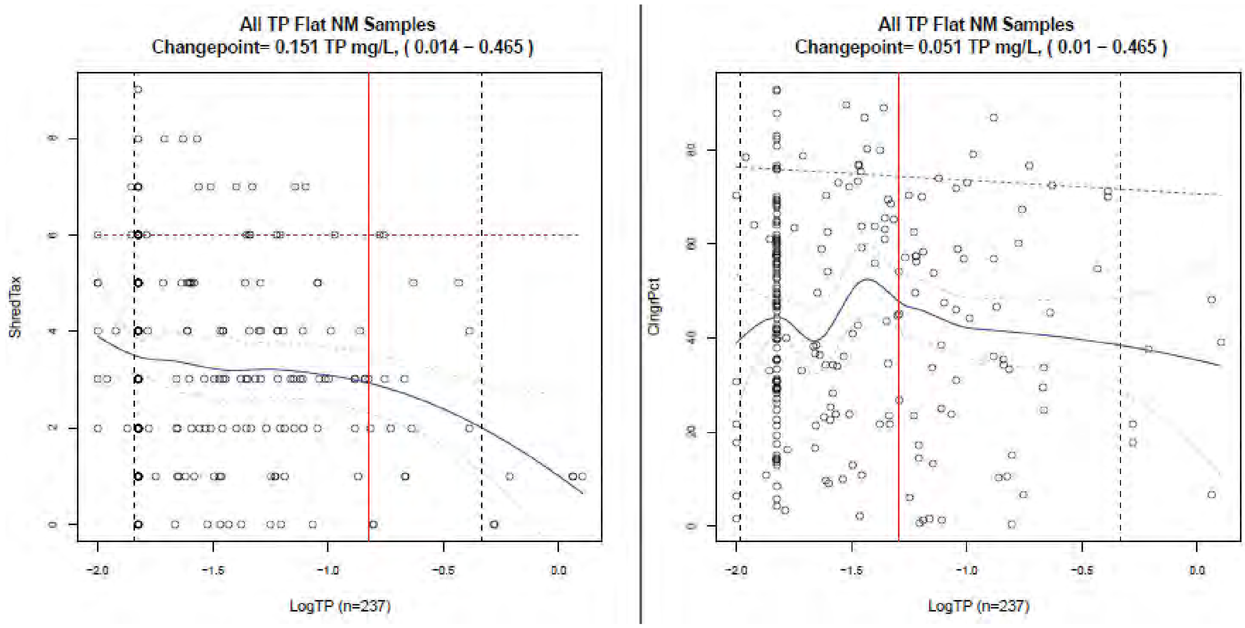

Figure L-27. Change-points for **TP** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-27. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.151	flat	broad	midslope	Remove
ClngrPct	0.051	good	broad	midslope	Retain

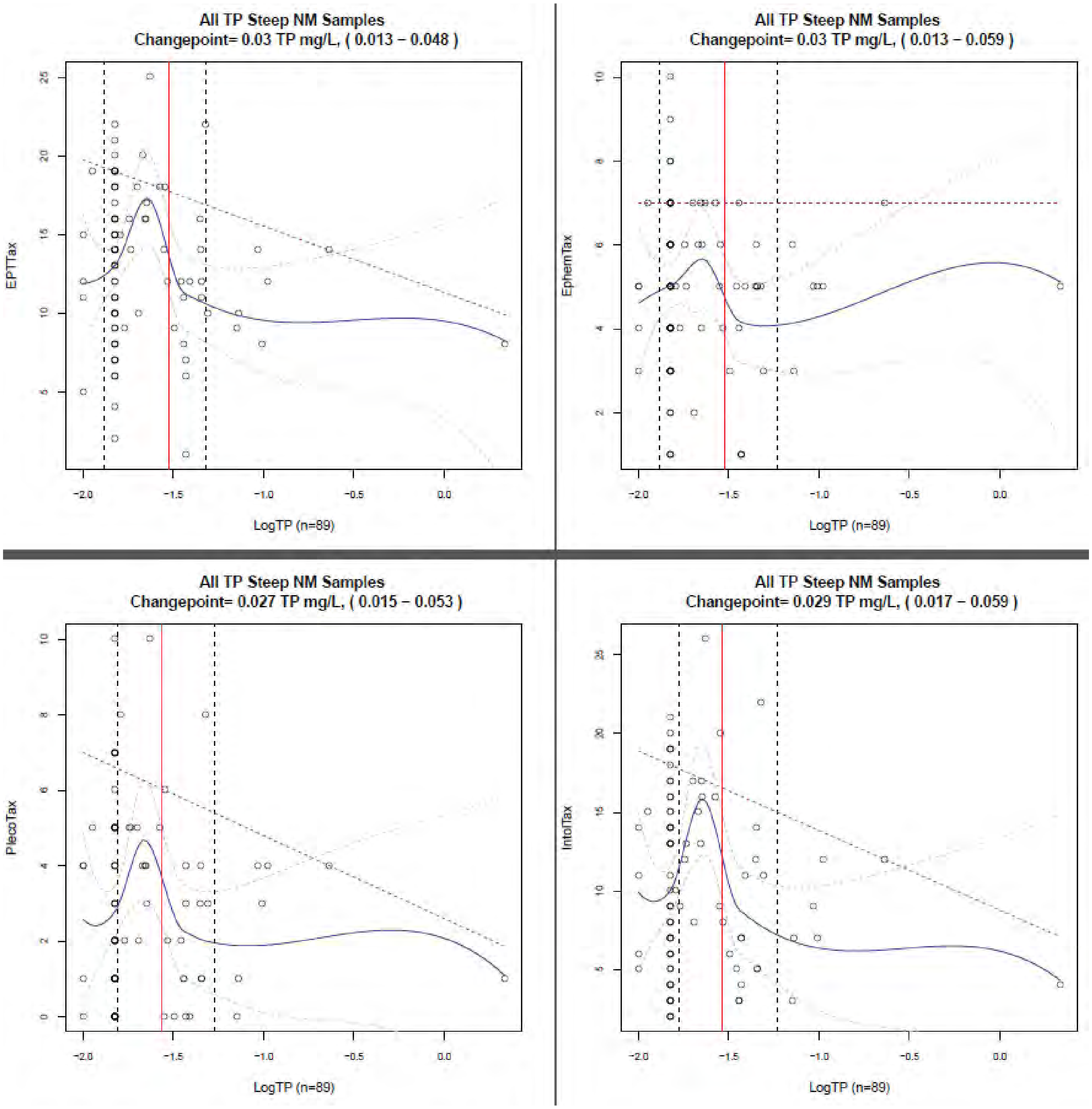

Figure L-28. Change-points for **TP** and **macroinvertebrates** in the **TP Steep** class.

Table L-28. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.030	good	moderate	midslope	Retain
EphemTax	0.030	flat	narrow	peak	Remove
PlecoTax	0.027	good	narrow	midslope	Retain
IntolTax	0.029	good	narrow	midslope	Retain

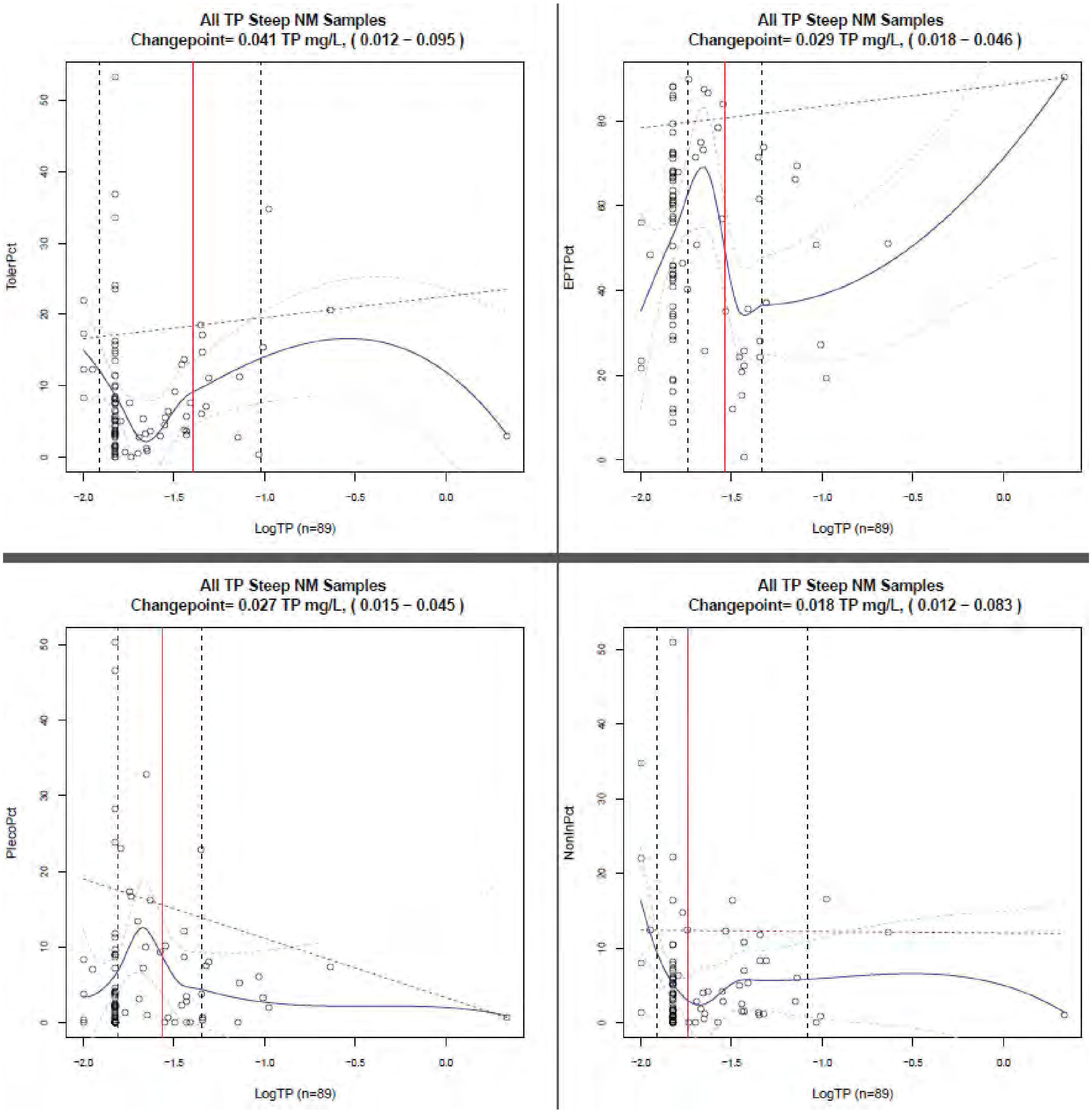

Figure L-29. Change-points for **TP** and **macroinvertebrates** in the **TP Steep** class.

Table L-29. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.041	good	moderate	midslope	Retain
EPTPct	0.029	good	narrow	inconsistent	Remove
PlecoPct	0.027	good	narrow	midslope	Retain
NonInPct	0.018	flat	moderate	trough	Remove

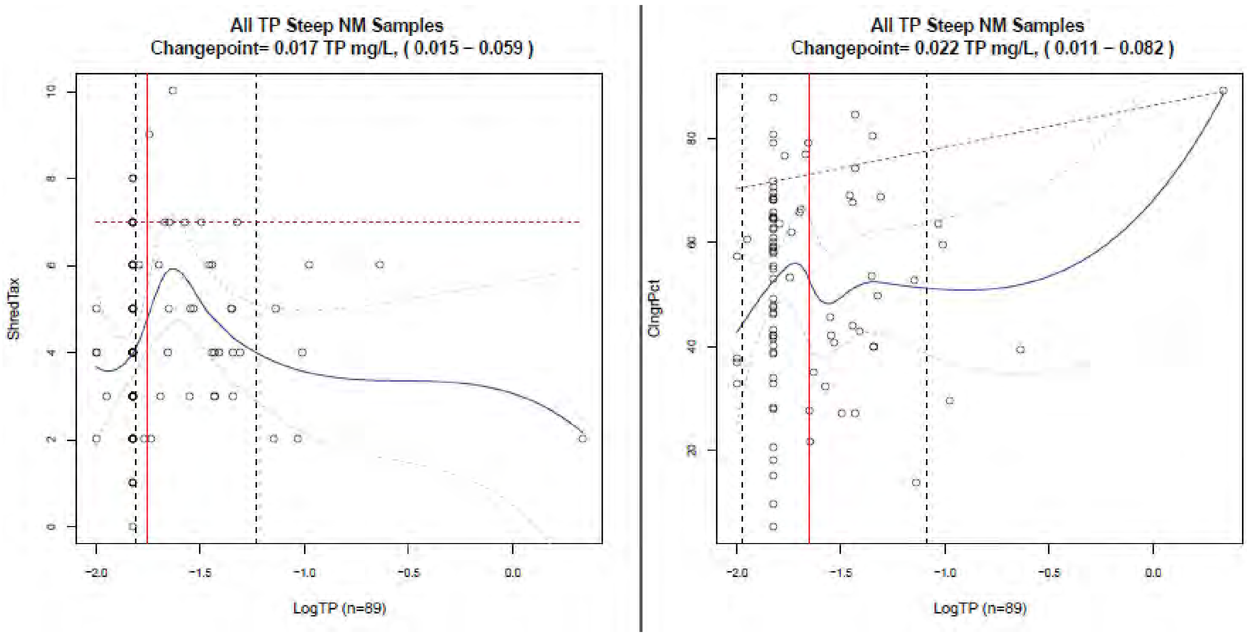

Figure L-30. Change-points for **TP** and **macroinvertebrates** in the **TP Steep** class.

Table L-30. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.017	flat	broad	peak	Remove
ClngrPct	0.022	Outlier driven	moderate	midslope	Remove

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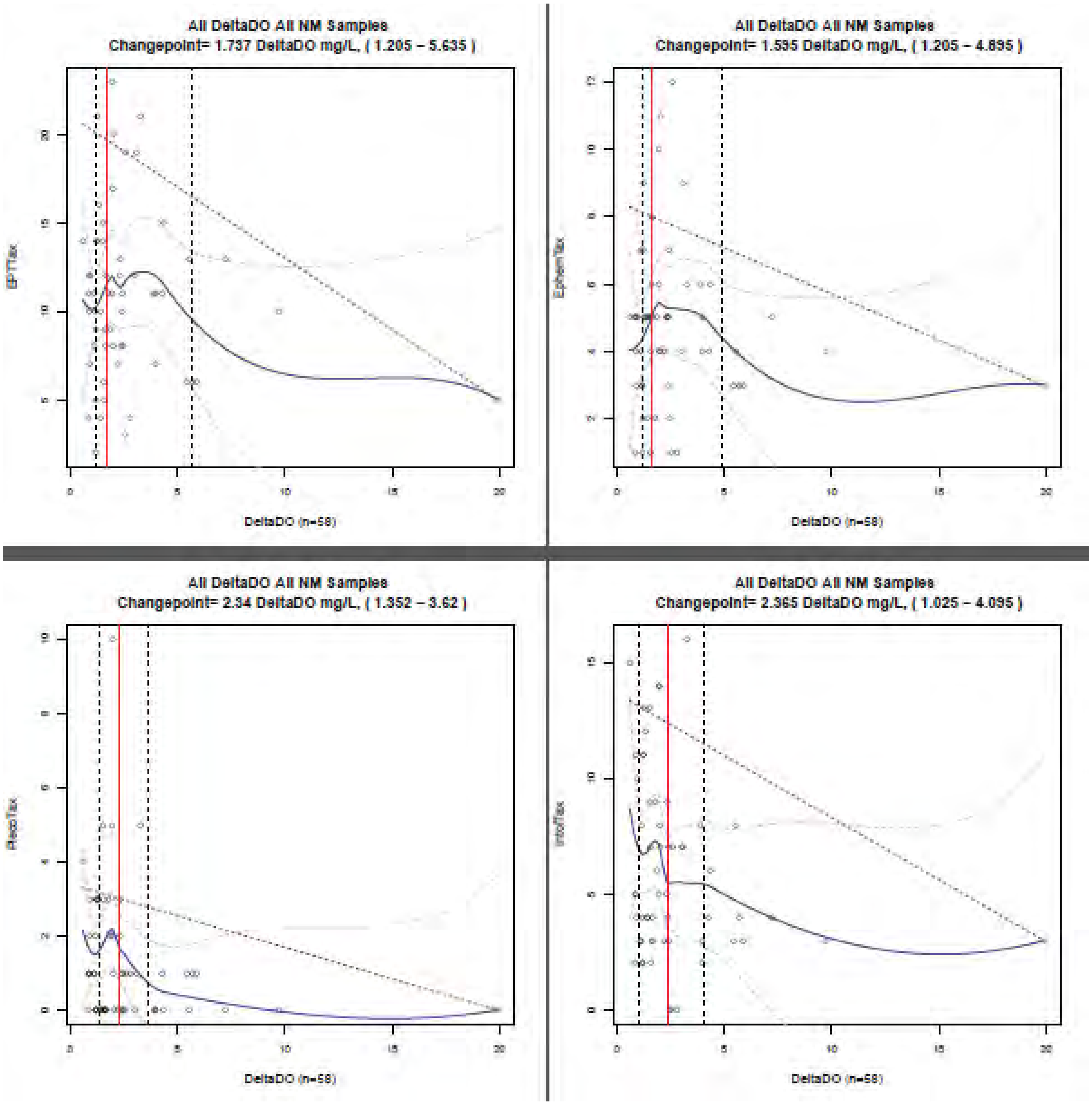

Figure L-31. Change-points for **Delta DO** and **macroinvertebrates** in all sites.

Table L-31. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	1.74	Opposite Loess	moderate	Peak	no
EphemTax	1.60	Opposite Loess	moderate	Peak	no
PlecoTax	2.34	OK	moderate	Midslope	Yes
IntolTax	2.37	OK	moderate	Toe of Slope	Yes

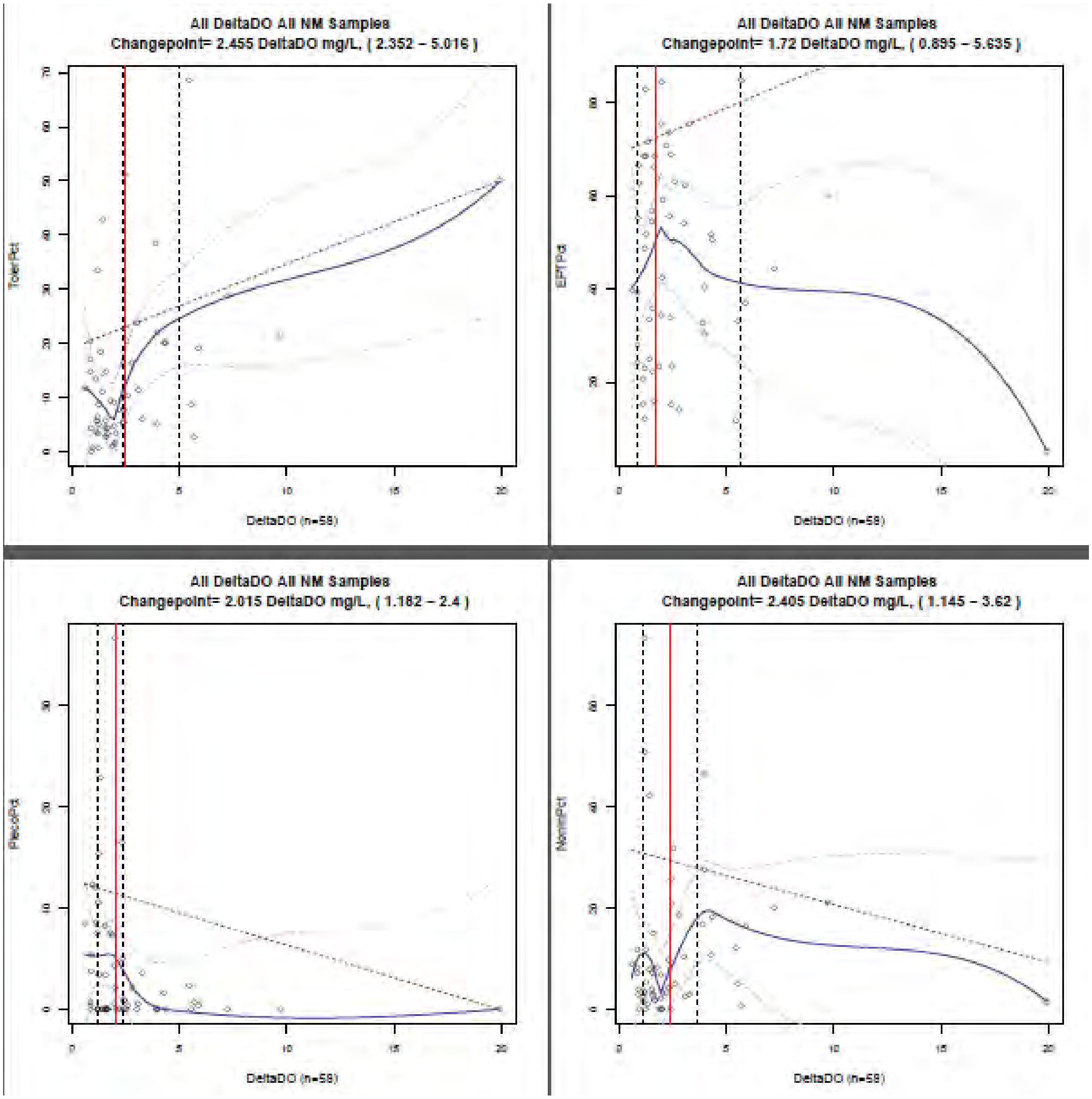

Figure L-32. Change-points for **Delta DO** and **macroinvertebrates** in all sites.

Table L-32. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	2.46	OK	moderate	Midslope	Yes
EPTPct	1.72	Wrong trend	moderate	Peak	no
PlecoPct	2.02	OK	narrow	Peak	Yes
NonInPct	2.41	wrong trend	moderate	Midslope	no

NMED EXHIBIT 25

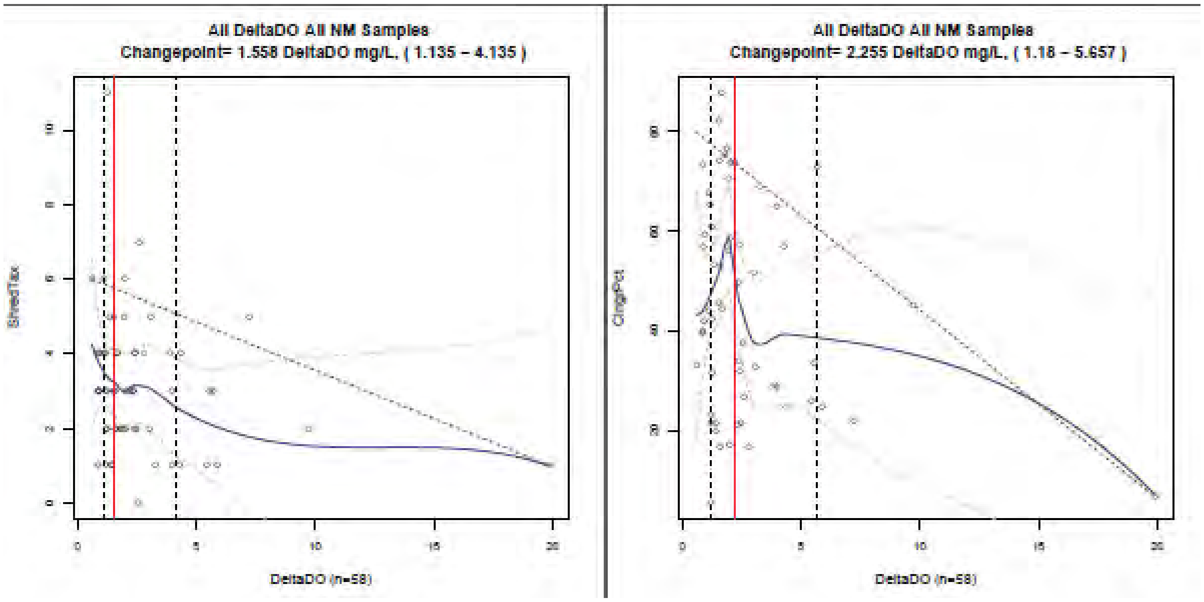

Figure L-33. Change-points for **Delta DO** and **macroinvertebrates** in all sites.

Table L-33. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	1.56	OK	moderate	Midslope	Yes
ClngrPct	2.26	OK	moderate	Midslope	Yes

NMED EXHIBIT 25

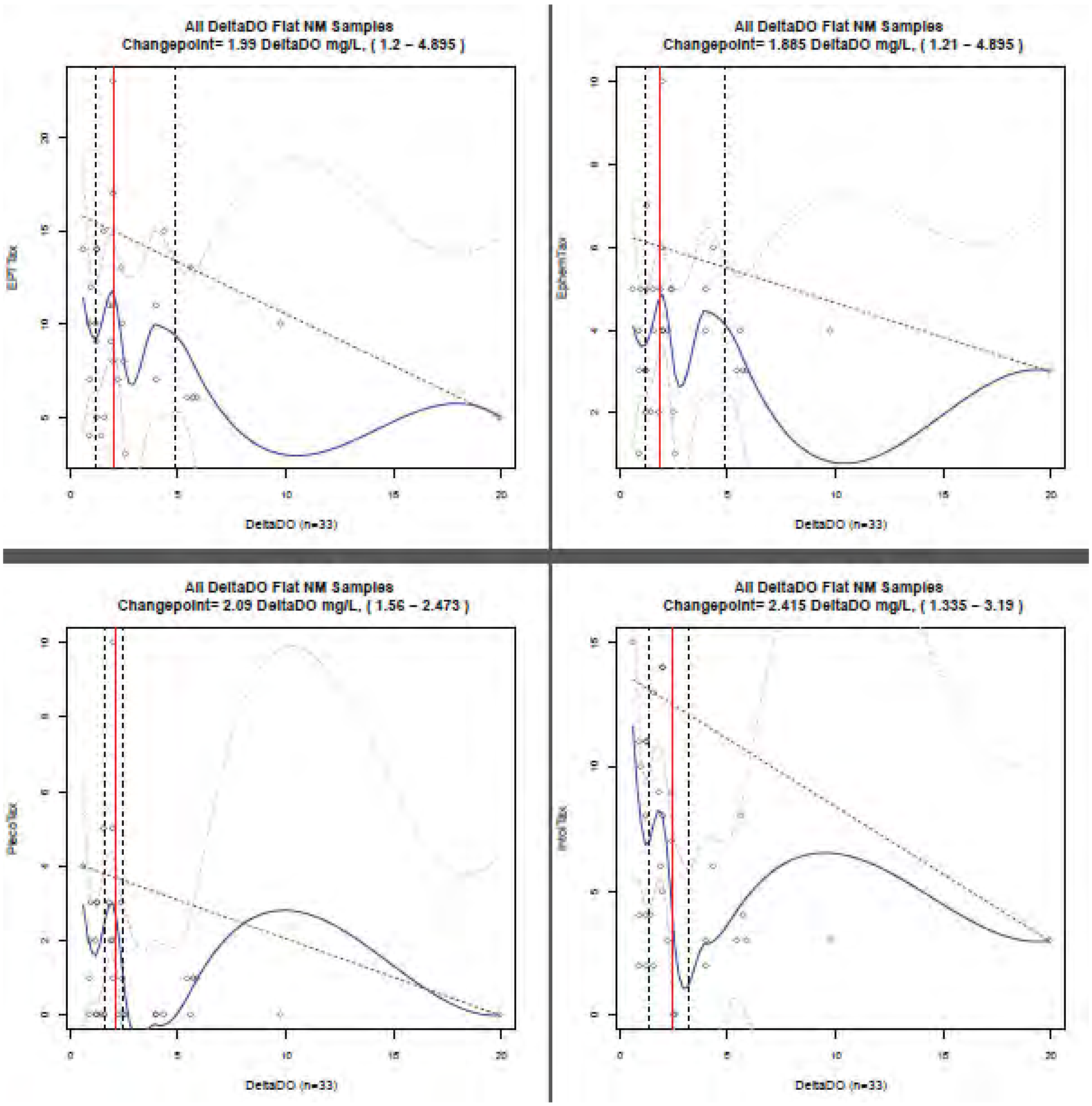

Figure L-34. Change-points for **Delta DO** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-34. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	1.99	OK	moderate	Peak	Yes
EphemTax	1.88	OK	moderate	Peak	Yes
PlecoTax	2.09	OK	narrow	Peak	Yes
IntolTax	2.42	OK	narrow	Midslope	Yes

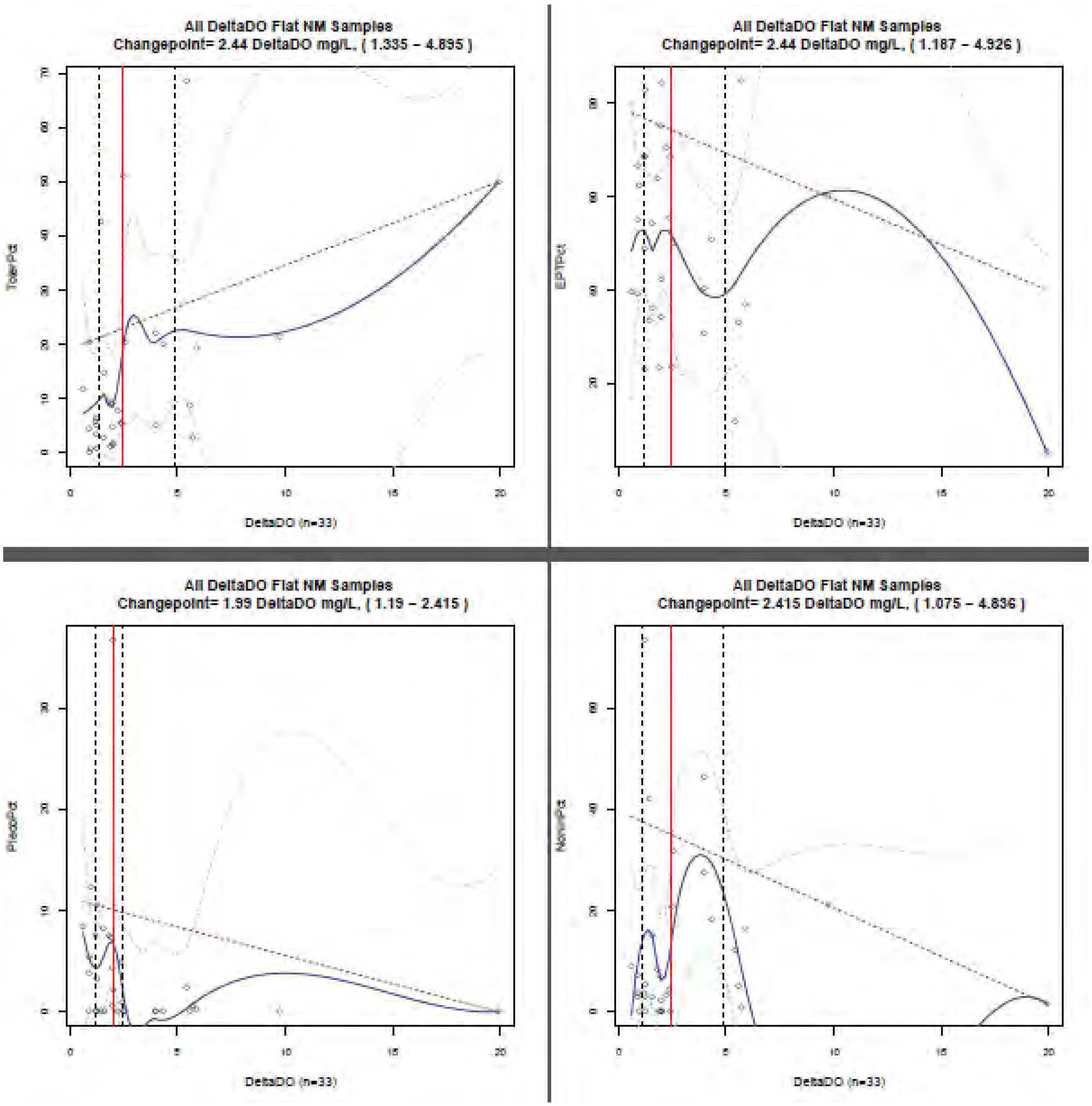

Figure L-35. Change-points for **Delta DO** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-35. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	2.44	OK	moderate	Midslope	Yes
EPTPct	2.44	OK	moderate	Peak	Yes
PlecoPct	1.99	OK	narrow	Peak	Yes
NonInPct	2.42	wrong trend	moderate	Peak	no

NMED EXHIBIT 25

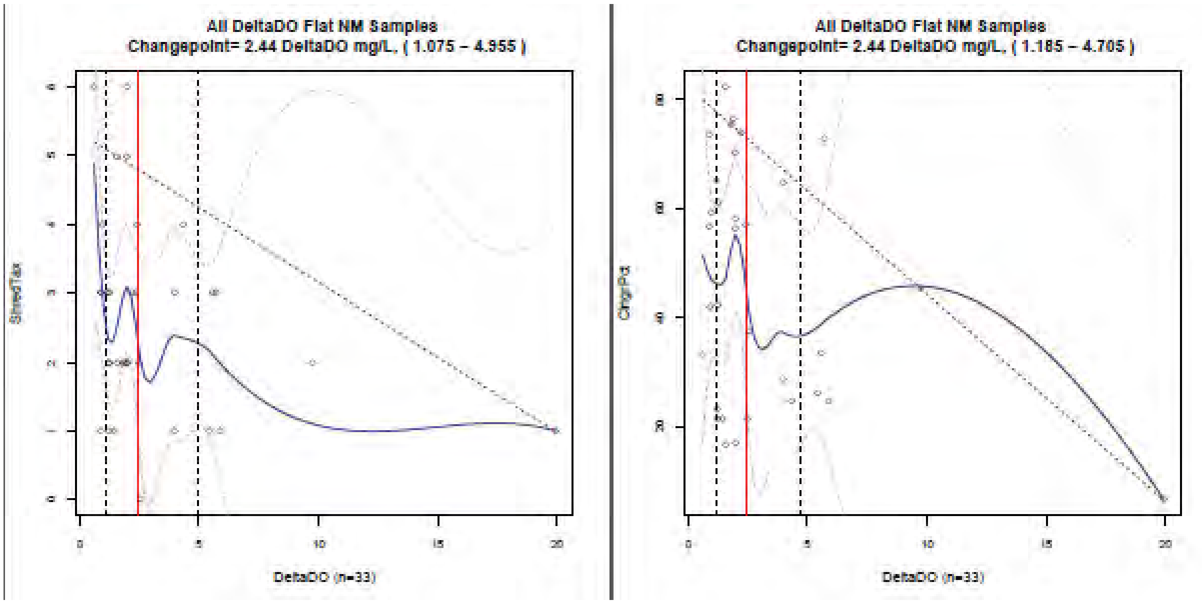

Figure L-36. Change-points for **Delta DO** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-36. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	2.44	OK	moderate	Midslope	Yes
ClngrPct	2.44	OK	moderate	Midslope	Yes

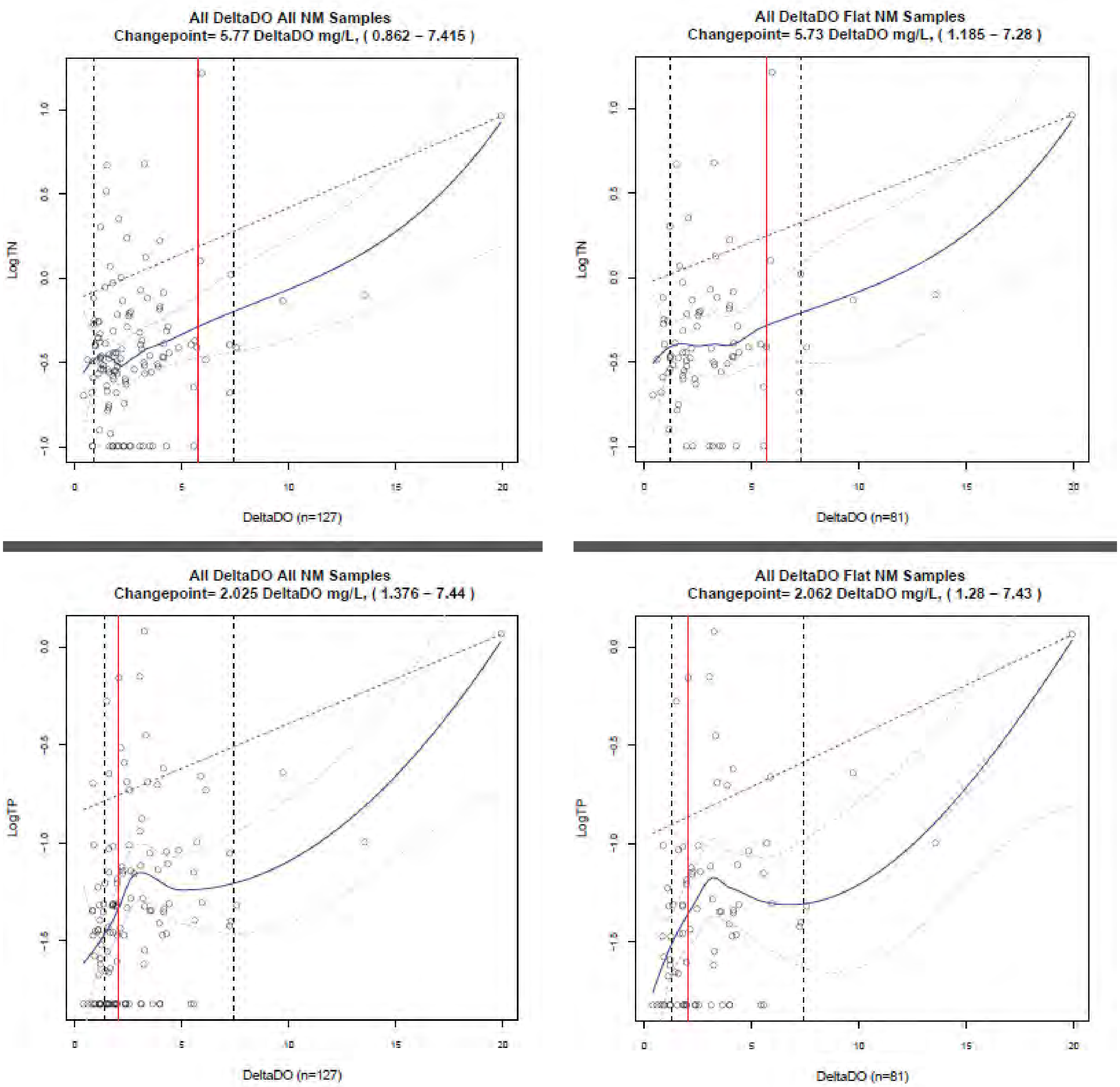

Figure L-37. Change-points for **Delta DO** and **nutrients** in all sites (left) and in the **TP Flat-Moderate** class (right).

Table L-37. Change-point evaluation.

Nutrient/subset	CP	QR95	CP_CI	Loess	Retain
TN/All	5.77	OK	Broad	Midslope	Yes
TP/All	2.025	OK	Broad	Midslope	Yes
TN/Flat	5.73	OK	Broad	Midslope	Yes
TP/Flat	2.062	OK	Broad	Midslope	Yes

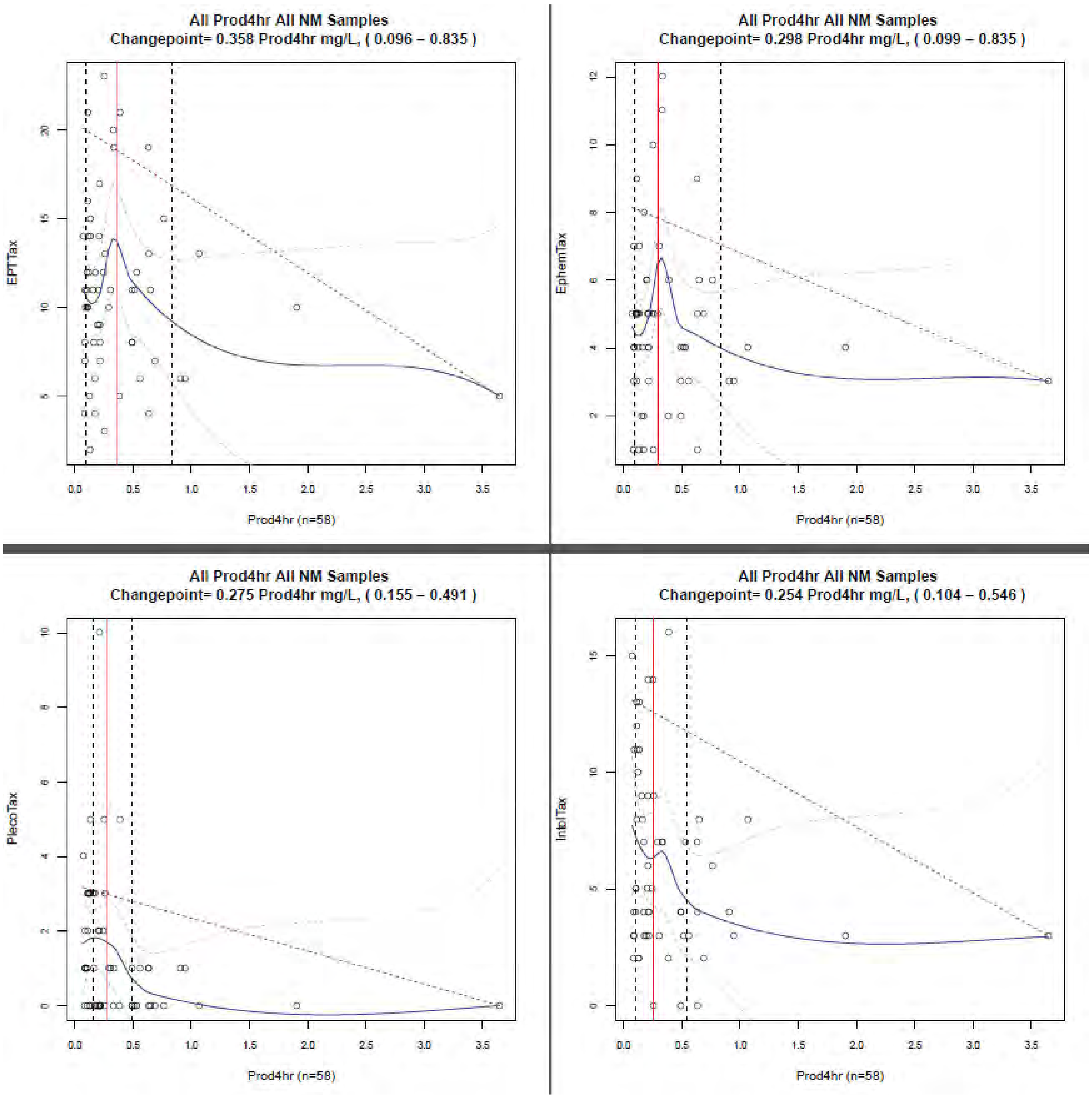

Figure L-38. Change-points for **Pmax4hr** and **macroinvertebrates** in all sites.

Table L-38. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.358	OK	moderate	Peak	Yes
EphemTax	0.298	OK	moderate	Peak	Yes
PlecoTax	0.275	OK	narrow	Peak	Yes
IntolTax	0.254	OK	moderate	Midslope	Yes

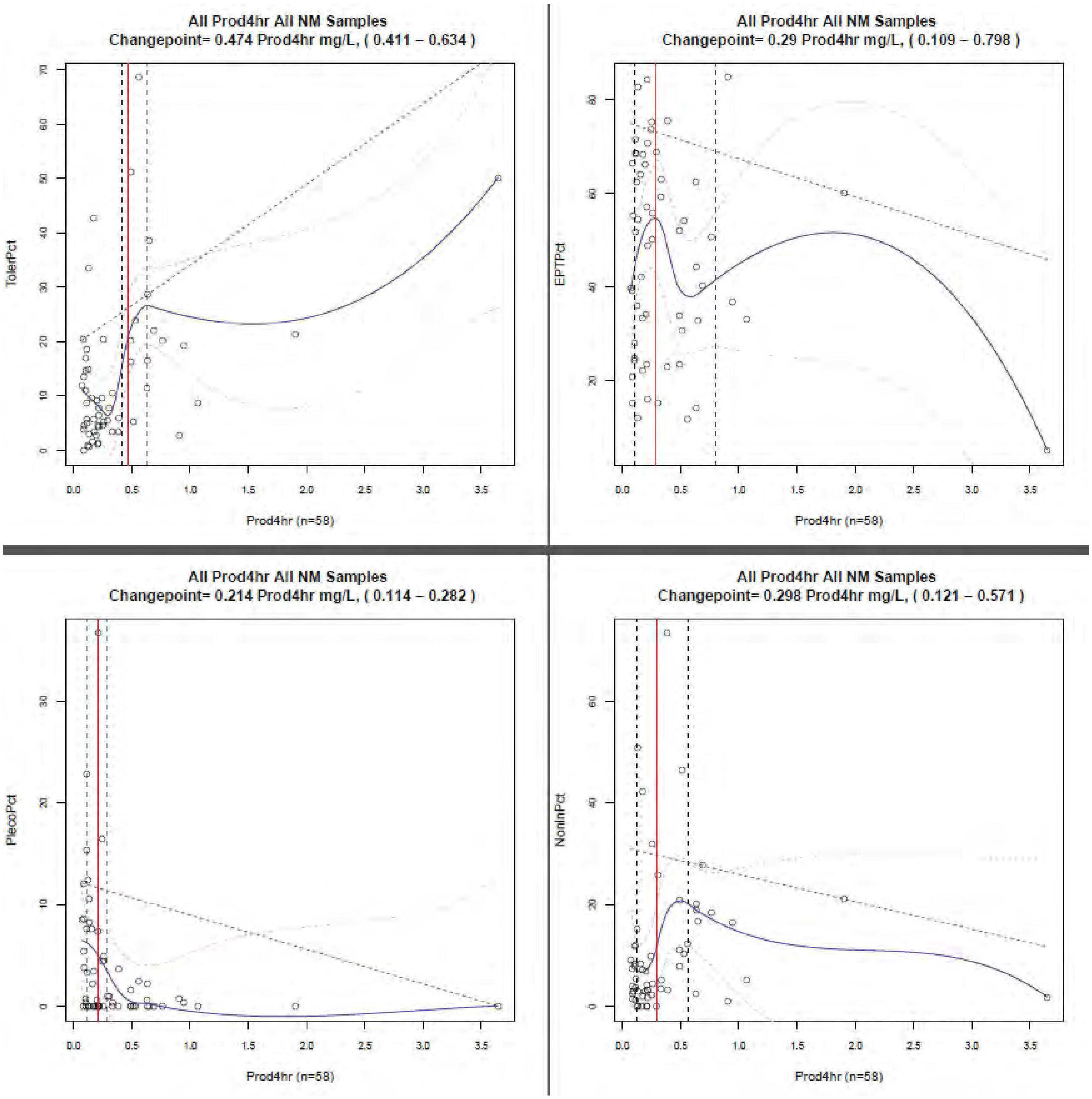

Figure L-39. Change-points for **Pmax4hr** and **macroinvertebrates** in all sites.

Table L-39. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.474	OK	narrow	Midslope	Yes
EPTPct	0.29	OK	moderate	Peak	Yes
PlecoPct	0.214	OK	narrow	Midslope	Yes
NonInPct	0.298	wrong trend	moderate	Midslope	no

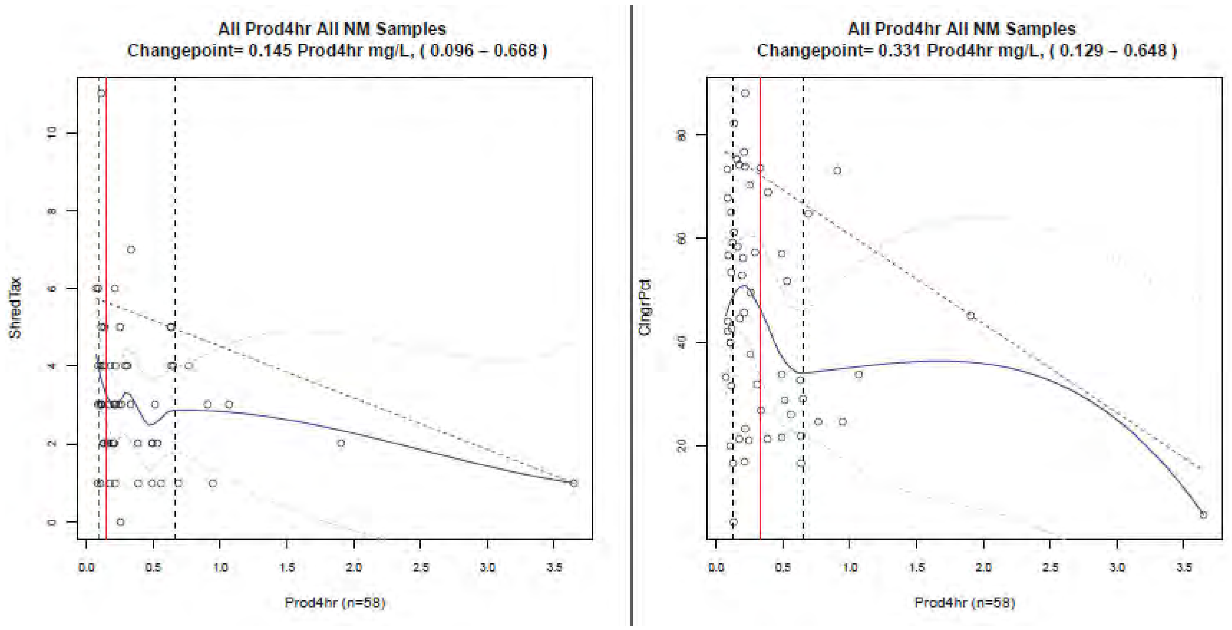

Figure L-40. Change-points for **Pmax4hr** and **macroinvertebrates** in all sites.

Table L-40. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.145	OK	moderate	Midslope	Yes
ClngrPct	0.331	OK	moderate	Midslope	Yes

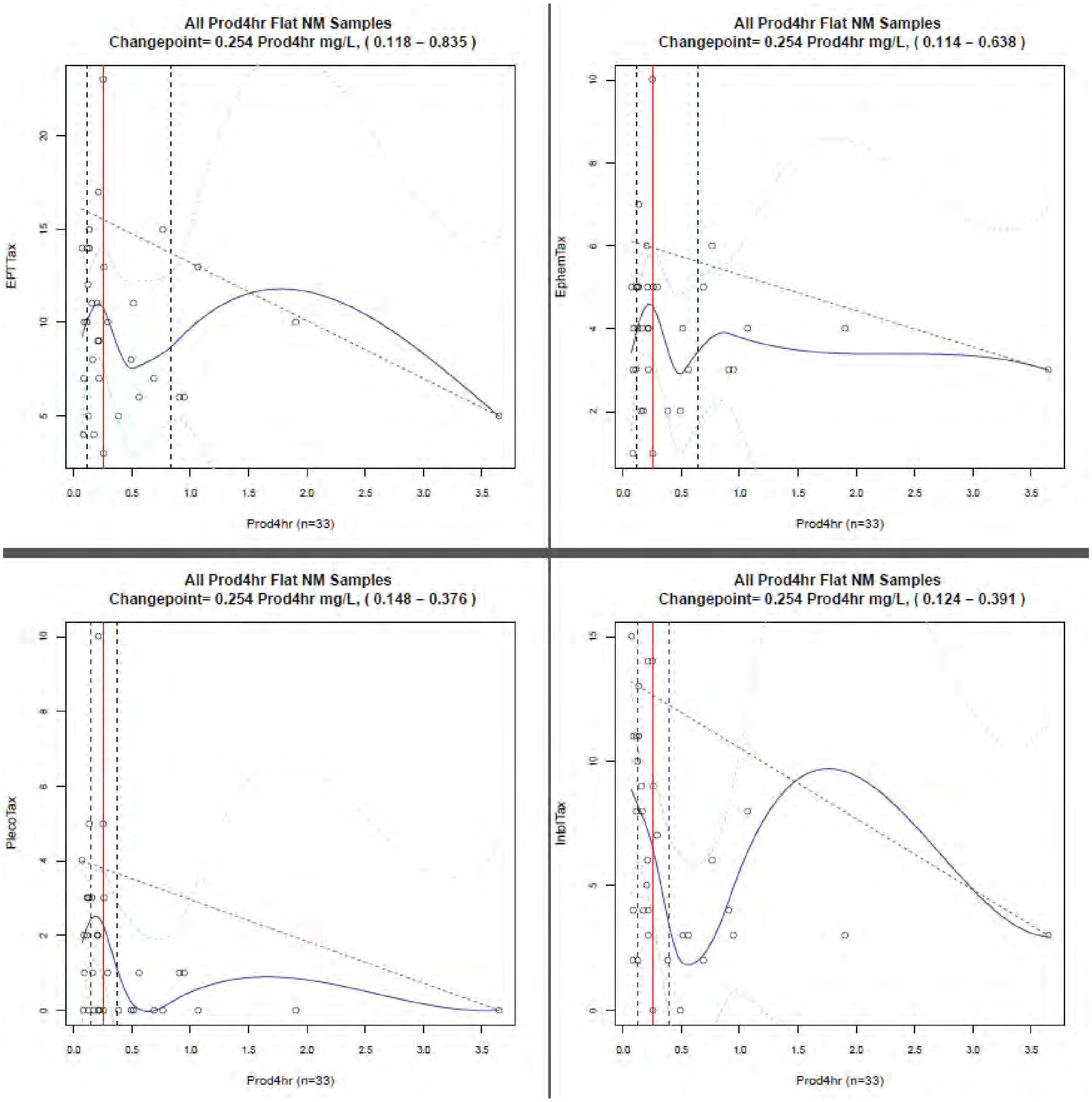

Figure L-41. Change-points for **Pmax4hr** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-41. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
EPTTax	0.254	OK	moderate	Peak	Yes
EphemTax	0.254	OK	moderate	Peak	Yes
PlecoTax	0.254	OK	narrow	Peak	Yes
IntolTax	0.254	OK	narrow	Midslope	Yes

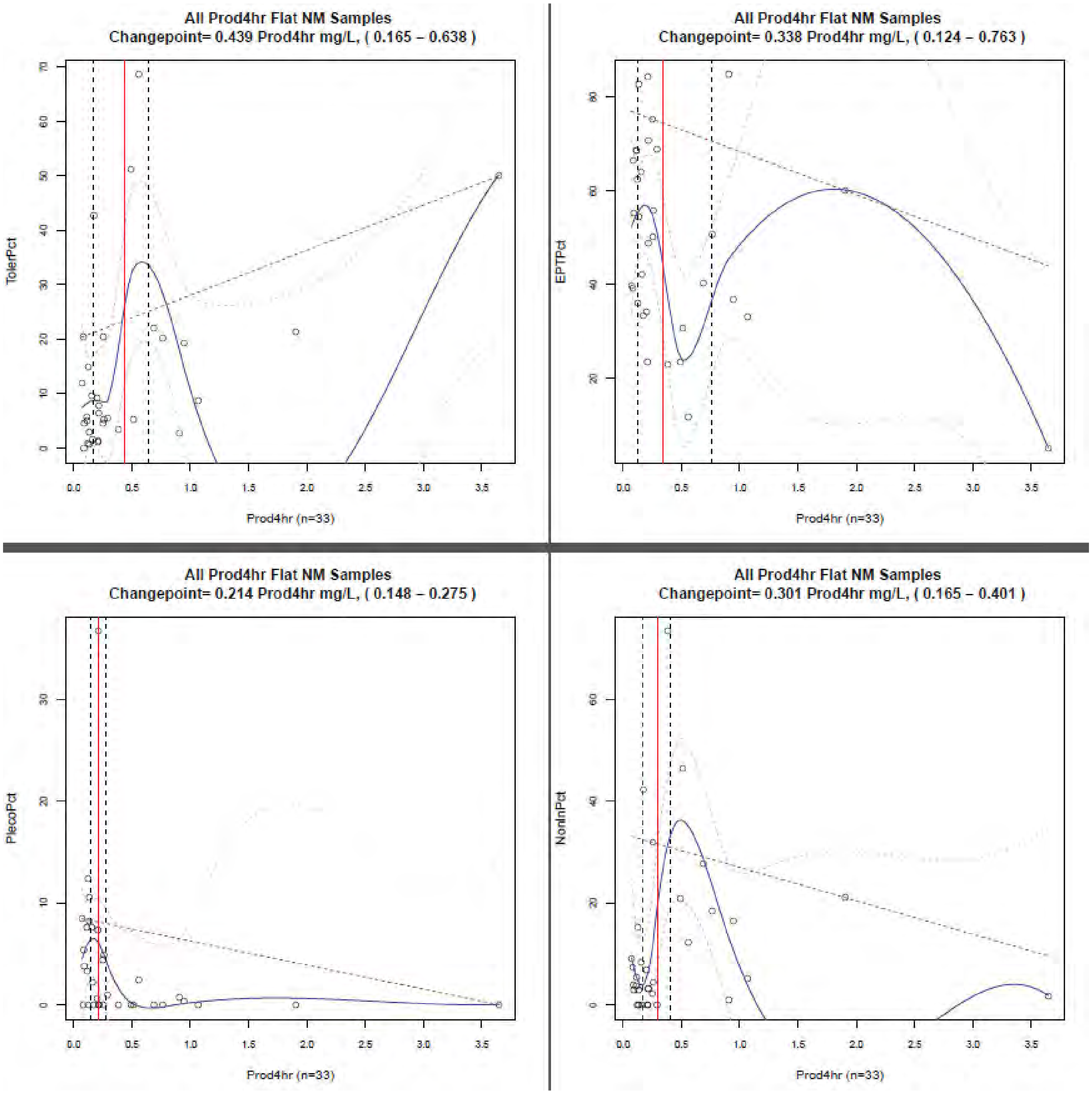

Figure L-42. Change-points for **Pmax4hr** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-42. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
TolerPct	0.439	OK	moderate	Midslope	Yes
EPTPct	0.338	OK	moderate	Midslope	Yes
PlecoPct	0.214	OK	narrow	Peak	Yes
NonInPct	0.301	wrong trend	narrow	Midslope	no

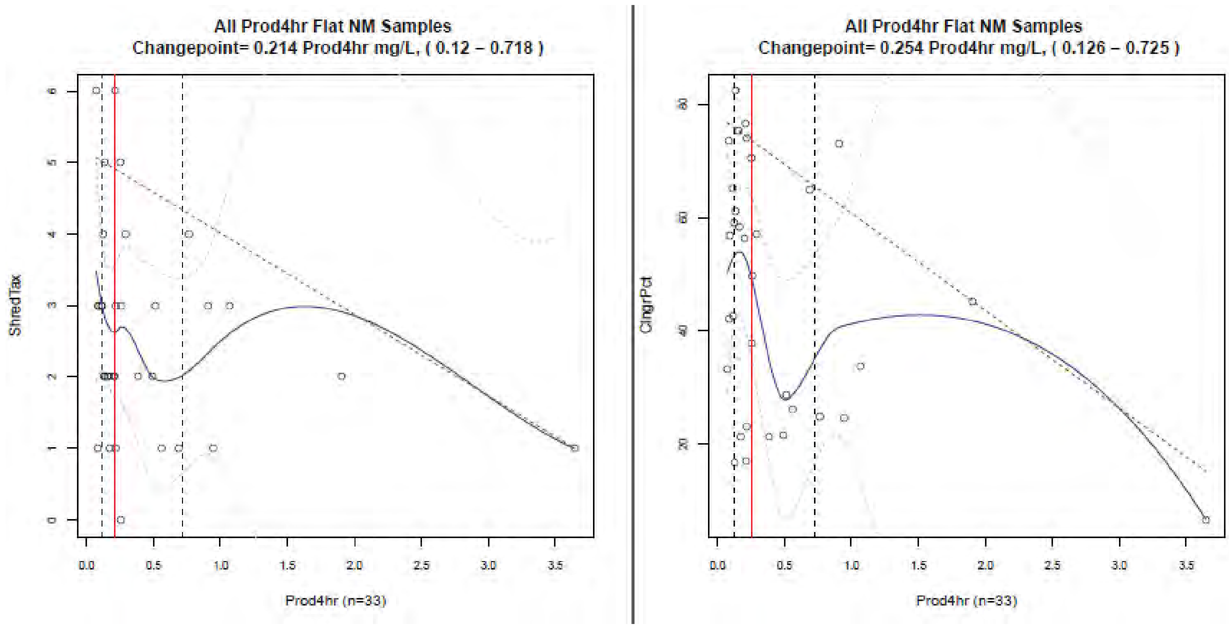

Figure L-43. Change-points for **Pmax4hr** and **macroinvertebrates** in the **TP Flat-Moderate** class.

Table L-43. Change-point evaluation.

Metric	CP	QR95	CP_CI	Loess	Retain
ShredTax	0.214	OK	moderate	Midslope	Yes
ClngrPct	0.254	OK	moderate	Peak	Yes

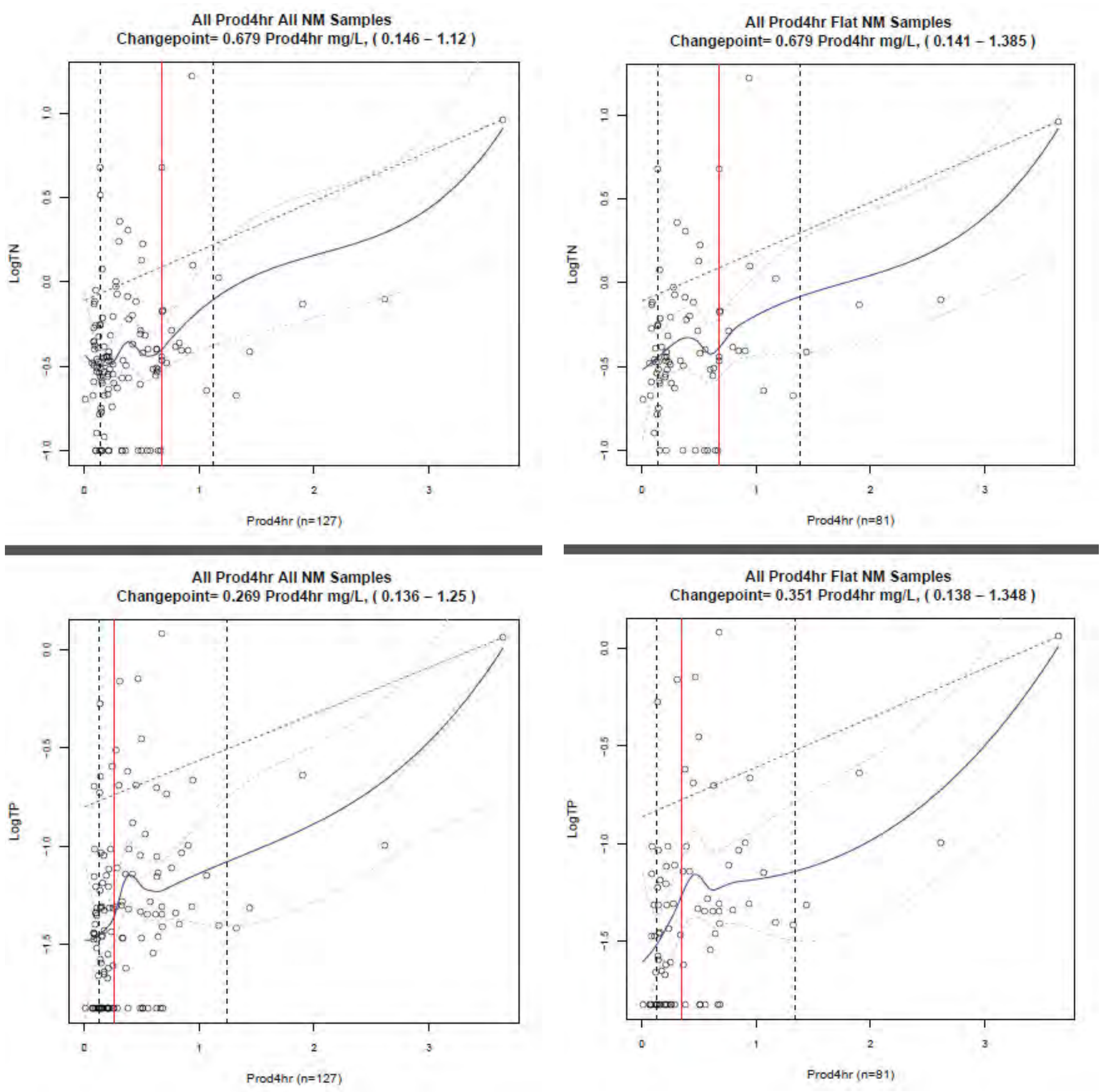

Figure L-44. Change-points for **Pmax4hr** and **nutrients** in all sites (left) and in the **TP Flat-Moderate** class (right).

Table L-44. Change-point evaluation.

Nutrient/subset	CP	QR95	CP_CI	Loess	Retain
TN/All	0.679	OK	Broad	Midslope	Yes
TP/All	0.269	OK	Broad	Midslope	Yes
TN/Flat	0.679	OK	Broad	Midslope	Yes
TP/Flat	0.351	OK	Broad	Midslope	Yes

Refinement of Stream Nutrient Impairment Thresholds in New Mexico

New Mexico Environment Department
Surface Water Quality Bureau

JUNE 1, 2016

NMED EXHIBIT 26

Overview

This document provides a summary of the process the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB) initiated and helped to complete in order to refine thresholds for plant nutrients in perennial, wadeable streams in New Mexico. This effort was necessary to apply the *State of New Mexico Standards for Interstate and Intrastate Surface Waters* narrative standard for plant nutrients found at 20.6.4.13 NMAC:

> ***E. Plant Nutrients:*** *Plant nutrients from other than natural causes shall not be present in concentrations that will produce undesirable aquatic life or result in a dominance of nuisance species in surface waters of the state.*

Narrative criteria must be translated to numeric thresholds for consistent impairment, NPDES permit limit, and TMDL budget determinations. This project follows United States Environmental Protection Agency (EPA) nutrient criteria guidance (EPA 2010) and Empirical Approaches for Nutrient Criteria Derivation (EPA 2009). The goal at this time is to define thresholds for application of New Mexico's narrative nutrient water quality standard rather than numeric water quality criteria. Analysis was conducted to refine nutrient thresholds using regional data, defined reference conditions, relationships between cause and response variables, and a verified classification system.

Staff from Tetra Tech, Inc.; EPA Region 6; EPA's Office of Water, Office of Science and Technology; and SWQB worked as a team to complete this project. With input and directions from the workgroup Ben Jessup of Tetra Tech conducted most of the analysis and drafted the final report (Jessup et al. 2015). The work was supported by EPA's Office of Water, Office of Science and Technology, through the Nutrient Scientific Exchange and Partnership System (N-STEPS) administered by EPA's National Nutrient Criteria Program.

The results of this project will be used to revise the current perennial, wadeable stream nutrient assessment protocol (NMED/SWQB 2015) for development of subsequent Integrated Lists. Revision of the assessment protocol and associated thresholds was needed to better define nutrients from "other than natural causes" and to associate nutrient concentrations with the impairment of designated uses and to identify thresholds that filter out impaired systems.

The analysis consisted of two major approaches: reference conditions and stressor-response relationships. The reference condition approach derived candidate thresholds from distributions of nutrient concentrations from least disturbed sites which are the best estimate of "natural" conditions. Stressor-response analyses derived candidate thresholds by defining the relationships between total nitrogen (TN) and total phosphorus (TP) concentrations (i.e., causal variables) and response variables. Diatom and benthic macroinvertebrate metrics, and dissolved oxygen (DO) and chlorophyll a (chl-a) concentrations and metrics were the response variables used in this anaysis. Response variables represent the relative integrity of the aquatic community and indicate when designated aquatic life uses are being protected and not producing "undesirable aquatic life" or "dominance of nuisance species."

Data were collected within New Mexico and in the surrounding areas through NMED and national monitoring programs, including the National Rivers and Streams Assessment (NRSA), the Wadeable Streams Assessment (WSA), and Environmental Monitoring and Assessment Program (EMAP). A GIS analysis of sites and their catchments was conducted to characterize environmental conditions for use in disturbance gradient designations and site classification. All data were compiled in a relational database. Screening sites for data integrity and completeness resulted in 663 sites with nutrient data for one or more samples collected between 1990 and 2012. Other types of data (diel DO, chl-a, macroinvertebrates, and diatoms) were available for subsets of those sites. All data were screened for outlier values and nutrient values were standardized to common detection limits.

The reference site and disturbance gradient analysis of 542 sites resulted in 31% of sites being identified as least disturbed reference sites. Analysis of reference sites was used to determine site classes based on nutrient conditions. For nitrogen, concentrations were associated with average watershed land slope, and three nutrient classes were identified as TN Flat, TN Moderate, and TN Steep sites. For phosphorus, soil TP and volcanic geology were important in addition to land slope, resulting in three different nutrient classes identified as TP High-Volcanic, TP Flat-Moderate, and TP Steep. Frequency distributions of nutrient conditions in reference sites were used to derive TN, TP, and Delta DO candidate thresholds for each site class.

Correlation and other multivariate techniques supported the major linkages between nutrients, chl-a, DO, diatoms, and macroinvertebrates. Chl-a relationships supported some causal linkages between nutrients and DO but were too weak and variable to support its use as indicator of nutrient impairment. Regression interpolations and change-point analysis for macroinvertebrate, diatom, and DO metrics in response to nutrient concentration resulted in multiple candidate TN and TP thresholds in each site class. For each nutrient and site class, candidate thresholds from all analyses were evaluated and the selected values are shown in the table below:

Table 1. Proposed TN, TP, and DO thresholds

Nutrient Site Class	TN (mg/L)	TP (mg/L)	Delta DO (mg/L)
TN Flat	0.65	-	-
TN Moderate	0.37	-	-
TN Steep	0.30	-	-
TP High-volcanic	-	0.084	5.02
TP Flat-Moderate	-	0.061	4.08
TP Steep	-	0.030	1.79

This document provides a summary of the nutrient threshold development process and is excerpted from the final report Prepared by Tetra Tech, Inc. in cooperation with NMED, EPA, and the N-STEPS Program (Jessup et al. 2015). The entire 100+ page final report details the results of each analysis, and is available on the SWQB web site at: https://www.env.nm.gov/swqb/Nutrients/.

Table of Contents

1. Selecting and Evaluating Data

Water quality data were compiled from multiple sources: NMED monitoring programs, the National Rivers and Streams Assessment (NRSA) and the Wadeable Streams Assessment program (WSA) (Table 2). Most monitoring took place in the critical low flow index period from August to November. Samples used in this project were collected between 1990 and 2013. The study area included the state boundaries of New Mexico as well as regions in adjacent states in a level 3 ecoregion that also exist within New Mexico. For most ecoregions, sites within 50 miles of New Mexico were included. To the north and east of New Mexico, sites from further away (up to 150 miles) were included.

NMED provided four types of data for this analysis: nutrients and other chemical parameters, periphyton, macroinvertebrates, and diel dissolved oxygen. Periphyton data consisted of both biomass as benthic chlorophyll a (benthic chl-a) and diatom community composition (diatoms). NMED monitored four of EPA's recommended primary water quality variables in New Mexico streams (TN, TP, benthic chl-a, and turbidity) plus a number of secondary variables including DO concentration, DO percent saturation, specific conductance and pH (NMED/SWQB 2008). NMED collected and processed samples in accordance with methods documented in an EPA approved Quality Assurance Project Plan (QAPP) https://www.env.nm.gov/swqb/QAPP/index.html and associated Standard Operating Procedures (SOP) https://www.env.nm.gov/swqb/SOP/index.html . For the NRSA projects, benthic macroinvertebrates, periphyton, and both benthic and sestonic chl-a data were available (EPA 2004). For the WSA data, benthic macroinvertebrates were the only biological data available. All data were compiled in a single relational database (Microsoft Access), though data from each source were maintained in separate database tables (Tetra Tech 2014). Screening sites for data integrity and completeness resulted in 663 sites with nutrient data for one or more samples collected between 1990 and 2012. Other types of data (diel DO, chl-a, macroinvertebrates, and diatoms) were available for subsets of those sites.

1.1 Water Quality Data

The NMED nutrient records were most numerous and complete, while other types of data were relatively sparse. The NMED nutrient database included more than 7,000 records of nutrient concentrations from 883 stream sites. Four primary water quality variables were monitored in New Mexico streams (TN, TP, benthic chl-a, and turbidity) plus a number of secondary variables including DO concentration, DO percent saturation, and pH. TN was calculated by adding total Kjeldahl nitrogen (TKN), and nitrate plus nitrite (NO3+NO2). All nutrient data were screened for outlier values then standardized to common detection limits (0.03 mg/L for TP and 0.1 for both NO3+NO2 and TKN). Based on review of scientific literature, limited data analysis, and review of analysis of similar data sets, half detection limit substitutions were used for all analyses (Antweiler and Taylor 2008, Helsel 2010). Approximately 150 NMED nutrient records were identified as outliers and removed from analytical data sets. Many outliers were associated with storm flows and fire runoff.

Table 2. Data summary by source.

NMED:	*883 valid sites in NM with water chemistry (targeted sampling design)* *Multiple samples per site (approximately 7352 samples)* *Years 1990 - 2012* *Chemistry, site & habitat characteristics (partial data depending on site and visit)* *Benthic macroinvertebrate samples in 202 sites (440 samples)* *Periphyton (diatoms) in 212 sites* *Benthic chl-a in 146 sites* *Diel dissolved oxygen data in 175 sites*
NRSA:	*88 sites, each with a single visit (probabilistic sampling design)* *Years 2008 - 2009* *44 sites in NM, others within 50-150 miles of NM* *Chemistry, benthic & sestonic chl-a, periphyton (diatoms), site &* *habitat characteristics at each site*
WSA:	*56 sites, each with a single visit (probabilistic sampling design)* *Years 2000 - 2004* *10 sites in NM, others within 50-150 miles of NM* *Chemistry, benthic macroinvertebrates, site & habitat characteristics at each site*

1.2 Chlorophyll a

Of the NMED wadeable stream sites with nutrient data, 174 also had benthic chl-a data (including 35 with benthic macroinvertebrate data as well). These samples were collected between 2004 and 2011 in the months of August to November. Chl-a data were also collected for 50 NRSA sites, including both benthic and water column measures.

1.3 Periphyton Data

Periphyton data in and around New Mexico were collected by NMED and the NRSA. NMED collected roughly 212 diatom samples from 2002 to 2008 mostly in the fall sampling season (August - November). Samples were collected using a targeted richest habitat sampling method (NMED 2014). Periphyton data from 69 NRSA sites in and around New Mexico were added to a single periphyton database. Approximately 68 diatom metrics were calculated including metrics and taxa attributes described by Porter et al. (2008), Stevenson et al. (2008), and periphyton indices developed by Potapova and Charles (2007). Potential bias that might be introduced by different sampling protocols was investigated by comparing metric distributions.

1.4 Benthic Macroinvertebrates

NMED macroinvertebrate samples were collected using primarily four different methods, including reachwide, EMAP targeted riffle, kicknet from riffles, and Hess from riffles. Biomonitoring samples were collected in accordance with the EPA Rapid Bioassessment Protocol (RBP) (Barbour et al. 1999), the NMED Standard Operating Procedures (SOP) (NMED/SWQB 2015) and/or modified EPA EMAP macroinvertebrate sampling method (Peck et al. 2006). Opportunities to aggregate samples collected by different methods were explored and samples from multiple methods were pooled when the results of each method overlapped in stressor-response bi-plots. Samples methods with non-overlapping data points in the bi-plots were not used. NRSA and WSA benthic data were collected with consistent reachwide or targeted riffle methods (Peck et al. 2006) and were summarized as metrics in spreadsheet format. In the WSA and NRSA datasets, 56 and 40 benthic samples (respectively) matched chemistry samples.

1.5 Diel Dissolved Oxygen

Diel dissolved oxygen data were collected by NMED in stream sites throughout New Mexico between June and October (mostly August and September) from 2001 to 2012. These data were collected along with pH, specific conductance, temperature, and turbidity using multi-parameter, continuous recording sondes with recording periods of at least 48 hours and recording intervals ranging from 15 – 60 minutes. The data from approximately 200 spreadsheets were combined into a single data set so that metrics could be calculated efficiently. Data were checked for errors and data points or whole records were revised or eliminated if they were perceived to be inconsistent. There were four record sets with minimum DO greater than 10 mg/L that were removed as outliers.

After QC, statistics on 175 diel DO records were calculated. Diel DO statistics were related to nutrients in 133 sites. Diel DO and chl-a measurements coincided in 64 sites. Numerous metrics were calculated for each DO record including overall minimum DO, maximum daily fluctuation (Delta DO), gross primary production (GPP), ecosystem respiration (ER), and standard distribution statistics. NMED provided metrics on the maximum productivity (Pmax) and respiration (Rmax) in each data set based on 2, 3, and 4 hour intervals. The 4-hour interval was used for this analysis. Distribution metrics were also calculated for DO percent saturation data. In addition, system metabolism was calculated as GPP and ER, which accounted for temperature, elevation, and estimates or derivations of barometric pressure, nighttime regression, and light exposure. The calculations were carried out in R software using code provided by Dr. Robert Hall (Department of Zoology and Physiology, University of Wyoming, Laramie, WY).

2. Defining Human Disturbance Gradient

Site characteristics were observed or measured in the field, or derived from GIS analysis. The observed or measured data were recorded during site visits and included physical habitat assessments, channel dimensions, slope, canopy cover, riparian vegetation, riparian integrity, substrate characterizations, flow, and more. Each data source (NMED, NRSA, and WSA) included somewhat different variables for the observed and measured site characteristics. For NMED, habitat and flow variables were not collected at each site, but were often associated with benthic macroinvertebrate samples.

GIS analysis was conducted on a subset of 660 sites prioritized based on data completeness and potential reference site status. The information summarized from the GIS analysis includes land use, human activities, and environmental characteristics that are appropriate for reference site designation and site classification. These data include information on the setting of the sampling site and surrounding areas, such as ecoregion, average land slope, land use types and intensity, roads and road crossings, population density, watershed area, and more (Table 3).

Table 3. Variables used in GIS analysis**.**

Variable	Description
Point Values	
Stream Slope	NHD Plus join with flowline attributes table
Stream Order	NHD Plus join with NHDFlowlineVAA table
Elevation (cm)	NHD Plus DEM files
Designated Use	RAD 305b Assessed Segments joined with ATTAINS data
Precipitation	PRISM
Temperature	PRISM
Level 3 and 4 Ecoregions	EPA Ecoregions
Geology	USGS Integrated Geological Map
Watershed Values	
Road density	Attila tool and TIGER 2000 files
Number of road/stream crossings	ARCGIS tools
Land Slope	ARCGIS Spatial Analysis Slope tool
Land Use and Cover	Attila tool and NLCD 2006 data
Canopy Density	Attila tool and NLCD 2001 Canopy data

Reference sites were needed for characterizing the nutrient conditions in the absence of substantial disturbance. This allowed exploration of natural variation in nutrient concentrations across the study area and for derivation of potential nutrient thresholds from distributions of nutrient values in the least disturbed sites. Stream classification and reference site designations hinged upon each other to characterize nutrient conditions relative to both natural and disturbance gradients.

Land use coverage and human activity in the catchments were examined for appropriate thresholds to indicate different levels of disturbance. Development and agricultural land uses indicate catchment scale intensity of disturbance. Both pasture and crops were considered agricultural uses. Forest, water, and wetland are usually undisputable natural land covers. However, the "natural-ness" of scrub/shrub, grassland, and barren coverages are uncertain because they could be due to human activities or natural environmental factors, especially in more arid areas. Therefore, the known disturbances were emphasized. Road density and the density of road-stream crossings were used as a surrogate for intensity of human activity in the watershed. Known human activities in the catchment (dams, NPDES permits, Superfund sites, and mines) were used to qualify reference sites. Information on these activities were available as counts in the catchment, densities (counts/catchment area), and distance to the sampling site.

For each reference criteria variable, thresholds were established for five disturbance categories from reference to extremely stressed sites (Table 4). The thresholds were derived from distribution statistics for each criterion in all sites. The percentiles were used as guidelines for establishing thresholds, but subjective adjustments were made to arrive at feasible values and adequate numbers of sites in each disturbance category. Five disturbance categories were defined from best to worst conditions: Reference, Near-Reference, Other, Stressed, and Extremely Stressed. To receive reference status, a site must not fail any of the Stressed criteria and must pass at least 7 of the 8 Reference criteria. Near-Reference sites did not fail any of the

Stressed criteria and passed at least 7 of the 8 Near-Reference criteria. Stressed and Extremely Stressed sites failed at least 2 of the Stressed or Extremely Stressed criteria, respectively. Sites that did not fall into any of these categories were classified as Other.

Table 4. Reference and stressed site criteria, based on distributions of values over all 660 sites.

Variable	Reference	Near Reference	Stressed	Extreme Stress
Urban Index (% cover)	0.01	0.02	1	2
Agricultural index (% cover)	0.1	0.5	4	5
Road Density (mi/mi^2)	1	1.4	3	5
Road Crossing Density ($\#/mi^2$)	1	1.25	2	5
Dam Density ($\#/mi^2$)	0	0.005	0.03	0.05
NPDES Density ($\#/mi^2$)	0	0.01	0.1	0.2
Superfund Density ($\#/mi^2$)	0	na	0.01	na
Mine Density ($\#/mi^2$)	0.05	0.1	5	10
Dam Distance (mi)	na	na	1	0.5
NPDES Distance (mi)	na	na	1	0.5
Superfund Distance (mi)	na	na	2	1
Mine Distance (mi)	na	na	0.5	0.25

Because the NMED staff are familiar with site conditions that may not be reflected in the GIS data, they reviewed the reference designations indicated through empirical analyses and made changes to designations based on knowledge of the sites. For example GIS coverages do not reflect the intensity of grazing. Most of the designations (83%) assigned by numeric site criteria based on GIS analysis of land use coverage and human activity in the catchments were confirmed during the NMED review.

The reference site analysis and disturbance gradient designations resulted in 20% of sites identified as least disturbed reference sites. Another 11% were designated as near-reference. This is a reasonable proportion of reference sites because sites with potential for least-disturbed reference status were targeted when selecting sites for sampling and analysis. Smaller percentages of sites were designated as stressed (7%) or extremely stressed (6%). The remaining sites were designated as “other”, having moderate levels of disturbance. The reference and near-reference sites were combined and used as the lease disturbed sites for further analysis after confirming that the nutrient distributions were similar.

3. Forming Site Classes

Natural gradients that affect potential nutrient and biological response indicators were examined. Appropriate statistical methods (e.g., principal components analysis, correlation analysis, and examination of bi-plots and distributions, etc.) were used on minimal disturbed sites to develop a stream classification scheme that captures environmental variability. Aggregate ecoregions used in the EMAP-West study (Stoddard et al. 2005)—Mountains, Plains, and Xeric—were considered as a starting point for stream classification, and considered along with other categorical and continuous variables. The classification scheme developed for sediment assessments – Mountains, Foothills, and Xeric areas (Jessup et al. 2014) was also tested. Additional classification categories and variables were examined, including Level III and IV ecoregions (Griffith 2006), geology, latitude, longitude, stream order, elevation, drainage area, average land slope in the catchment, average annual precipitation, average annual temperature, width/depth ratio, entrenchment ratio, sinuosity, channel substrate, and stream slope.

3.1 Principal components analysis

Principal components analysis (PCA) was used as a tool for selecting site classification variables (Table 5). The PCA was run in two configurations: reference and near-reference sites, and all sites. Nutrient-related axes that were correlated with biotic variables were examined to gain insight into potential scaling or classification variables that would minimize biological variability and thus focus biological responses on disturbances. Variables were transformed as needed to approximate normal distributions using logarithmic and Arcsine-Square Root transformations. Ecoregion designations and other classification variables were entered as binary code (true or false).

Table 5. Classification variables.

Code	Description	Type
Latitude	Latitude	Continuous
Longitude	Longitude	Continuous
Elev_m	Elevation (m)	Continuous
DrAreaMi2	Drainage area (square miles) (log transformed)	Continuous
LndSlpAvgpct	Average land slope (%)	Continuous
PrecipAvg30	30 year average precipitation (mm)	Continuous
TempAvg30	30 year average air temperature (C)	Continuous
NMEDnutClass	NMED existing nutrient classes	Categorical
MFX	Mountain, Foothill, and Xeric classes	Categorical
Ecoreg3	Level 3 ecoregion	Categorical
GeolRockType1	Geologic rock type	Categorical

3.2 Correlation analysis

Correlation analysis was used to describe single factor relationships between nutrients and environmental variables in reference sites. In contrast to the PCA, the correlation analysis was always limited to reference sites to emphasize the effects of natural site conditions instead of disturbance levels. The non-parametric Spearman rank order correlation coefficient was used because it is less sensitive to skewed distributions. The relationships suggested by PCA and correlations were examined in box plots and bi-plots. Bi-plots were used to show patterns of relationships between variables and to highlight tertiary attributes of the relationships such as reference status, ecoregion, or other covariates.

Preliminary analysis indicated nutrient data could be pooled across data sources (NMED, NRSA, and WSA) and that the reference and near-reference sites should be combined for the remaining classification exercises. Existing classification schemes based on level 2 ecoregions (Stoddard et al. 2005) or sediment regions (Jessup et al. 2014) showed insufficient separation of nutrient distributions and a determination of a new classification scheme specific to nutrient condition was warranted.

3.3 Classification and Regression Tree

Classification and Regression Tree (CART) models (also called recursive partitioning) account for variation in a dependent variable by progressively splitting samples into two bins that best partition the total variation among samples. This process forms a prediction tree based on a series of binary splits in the data. The first split occurs at the value of the predictor variable that most efficiently (as measured by the mean within-group standard deviation [SD]) partitions overall variation of the dependent variable into two groups. CART then partitions each of these two groups, if justified, into two smaller groups or nodes in the same manner, although the partitioning variable may differ. CART models were built with the R routine, 'rpart' (version 3.0.2; R Development Core Team, http://www.r-project.org/), for both TP and TN. The splits can inform site classification – giving variables and thresholds that partition the data by nutrient levels. At the end of each branch of the tree, TN or TP values are predicted as the average for that group.

A random forest routine (R: random Forest) was conducted to find the most important variables in 500 runs of CART using random subsets of the data for each run. Importance can be used to confirm the selection of variables in the predictive CART model. At first, only continuous variables (Table 5) were used to predict splits relative to site average TP and TN (log transformed) in reference and near-reference sites. Categorical variables were added to the models to determine whether existing classifications were as strong as the quantitative variables.

3.3.1 Phosphorus

Phosphorus values were first partitioned by longitude in the CART models both with and without categorical variables. The split was defined at longitude -108.13 which is the approximate watershed boundary between the Rio Grande and Gila River basins. Additional splits were based on average land slope, latitude, and precipitation. The random forest analysis suggested that the most important classifying variables were longitude (importance measure =

3.04), land slope (2.73), latitude (2.32), and precipitation (2.09). Land slope was the first split of CART analyses conducted separately for sites in western or eastern classes. Steeper sites have lower TP, in general (Figure 1). A CART analysis forcing land slope as the classification variable in all sites resulted in a split threshold of 29%.

NMED reviewed the initial classification analysis resulting in classes defined by longitude and land slope. The longitude split appeared to be driven by the large number of reference sites in the higher background TP watersheds in SW New Mexico. Higher background TP was suspected of being related to volcanic geology, but the geologic designations alone could not explain differences in reference TP. While all of the high TP reference sites were in volcanic regions, other volcanic formations did not have high background TP. Instead, specific basins (8-digit HUCs) were identified with high TP in reference sites. These watersheds correspond to those shown to have high soil TP (Woodruff et al. 2015).

Creation of the TP High-Volcanic site class resulted in 3 site classes for TP (Table 6). The TP High-Volcanic site class had more homogenous reference TP values than the class based on longitude and average land slope. The TP High-Volcanic site class includes the following basins: the Upper Gila, the Upper Gila-Mangas, the San Francisco, the Mimbres, and the San Antonio/Conejos. The San Antonio/Conejos is the only basin that is not in southwest NM. It is a volcanic region along the central section of the northern border of New Mexico. The following smaller basins (12-digit HUCs) were excluded though they are in the Upper Gila basin: Diamond, Taylor and Beaver Creeks (HUCs 150400010404, 150400010406, 150400010402, 150400010403, 150400010305, and 150400010302). The Jemez basin was suspected of being part of this class, but was not because background TP levels were not as high as in other TP High-Volcanic sites.

Sites not in the TP High-Volcanic class were separated into two classes based on 29% average catchment land slope. The TP Steep class has sites with slopes greater than 29% and background TP concentrations that were the lowest of the three classes. The TP Flat-Moderate class has flatter landscapes, though three basins with marginally flat sites (<31.8% land slope) were included because background TP concentrations were higher than typical TP Steep sites. These exceptions included drainages in the Vallecitos, Pajarito and Sulphur/Redondo basins (HUCs 130202020204, 130202010204, and 130202020202).

Table 6. Site classes for TP.

TP High-Volcanic –The class includes all sites in the San Antonio and Conejos, the Upper Gila, Upper Gila-Mangas, San Francisco, and Mimbres basins. In the Upper Gila basin, it excludes sites in the Diamond, Taylor and Beaver Creek sub-basins (HUCs 150400010404, 150400010406, 150400010402, 150400010403, 150400010305, and 150400010302).
TP Flat-Moderate - This class includes all sites less than or equal to 29% average land slope and not in the TP High-Volcanic site class. It also includes sites in three drainages of the Jemez basin, the Vallecitos, Pajarito, and Sulphur/Redondo sub-basins (HUCS 130202020204, 130202010204, and 130202020202).

TP Steep - The Steep class includes all sites with average land slopes greater than 29% and not in the TP High-Volcanic site class.

These three classes had significantly different TP values (Figure 1) based on the non-parametric Kruskal-Wallis test ($p<0.01$ for all comparisons).

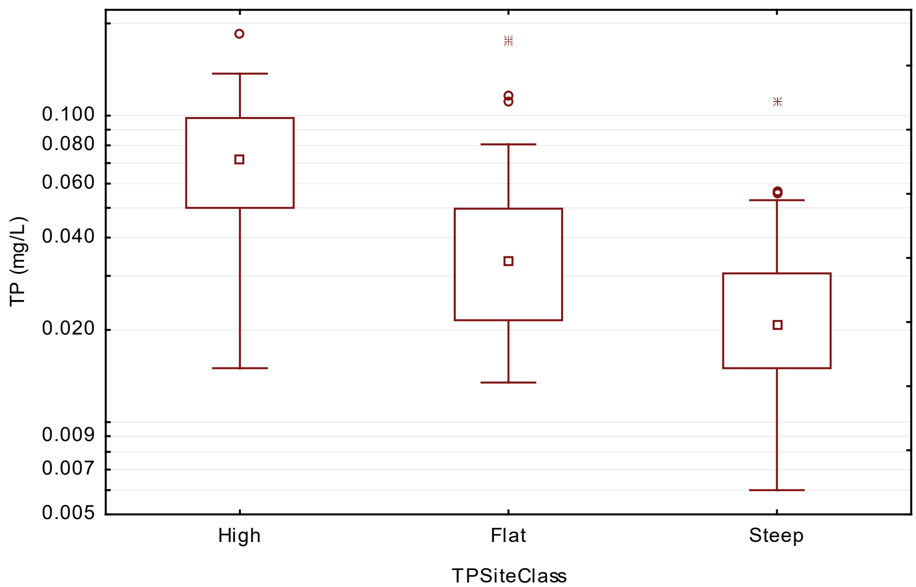

Figure 1. Total Phosphorus (TP) concentrations in reference or near-reference sites by potential site classes for TP. Sample sizes are 55, 76, and 48, in the order displayed.

3.3.2 Nitrogen

Similar to phosphorus, total nitrogen values were first partitioned by longitude in the CART models both with and without categorical variables. Importance coefficients in the random forest analysis were as follows: longitude (1.92), land slope (1.76), precipitation (1.57), latitude (1.44), and temperature (1.28). The split for longitude at -105.2, divided both ecoregions and watersheds. Land slope was explored as a classification variable because it was important in the random forest analysis. A CART analysis with all sites forcing only land slope in the model resulted in 2 splits at 15% and 32%. The western streams with the flattest landscapes were represented by only 12 sites. Because land slope appears to partition TN values as well as or better than longitude *and* land slope, classes were based on land slope alone (Table 7). This classification scheme resulted in distinct TN values within the classes (Figure 2).

Table 7. Site classes for TN.

TN Flat - TN Flat sites have average catchment land slopes less than 15%
TN Moderate - TN Moderate sites have average catchment land slopes from 15% to 32%

NMED EXHIBIT 26

TN Steep - TN Steep sites have average catchment land slopes greater than 32%

The TN values were significantly different based on the non-parametric Kruskal-Wallis test. The differences in relation to the Flat class ($p<0.001$) were greater than the difference between the Moderate and Steep groups ($p=0.03$).

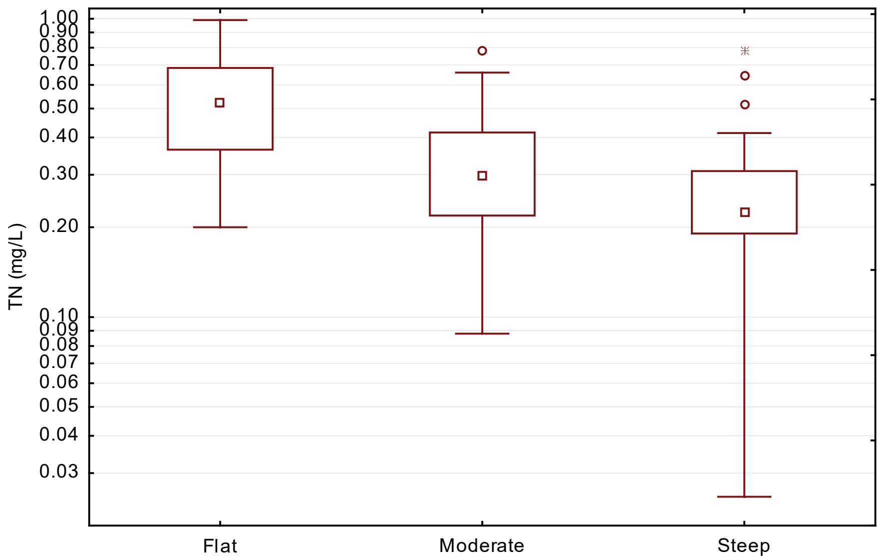

Figure 2. Total Nitrogen (TN) concentrations in reference and near-reference sites by potential site classes for TN. Sample sizes are 31, 95, and 51, in the order displayed.

Different site classes for TN and TP were not anticipated when classifying sites to partition nutrient variability. In the independent analyses for each nutrient, similar classification variables, longitude and land slope, were identified. Though identical site classes for TN and TP were attempted, separate classes for TN and TP were more precise and are appropriate for application of numeric nutrient thresholds.

4. Frequency Distributions

Once sites were divided into the different classes, the frequency distributions of these classes were analyzed. Non-parametric quantiles were calculated from frequency distributions of nutrient concentrations of reference and near reference sites divided into site classes. The distributions were based on median TN and TP concentrations at each site. NMED preferred to use the median values as the best representation of site conditions because the data were log normally distributed and the median was a better estimate of the central tendency of the data. Also, mean values can be biased by a few extreme values. The frequency statistics included data from all data sources for nutrients.

Frequency distributions of reference sites resulted in quantiles that were considered as candidate thresholds for TN and TP in data subsets by site class. Within site classes, the median, 75th, 80th, 85th, and 90th quantiles of the concentrations were determined to characterize the combined reference and near-reference sites (Table 8). To illustrate the validity of using reference quantiles to derive thresholds for the New Mexico data sets, distributions of TP, TN and benthic chl-a were plotted by site class and reference status. Nutrient concentrations generally increased with increasing disturbance. Confidence intervals (90%) were calculated for each quantile using 1001 bootstrap iterations. Analysis was conducted using R software.

NMED chose the 90th quantile to represent a starting point for candidate thresholds. Quantile selection for is dependent upon the data, and the certainty one has that they accurately reflect reference conditions. For this analysis, there was a high level of confidence in reference site selection and the 75th quantile did not seem to include naturally enriched systems. In most cases, the 90th quantile was more closely aligned with the benthic macroinvertebrate and diatom change point analyses, and is hence assumed protective of the applicable designated aquatic life use(s). However, lower quantiles were selected when the 90th quantile did not align with stressor response thresholds (highlighted in Table 8).

Benthic chl-a concentrations were evaluated in the TP classes and had only one observation per site. For benthic chl-a, median values in Stressed and Highly Stressed categories were consistently higher than medians in Reference and Near-Reference categories, though the stressed categories were represented by fewer than five samples in all but the TP Flat-Moderate class. The uneven distribution of benthic chl-a in the TN site classes did not allow for this type of analysis.

Table 8. Frequency distribution statistics for median TP and TN reference sites. The recommended candidate thresholds are highlighted.

	TP (mg/L)			TN (mg/L)		
Quantile	Lower 90% CI	Value	Upper 90% CI	Lower 90% CI	Value	Upper 90% CI
	TP High-Volcanic (N=55)			TN Flat (N=30)		
50th	0.049	0.058	0.071	0.38	0.47	0.56
75th	0.072	**0.084**	0.09	0.55	0.61	0.67
80th	0.08	0.088	0.104	0.56	0.62	0.7
85th	0.084	0.092	0.106	0.59	**0.65**	0.84
90th	0.089	0.105	0.114	0.62	0.69	0.85
	TP Flat-Moderate (N=76)			TN Moderate (N=96)		
50th	0.016	0.025	0.033	0.23	0.25	0.28
75th	0.034	0.041	0.05	0.33	0.35	0.37
80th	0.036	0.048	0.058	0.35	**0.37**	0.41
85th	0.043	0.054	0.061	0.36	0.40	0.45
90th	0.051	**0.061**	0.069	0.38	0.42	0.51
	TP Steep (N=48)			TN Steep (N=53)		
50th	0.015	0.015	0.015	0.18	0.20	0.21
75th	0.015	0.015	0.018	0.21	0.23	0.27
80th	0.015	0.016	0.023	0.22	0.25	0.3

85th	0.015	0.018	0.035	0.24	0.28	0.33
90th	0.016	**0.030**	0.053	0.26	**0.30**	0.34

Quantiles of Delta DO and Pmax4hr diel DO measures in reference and near-reference sites were similar in the High-Volcanic and TP Flat-Moderate site classes and were relatively lower in the TP Steep site class (Table 9). Delta DO and Pmax4hr increased with increasing stress in the streams, especially in the TP Flat-Moderate site class.

Table 9. Frequency distribution statistics for diel DO statistics in valid reference and near reference sites. The recommended candidate threshold (90th quantile) is shown in bold-type.

Quantile	Delta DO			Pmax4hr		
	Lower 90% CI	Value	Upper 90% CI	Lower 90% CI	Value	Upper 90% CI
	TP High-Volcanic			TP High-Volcanic		
50th	1.93	2.17	3.03	0.176	0.304	0.439
75th	2.17	3.27	4.29	0.331	0.501	0.648
90th	3.13	**5.02**	7.24	0.460	**0.635**	0.720
	TP Flat-Moderate			TP Flat-Moderate		
50th	1.22	2.28	3.52	0.148	0.208	0.393
75th	2.28	3.06	3.98	0.296	0.501	0.678
90th	3.52	**4.08**	7.26	0.493	**0.682**	1.200
	TP Steep			TP Steep		
50th	1.10	1.13	1.57	0.095	0.105	0.196
75th	1.10	1.57	2.37	0.105	0.186	0.490
90th	1.40	**1.79**	2.37	0.126	**0.284**	0.490

5. Evaluating Estimated Stressor-Response Relationships

Step 4 of Empirical Approaches for Nutrient Criteria Derivation (EPA 2009) is Evaluating Estimated Stressor-Response relationships. A conceptual model is helpful in defining stressor-response relationships. Conceptual models were developed to represent known relationships between changes in TN and TP concentrations, biological effects, and attainment of designated uses. Conceptual nutrient models are well established and were not reconstructed for this study. Instead, the conceptual model published by EPA (2010) was used as a standard that is applicable in New Mexico streams (Figure 3). The conceptual model shows intricate pathways of effects. It illustrates interactions that might be effective though our analytical data set is insufficient to account for them. Analyses that compared indirect elements in the conceptual model (e.g., relating nutrient concentrations to macroinvertebrate responses) relied on the validity of the intermediate linkages. The conceptual model provides a means of communicating the current state of knowledge regarding the effects of TN and TP in aquatic systems and is an important tool for guiding causal analyses.

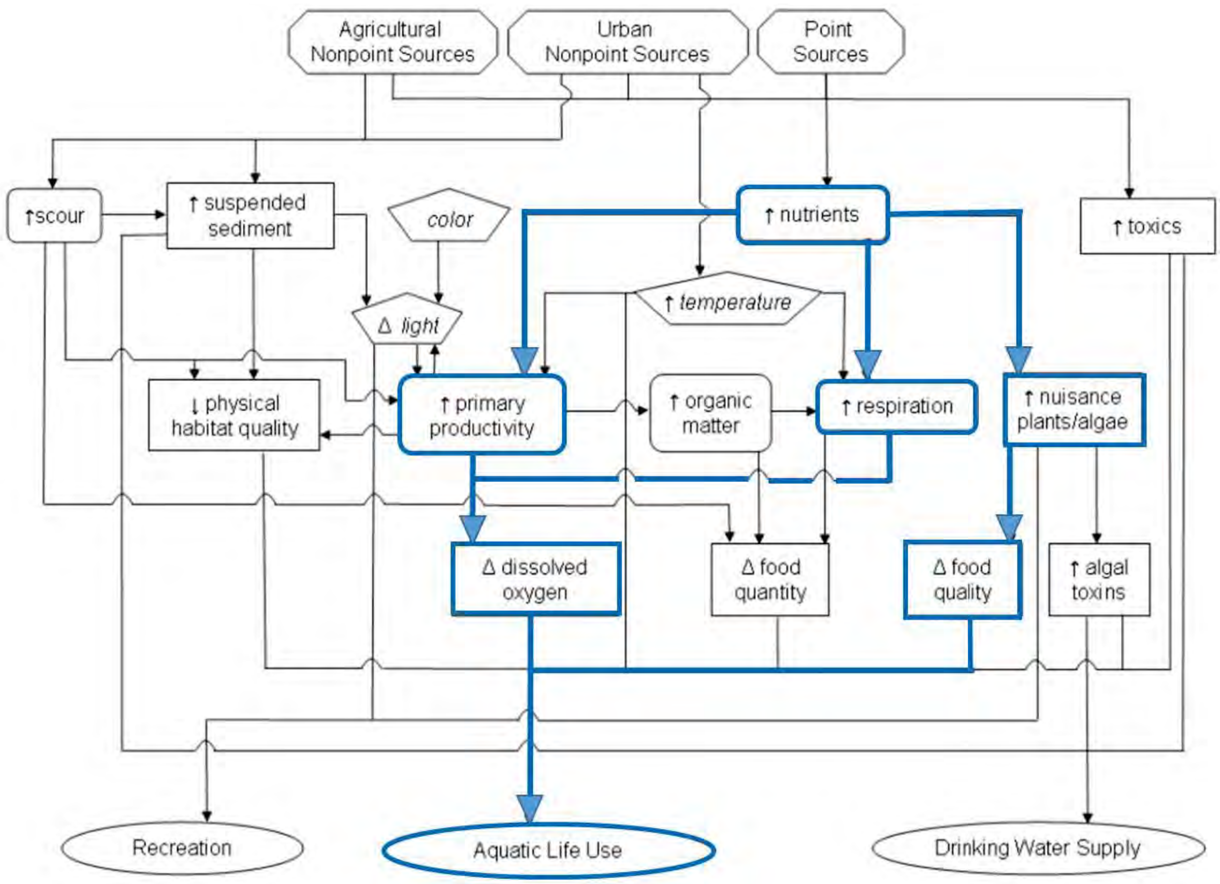

Figure 3. Conceptual diagram linking sources of human disturbance with designated uses through pathways that include nutrients (from EPA 2010).

The linkages and relationships explored through stressor-response analysis are listed below. These relationships were analyzed as one-to-one stressor-response relationships, and as indirect relationships (e.g., nutrient-macroinvertebrate responses without intermediate links). The indirect relationships between nutrients – DO and nutrients – macroinvertebrate metrics were explored in addition to the direct nutrient – chl-a – DO – macroinvertebrate relationships.

1. ↑ Nutrients = ↑ Chlorophyll a
2. ↑ Chlorophyll a = Δ DO dynamics
3. ↑ Nutrients = Δ Diatom Metrics
4. Δ DO dynamics = Δ Macroinvertebrate Metrics
5. ↑ Nutrients = Δ DO dynamics

5.1 Correlations and Interactions

To strengthen understanding of the primary linkages in the conceptual model (nutrients - chl-a, chl-a - DO dynamics, nutrients - diatom metrics, and DO - macroinvertebrate metrics), each relationship was explored in further detail. Relationships were also examined to determine whether consistent modifiers could be factored out to refine the general relationship. The explorations included correlation analysis, multiple regression, CART, random forest, and graphic displays. Nutrient concentrations collected within 30 days of the response variable were averaged. Censored data were assigned a value of half the detection limit and retained for these analyses. In addition, Spearman rank correlation analysis for TN and TP and water quality variables (NO_3+NO_2, TKN, pH, conductivity, turbidity, temperature, and DO) showed positive relationships between the nutrients and between nutrients and other water quality measures; with pH and conductivity being more strongly correlated to TN, and turbidity and temperature being more strongly correlated with TP.

5.1.1 Chlorophyll a

A Spearman rank-order correlation analysis was conducted with TN and TP against benthic chl-a concentrations. For benthic chl-a, a total of 192 valid samples from NMED and NRSA sites were included in the analysis. On average, NRSA benthic chl-a concentration was less than NMED chl-a as NMED used a targeted richest habitat sampling, so the data were analyzed separately by source. Of all the Spearman correlations, only TP and chl-a in NMED TP High-Volcanic and all sites were significantly correlated (Table 11). The lack of significant correlations does not support the use of benthic chl-a as a reliable indicator of nutrient enrichment.

Table 11. Sample sizes (N) and Spearman rank correlation coefficients (rho) for benthic chl-a by nutrient and site class. Significant correlations ($p<0.05$) are marked with an asterisk (*).

	NMED		NRSA	
TP (Site Classes)	N	rho	N	rho
All sites	140	0.17*	50	-0.16
TP High-Volcanic	23	0.48*	13	-0.29
TP Flat-Moderate	90	0.16	28	-0.29
TP Steep	27	0.05	7	0.94
TN (Site Classes)				
All sites	142	0.02	50	0.09
TN Flat	26	0.04	24	0.28
TN Moderate	94	-0.04	21	0.13
TN Steep	22	-0.04	5	N/A

Positive correlations were expected between nutrients and benthic chl-a. However, a number of biotic and abiotic variables influence algal biomass accrual (Marks et al 2000). For example, hydrologic disturbances have a strong influence on algal biomass (Biggs 2000; Peterson et al. 1994). Other modifying factors (e.g., canopy cover, stream flow, drainage area, temperature, turbidity, sampling variability, etc.) may be confounding the assumed relationship between nutrients and benthic chl-a. Canopy cover, stream flow, elevation, land use types, drainage area, latitude, longitude, conductivity, temperature, pH, and turbidity were investigated. However the dataset did not have sufficient information to account for canopy cover and stream flow influences or other confounding factors.

5.1.2 Diel Dissolved Oxygen

A Spearman rank correlation analysis was conducted with TN, TP, and benthic chl-a against diel DO statistics. Production (Pmax4hr) and respiration (Rmax4hr) were negatively correlated to each other (Spearman rho = -0.92, p<0.05) as were gross primary production (GPP), and ecosystem respiration (ER) (Spearman rho = -0.55, p<0.05). TP was positively correlated with productivity measures and maximum daily change in DO (DeltaDO) (Table 12). Both TP and TN were negatively correlated with minimum DO (rho = -0.18, p<0.05). TN was also negatively correlated with Rmax4hr and positively correlated with Pmax4hr and DeltaDO (p=0.06). Benthic chl-a was positively correlated to DeltaDO, Pmax4hr, and ER. The correlation with ER was expected to be negative, as it was with Rmax4hr. The bi-plots show weak positive relationships between the nutrients and DeltaDO and Pmax4hr and weak negative relationships between nutrients and minimum DO. Minimum DO and chl-a are not strongly related. However, the relationships of chl-a with Pmax4hr and DeltaDO are somewhat stronger, supporting the causal linkage between chl-a and DO.

Table 12. Spearman correlation coefficients for TN, TP, and benthic chl-a versus diel DO statistics; minimum DO (DO_min), maximum daily DO change (DeltaDO), 4 hour maximum production (Pmax4hr), 4 hour maximum respiration (Rmax4hr), gross primary production (GPP), and ecosystem respiration (ER). Asterisk (*) denotes significant correlations (p<0.05).

	DO_min	DeltaDO	Pmax4hr	Rmax4hr	GPP	ER
TN	-0.18*	0.17	0.17	-0.19*	0.05	0.11
TP	-0.18*	0.30*	0.29*	-0.31*	0.19*	0.01
Benthic chl-a	-0.11	0.28*	0.38*	-0.25*	0.09	0.38*
DO_min		-0.58*	-0.50*	0.45*	-0.31*	0.04
DeltaDO			0.91*	-0.90*	0.53*	0.12
Pmax4hr				-0.92*	0.62*	0.08
Rmax4hr					-0.62*	-0.06
GPP						-0.55*

5.1.3 Diatoms

A Spearman rank-order correlation analysis of nutrient values associated with diatom metrics was conducted. Sixty-eight (68) diatom metrics were correlated with TN, TP, and potential modifying factors in 151 NMED sites and 49 NRSA sites. The analysis started with NMED sites only and then addressed NRSA sites and combined data sets. The data in the analysis were limited to one sample per site when nutrient and diatom samples were collected within 30 days of each other. Diatoms appear to be more sensitive to TP than to TN, based on the number of significant correlations. The fewest significant relationships were between the metrics and chl-a. Based on significant correlations and metric types, eight responsive metrics were selected for continued analysis in stressor-response analyses (Table 13).

Table 13. Diatom metrics showing responsiveness in correlation analysis and used in stressor-response analysis.

Metric code	Metric description	Metric type
wa_OptCat_DisTotMMI	Multi-metric index of disturbance	Weighted average, general disturbance
wa_OptCat_L1DisTot	Sum of disturbances	Weighted average, general disturbance
wa_OptCat_L1Ptl	Western EMAP TP score	Weighted average, TP
wa_OptCat_LNtl	Western EMAP TN score	Weighted average, TN
wa_OptCat_NutMMI	Western EMAP multi-metric index	Weighted average, nutrients
pi_NAWQA_TN_1	% TN tolerant diatoms	Percent Individuals, TN
pi_Ptpv_TP_all_Hi	% high TP diatoms, all regions	Percent Individuals, TP
x_Shan_e	Shannon-Wiener Diversity Index	Taxa diversity

5.1.4 Benthic Macroinvertebrates

A Spearman rank-order correlation analysis of nutrients, diel DO, and benthic chl-a associated with benthic macroinvertebrate metrics was conducted. The samples were limited to one per site when nutrient or chl-a and macroinvertebrate samples were collected within 30 days of each other. For diel DO statistics, the analysis was limited to DO and macroinvertebrate samples collected within the same season (within 80 days). Distributions of metric values collected with different sampling methods were overlapping in stressor-response biplots. Therefore, all wadeable stream samples were pooled, including multiple methods and data from NMED, WSA, and NRSA. Only early kicknet samples from NMED and low gradient samples from NRSA were eliminated. The data screening resulted in 438-440 samples for TP and TN, respectively, from 313 sites. For diel DO and benthic chl-a samples, there were 76 and 193 samples, respectively. Dissolved oxygen grab samples were collected along with macroinvertebrate samples with greater frequency than diel DO samples. However, because the variability inherent to DO over time, the DO grab data were not used.

5.1.4.1 Benthic Macroinvertebrate DO Correlations

The minimum DO (DO_min) and maximum 4 hour productivity (Pmax4hr) had the highest numbers of significant correlations in all sites (15-16 of 63 metrics, each). Other DO statistics had fewer significant correlations (GPP: 5, ER: 4, and Rmax4hr: 10). The strongest correlations for DO_min were positive with shredder taxa, shredder percent, and Plecoptera percent (Spearman rho = 0.39, 0.34, and 0.31, respectively). Other metrics with high positive correlations (rho = 0.30) included Ephemeroptera taxa, Beck's index, and intolerant percent. Gastropod percent and the HBI were negatively correlated (rho = 0.30). With productivity

NMED EXHIBIT 26

(Pmax4hr), the strongest metric correlations were negative (rho = -0.37 - -0.42) with Plecoptera taxa, Plecoptera percent, Beck's index, and intolerant taxa.

5.1.4.2 Benthic Macroinvertebrate Chlorophyll Correlations

Benthic chl-a was correlated to 14 macroinvertebrate metrics in all sites. The strongest correlations were with the Shannon-Wiener diversity index and intolerant taxa (Spearman rho = 0.37 and -0.34, respectively). A positive correlation with Shannon-Wiener diversity and a positive correlation with Trichoptera taxa and percent Trichoptera indicates that higher benthic chl-a increases some aspects of the macroinvertebrate assemblage diversity.

5.1.4.3 Benthic Macroinvertebrate Nutrient Correlations

For TN, 42 of the 63 metrics were significantly ($p<0.05$) correlated with nutrient concentration in all sites. Fewer metrics were significantly correlated in each site class, with 28, 25, and 6 in the TN Flat, TN Moderate, and TN Steep classes, respectively. Only predator taxa and % predators were correlated in all site classes. The strongest correlations (all negative) were in the TN Flat and TN Moderate classes for the total taxa metric, EPT taxa metric, Beck's Biotic Index (weighted richness of sensitive taxa), and the clinger taxa metric. The relatively unresponsive metrics in the steep site class might be due to lower nutrient concentrations in general, with fewer values >0.5mg/L TN than in the TN Flat and TN Moderate site classes.

For TP, fewer correlations were significant and the strength was weaker, compared to the TN correlations. There were 21 significant ($p<0.05$) correlations when including all site classes. Correlations varied among site classes. In the TP High-Volcanic, TP Flat-Moderate, and TP Steep classes, 17, 12, and 6 metrics were significantly correlated, respectively. Macroinvertebrates appear to be more responsive to TN than to TP. The positive correlation between TN and TP was not very strong in this data set (Spearman rho = 0.28, $p < 0.05$).

Several benthic macroinvertebrate metrics were related to nutrients, benthic chl-a, and DO, but only ten were selected for ongoing analyses to simplify interpretation of the stressor-response relationships. Responses for 19 candidate metrics were qualified as strongly positive, positive, negative, or strongly negative in relation to multiple measures of nutrients, benthic chl-a, and DO. The ratings were based on correlation coefficients in all sites and in the individual site classes or methods. Ten benthic macroinvertebrate metrics with consistent and strong correlations were identified (Table 14, bold font).

Table 14. Qualitative response trends for macroinvertebrate metrics to nutrients, benthic chl-a, and DO. The trends of responses were negative (Neg) or positive (Pos). Stronger relationships (more significant correlations in site classes) are shown in bold type.

		TN	TP	Chl-a	DO[a]	Overall
Richness	Total Taxa	Neg	Neg	Pos	Mix	Mix
	1 EPT Taxa	**Neg**	**Neg**	Mix	**Neg**	Neg
	2 Ephemeroptera Taxa	**Neg**	**Neg**	Neg	**Neg**	**Neg**

		TN	TP	Chl-a	DO[a]	Overall
	3 Plecoptera Taxa	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
	Trichoptera Taxa	**Neg**	**Neg**	Pos	Mix	Mix
	Shannon-Wiener Index	**Neg**	**Neg**	**Pos**	Mix	Mix
Composition	**4 EPT percent**	Neg	Mix	Mix	Mix	Neg/Mix
	Ephem percent	Mix	Mix	Mix	Mix	Mix
	5 Pleco percent	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
	Trich percent	**Neg**	**Neg**	**Pos**	Mix	Mix
	6 NonIn percent	**Pos**	Pos	Pos	Pos	**Pos**
Tolerance	**7 Intolerant Taxa**	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
	8 Toler percent	**Pos**	Pos	Pos	**Pos**	**Pos**
Feeding Group	Cllct percent	**Pos**	**Pos**	**Neg**	Mix	Mix
	Scrap percent	**Neg**	**Neg**	**Pos**	Mix	Mix
	Shred percent	**Neg**	Neg	**Neg**	**Neg**	**Neg**
	9 Shredder Taxa	**Neg**	**Neg**	**Neg**	**Neg**	**Neg**
Habit	Brrwr percent	**Pos**	**Pos**	**Neg**	Pos	Mix
	10 Clngr percent	**Neg**	**Neg**	Mix	Mix	Neg

a: The DO measures characterized in the qualitative correlations were Pmax4hr and GPP, which gave opposite responses compared to Rmax4hr and minimum DO.

As with diatom metrics, the most responsive macroinvertebrate metrics were selected for continuing analysis of stressor-response effects. These included 10 metrics that are commonly used in bioassessments, had consistent and strong correlations, and represent different attributes of the community. In the conceptual model, macroinvertebrates respond directly to minimum DO conditions, which are related to chl-a. Other measures of DO (Pmax4hr and DeltaDO) were also related to macroinvertebrate metrics, though these were not specified in the conceptual model. However, in these analyses, the strongest relationship was directly between nutrients and macroinvertebrate metrics (bypassing DO or chl-a). This might be due to a larger data set for nutrients relative to datasets for DO or chl-a. The intermediate stressors (chl-a and DO) showed trends that support the causal model. Different macroinvertebrate sampling methods were indistinct in biplots of stressors and metrics. Therefore, data from multiple sampling methods were pooled in stressor-response analyses.

5.2 Regression Interpolation

When a clear linear relationship is evident between a nutrient concentration and a response variable with an existing threshold, then a nutrient concentration can be associated with the response threshold through intersection with the linear regression. Since no response thresholds were established, the 25th or 75th quartile of the response metrics in reference sites was used to represent a protective threshold. The high-small multi-metric macroinvertebrate condition index (Jacobi et al. 2006) was not used, though it had an associated threshold of impact, because it could only be applied in a limited number of sites.

Ten macroinvertebrate and eight diatom metrics were regressed against TN and TP. The regressions included all nutrient and biological samples that were taken from the same site within a 30 day window. Data from all site classes were used to derive the regression equations because this assured a complete nutrient gradient on the x-axis and showed more significant relationships. This resulted in a mean regression slope that is not as steep as the effective slope observed as a regression of the upper quantiles of the data. Shallow slopes of the regression equations result in large changes in interpolated nutrient values for each incremental change of the reference metric value.

The reference 25th (or 75th) quantile of metric values in each nutrient site class were interpolated to a nutrient value on the x-axis. These quartiles of reference observations were selected as the critical values to represent reference expectations. The nutrient values associated with reference metric quartiles were interpolated by substituting the critical metric value as y in the equation and solving for x. The results were only considered as candidate nutrient thresholds if the regression equation was significant ($p<0.05$) and the interpolated nutrient value was within the range of observed values. Any values extrapolated beyond the observed range in each site class were disregarded. The resulting valid candidate thresholds ranged from 0.13 to 3.26 mg/L for TN and from 0.003 to 1.74 mg/L for TP (Table 15). Median valid candidate threshold values were calculated. Regression interpolation of TN and TP from a critical, minimum DO of 5 or 6 mg/L did not yield valid results.

Table 15. Candidate thresholds derived from regression interpolations on selected macroinvertebrate and diatom metrics. Values in gray font were not valid because they did not have significant regression equations or were outside of the observed range of values in the site classes.

	TN (mg/L)			TP (mg/L)		
	TN Flat	TN Moderate	TN Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
EPTTax	3.70	0.18	0.43	0.11	3.39	0.11
EphemTax	2.27	0.62	0.62	1.00	211	1.00
PlecoTax	3.26	3.26	3.26	1.61	1.61	0.15
IntolTax	3.48	0.53	0.85	0.88	6.22	0.33
Toler percent	501	0.29	0.33	0.22	3.11	0.017
EPT percent	398	0.13	21.47	59102	31.91	491758
Pleco percent	0.49	0.49	0.49	1.74	1.74	0.80
NonIn percent	28.33	0.21	0.37	1.46	0.281	0.003
ShredTax	2.28	2.28	0.64	56.47	56.47	0.60
Clngr percent	108	0.88	2.44	13.22	5.01	0.50
BMI Medians	2.28	0.49	0.46	0.11	1.61	0.11
wa_OptCat_DisTotMMI	10.35	0.36	0.19	0.042	0.168	0.028
wa_OptCat_L1DisTot	18.26	0.30	0.19	0.024	0.358	0.027
wa_OptCat_L1Ptl	7.45	0.43	0.29	0.068	0.145	0.029
wa_OptCat_LNtl	10.49	0.33	0.18	0.057	0.311	0.054
wa_OptCat_NutMMI	9.26	0.32	0.23	0.047	0.193	0.025

	TN (mg/L)			TP (mg/L)		
	TN Flat	TN Moderate	TN Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
pi_NAWQA_TN_1	1.28	4.36	5.32	0.457	0.129	0.010
pi_Ptpv_TP_all_Hi	7.98	0.25	0.69	0.083	0.152	0.011
x_Shan_e	2.26	16.63	161700	9.272	7.272	0.012
Diatom Medians	1.28	0.33	0.21	0.052	0.168	0.026
Median of all valid interpolated values	2.27	0.33	0.35	0.063	0.237	0.025
Reference 90th quantile	0.69	0.42	0.30	0.105	0.071	0.054
Maximum in site class	3.44	2.63	0.75	0.22	1.82	0.12

For the regression interpolation of DO statistics on nutrient concentrations, both nutrient concentrations and DO stats were log transformed. The regression equations were calculated with all sites classes combined. Regression equations in the three individual TP site classes resulted in non-significant regressions in the TP High-Volcanic and TP Steep site classes. However, in the TP Steep class, the relationships between TP and both Delta DO and Pmax4hr were negative and significant ($p<0.05$). The negative relationships were only seen in the TP Steep site class. Equations for the TP Flat-Moderate class were similar to those in all sites, so we emphasized results from equations for all site classes combined (Table 16). Regression interpolation in the TP High-Volcanic and TP Steep site classes were at the extreme high and low (respectively) ends of the range of observed values.

Table 16. Candidate thresholds for DO statistics derived from regression interpolations on reference 90th quantile nutrient concentrations. Values in gray font were not valid because they were at the extremes of the range of values.

	Delta DO			Pmax4hr		
	TP High-Volcanic	TP Flat-Moderate	TP Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
TN	16.39	3.34	1.13	3.23	0.47	0.13
TP	12.63	4.06	0.92	2.36	0.56	0.08

5.3 Change-point Analysis

The change-point is the point along an environmental gradient (nutrient concentrations) at which there is a high degree of change in the response variable (macroinvertebrate, diatom, or DO metrics). The nonparametric deviance reduction method for identifying change-points (Qian et al. 2003, King and Richardson 2003) works well when the response is stepped, or drastically changing at a recognizable point along nutrient concentration gradient. With this method, the data are divided into two groups, above and below a potential nutrient threshold, where each group is internally similar and the difference among groups is high. One caveat of the change-point analysis is that a change-point may be identified, and even determined to be statistically significant, when the change-point value is actually only an artifact of the analysis and not an indication of a change in system properties (Qian and Cuffney 2012, Daily et al. 2012). The methods can find change-points, even in datasets with nearly straight line relationships between X and Y. It has been well established that nutrient concentrations limit algal growth as well as species composition. Therefore, it is reasonable to believe an ecological threshold does exist between certain periphyton metrics and nutrient concentrations. The changepoint results were qualified using three assessment measures: valuation of the 95th quantile regression line, the relative size of the confidence interval around the change-point, and coincidence of an appropriate slope in the LOWESS regression line at the change-point. Confidence intervals were calculated for each change-point to illustrate the possible ranges of change-points.

Change-points were identified for both TN and TP from 10 macroinvertebrate metrics, 8 diatom metrics, and 2 DO measures (Table 17). Change-points for chl-a were not identified because benthic chl-a was not significantly correlated to nutrient concentrations and did not produce valid change points. As discussed previously, a number of biotic and abiotic variables influence algal biomass accrual (Marks et al 2000).

The ranges of valid change-points were fairly narrow for each nutrient and site class (at most 1.24 mg/L for TN and 0.08 mg/L for TP). For TN, median candidate thresholds were greatest in the TN Flat site class and least in the TN Steep site class. Likewise for TP, TP Steep sites had lower median change-points and increasing change-point medians were in the TP Flat-Moderate and TP high-Volcanic classes. The EPT taxa, Plecoptera taxa, weighted average disturbance (wa_OptCat_L1DisTot), and weighted average nitrogen preference (wa_OptCat_LNtl) metrics had the most valid change-points associated with them.

Table 17. Change-points (CP) as candidate thresholds from selected benthic macroinvertebrate (BMI), diatom and dissolved oxygen (DO) metrics. Values in gray font did not pass the tests for valid change-points.

Metric	TN (mg/L) TN Flat	TN (mg/L) TN Moderate	TN (mg/L) TN Steep	TP (mg/L) TP High-Volcanic	TP (mg/L) TP Flat-Moderate	TP (mg/L) TP Steep
EPTTax	0.49	0.25	0.42	0.067	0.044	0.030
EphemTax	0.49	0.22	0.28	0.058	0.044	0.030
PlecoTax	0.56	0.33	0.25	0.063	0.041	0.027
IntolTax	0.48	0.29	0.39	0.061	0.051	0.029
Toler percent	0.66	0.40	0.26	0.083	0.052	0.041
EPT percent	0.97	0.36	0.22	0.047	0.014	0.029
Pleco percent	0.35	0.33	0.14	0.114	0.044	0.027
NonIn percent	0.72	1.26	0.23	0.083	0.014	0.018
ShredTax	0.48	0.25	0.23	0.047	0.151	0.017
Clngr percent	1.09	0.49	0.28	0.122	0.051	0.022
Median CP BMI	0.53	0.31	0.28	0.063	0.044	0.029
wa_OptCat_DisTotMMI	0.48	0.52	0.16	0.068	0.056	0.035
wa_OptCat_L1DisTot	0.50	0.38	0.26	0.068	0.066	0.034
wa_OptCat_L1Ptl	0.48	0.52	0.13	0.066	0.032	0.036
wa_OptCat_LNtl	0.47	0.39	0.19	0.068	0.078	0.035
wa_OptCat_NutMMI	0.47	0.52	0.15	0.066	0.056	0.035

Metric	TN (mg/L) TN Flat	TN Moderate	TN Steep	TP (mg/L) TP High-Volcanic	TP Flat-Moderate	TP Steep
pi_NAWQA_TN_1	0.66	0.67	0.13	0.084	0.028	0.019
pi_Ptpv_TP_all_Hi	0.52	0.71	0.21	0.094	0.032	0.029
x_Shan_e	0.70	0.51	0.25	0.071	0.034	0.027
Median CP diatoms	0.49	0.45	0.18	0.068	0.056	0.035
DO_min	0.63	0.34	0.30	0.066	0.039	0.035
Pmax4hr	0.70	0.37	0.36	0.059	0.099	0.035
Median valid CP BMI, diatoms, & DO	0.50	0.36	0.22	0.067	0.044	0.035
Reference 90th quantile	0.69	0.42	0.30	0.105	0.071	0.054

Change-points for Delta DO and Pmax4hr were calculated based on macroinvertebrate metrics and nutrient concentrations (Table 18). Using nutrient concentrations in the CPA as a response to DO statistics is somewhat circular and might not be an appropriate application of the technique. However, median values for the DO change-points derived from macroinvertebrate metrics were equal to the medians when the nutrient-derived change-points were also included. Change-points were derived for all sites and for the TP Flat-Moderate sites. In the TP High-Volcanic and TP Steep site classes, there were not enough samples for valid change-point analyses.

Table 18. Change-points (CP) as candidate DO thresholds from selected benthic macroinvertebrate (BMI) metrics and nutrient concentrations. Values in gray font did not pass the tests for valid change-points.

Metric	Delta DO All sites	Delta DO TP Flat-Moderate	Pmax4hr All sites	Pmax4hr TP Flat-Moderate
EPTTax	1.74	1.99	0.358	0.254
EphemTax	1.60	1.88	0.298	0.254
PlecoTax	2.34	2.09	0.275	0.254
IntolTax	2.37	2.42	0.254	0.254
Toler percent	2.46	2.44	0.474	0.439
EPT percent	1.72	2.44	0.290	0.338
Pleco percent	2.02	1.99	0.214	0.214
NonIn percent	2.41	2.42	0.298	0.322
ShredTax	1.56	2.44	0.145	0.214
Clngr percent	2.26	2.44	0.331	0.254
LogTN	5.77	5.73	0.679	0.679
LogTP	2.03	2.06	0.269	0.351
Median	2.30	2.42	0.290	0.254

6. Synthesis of Multiple Thresholds

The strength of an analysis with numerous approaches and response endpoints comes from the multiple lines of evidence. They can be used to show central tendencies and ranges in candidate thresholds. The central tendency of candidate thresholds shows corroborated evidence, which give greater confidence in a selected threshold. Threshold selection may be based on confidence in an individual analytical technique, corroboration from multiple lines of evidence, and/or on corroborating evidence from the scientific literature.

Both reference percentiles and the stressor-response results were considered in selection of proposed thresholds. All candidate nutrient thresholds were compiled and summarized for each variable and site class using cumulative distribution function (CDF). All of the valid candidate thresholds were shown in tables and cumulative distribution function (CDF) curves in Appendix A. Synthesis of the multiple thresholds also included review of the individual analytical technique and corroboration from multiple lines of evidence and the scientific literature. Evidence from the stressor-response analyses and the scientific literature supports the selected quantile values as thresholds.

The CDF curves place the reference 90th quantile values within the ranges of stressor-response thresholds. If the proportion of the candidate thresholds below the 90th quantile was greater than 65% (the cumulative proportion), a quantile between 90 and 74 was selected to move the proposed threshold closer to the central tendency of all candidate thresholds. TP in the High-Volcanic site class is the exception. In this site class a larger proportion (86%) of the candidate thresholds are below the 75th quantile as biological responses occur within the range of reference TP concentrations. Since this is a biological response to natural conditions, the 75th quantile was selected as the proposed threshold. This synthesis resulted in proposed thresholds shown in Tables 19.

Table 19. Proposed TN and TP thresholds by nutrient site classes with related statistical foundation

	TN (mg/L)			TP (mg/L)		
	TN Flat	TN Moderate	TN Steep	TP High-Volcanic	TP Flat-Moderate	TP Steep
Reference quantile[1]	85	80	90	75	90	90
Proposed threshold	**0.65**	**0.37**	**0.30**	**0.084**	**0.061**	**0.03**
Reference quantile 90% confidence interval[1]	0.59 – 0.84	0.35 – 0.41	0.26 – 0.34	0.072 – 0.09	0.051 – 0.069	0.016 – 0.053
Stressor-response candidate thresholds median[2]	0.52	0.33	0.26	0.067	0.066	0.029
Cumulative proportion[2]	57%	61%	63%	86%	48%	53%

[1] from Table 8
[2] proportion of candidate thresholds below the selected reference quantile

These thresholds are supported by the scientific literature. The values are in the range of thresholds found in peer reviewed literature and EPA approved numeric nutrient criteria. Numeric nutrient standards for wadeable streams in different Montana ecoregions range from 0.275-1.3 for TN and 0.025-0.15 for TP (MTDEQ 2014). A Review of Stream Nutrient Criteria Development in the United States conducted by M. A. Evans-White, B. E. Haggard, and J. T. Scott and published in the Journal of Environmental Quality (Evans-White et al. 2013) found the following:

- percentile analysis of ecoregions found in NM produced TN thresholds ranging from 0.3 - 0.9 and TP thresholds of 0.01 - 0.1 (5 studies)
- benthic macroinvertebrate derived thresholds ranged from 0.6 - 1.7 for TN and 0.04 - 0.15 for TP (using 13 difference metrics in 3 studies)
- benthic algal derived thresholds ranged from 0.4 - 1.1 for TN and 0.01 - 0.07 for TP (using 19 difference metrics in 4 studies)
- of states with numeric nutrient standards (excluding Nevada's very high values) TN criteria were 0.2 - 2.0 (5 states) and TP criteria were 0.01 - 0.10 (9 states)

For Delta DO values, the reference distribution 90th quantile values were similar in the TP High-Volcanic and TP Flat-Moderate site classes. Due to small sample sizes in the other site classes, stressor-response analyses were only possible in the TP Flat-Moderate site class. The regression interpolation using nutrient thresholds were close and slightly lower than the 90th quantile value. Change-point analysis suggested lower thresholds for all macroinvertebrate metrics. Change-point values for all sites were similar to those derived in the TP Flat-Moderate site class and were generally in the range described by the reference distribution in the TP Steep sites. The 90th quantile of the Delta DO reference distribution is the proposed Diel DO thresholds. These thresholds will be applied by TP site class as it was used in calculating the threshold and Delta DO was significantly correlated with TP.

Table 20. Threshold ranges for Delta DO derived from reference distributions (Ref Dist 90th), the reference distribution 90% confidence interval (Ref Dist CI90), regression interpolation range (Reg Int range), change-point analysis (CPA) median, and CPA ranges associated with benthic macroinvertebrates (BMI) and nutrients.

	TP High-Volcanic	TP Flat-Moderate	TP Steep	All Classes
Ref Dist 90th	5.02	4.08	1.79	4.16
Ref Dist CI90	3.13 - 7.24	3.52 - 7.27	1.40 - 2.37	3.27-7.13
Reg Int range	NA	3.34 - 4.06	NA	NA
CPA median	NA	2.42	NA	2.30
CPA BMI range	NA	1.88 – 2.44	NA	1.56 – 2.46

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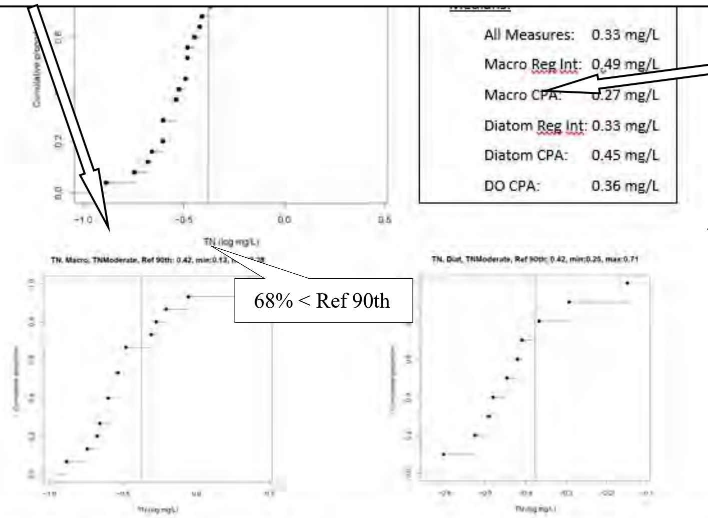
Appendix A Candidate Threshold Summary

Candidate Threshold Summary Legend

CDF diagram with all thresholds including 90th quantile of the reference distributions (vertical line with dashed vertical confidence interval) and change-point analysis and regression interpolation from both assemblages. X-axis is log mg/L. Y-axis is proportion of candidate thresholds less than X. The percentage of valid biological thresholds less than the reference 90th quantile is emphasized.



Title, with nutrient and site class

Summary statistics, with candidate threshold, confidence interval and medians of candidate thresholds by assemblage and method.

CDF diagrams for diatoms and macroinvertebrates, including both methods. Nutrients are shown on a log scale on the axes and are back-transformed in the text.

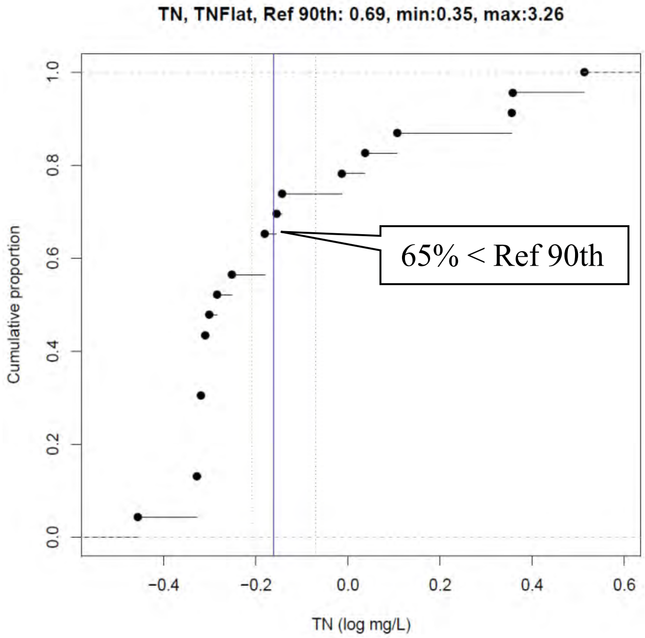
Macro Metric	Reg. Int.	CPA
EPTTax	0.18	0.25
EphemTax	0.62	0.22
PlecoTax	3.26	0.33
IntolTax	0.53	0.29
Toler percent	0.29	0.40
EPT percent	0.13	0.36
Pleco percent	0.49	0.33
NonIn percent	0.21	1.26
ShredTax	2.28	0.25
Clngr percent	0.88	0.49

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.36	0.52
wa_OptCat_L1DisTot	0.30	0.38
wa_OptCat_L1Ptl	0.43	0.52
wa_OptCat_LNtl	0.33	0.39
wa_OptCat_NutMMI	0.32	0.52
pi_NAWQA_TN_1	[illegible]	0.67
pi_Ptpv_TP_all_Hi	0.25	0.71
x_Shan_e	16.6	0.51

Threshold values from macroinvertebrate and diatom assemblages and from regression interpolation (Reg. Int.) and change-point analysis (CPA). Gray-shaded values are not valid and were not used in the CDF or summary statistics.

NMED EXHIBIT 26

7.1 TN Threshold Synthesis – Flat Site Class



90th Quantile of Ref: **0.69 mg/L**
90% CI: 0.62 – 0.85 mg/L
Medians:

All Measures: 0.52 mg/L

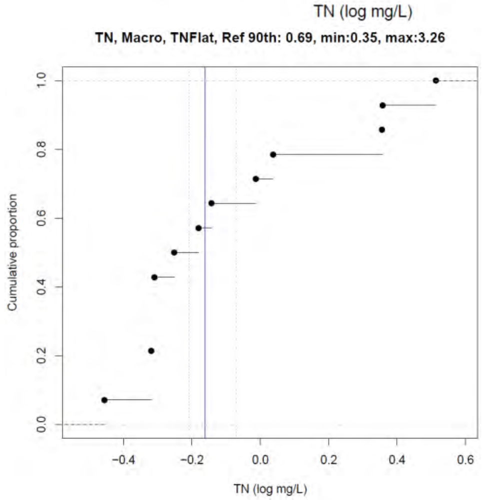
Macro Reg Int: 2.28 mg/L

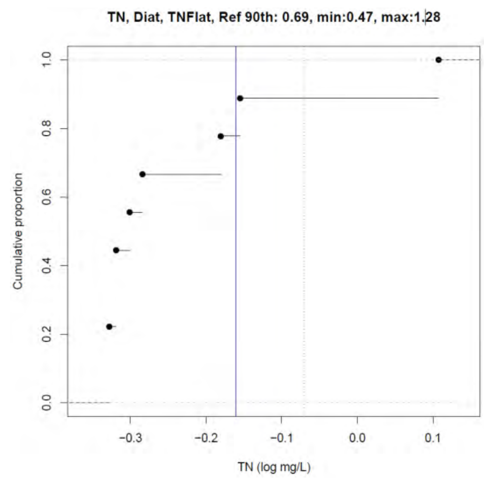
Macro CPA: 0.53 mg/L

Diatom Reg Int: 1.28 mg/L

Diatom CPA: 0.49 mg/L

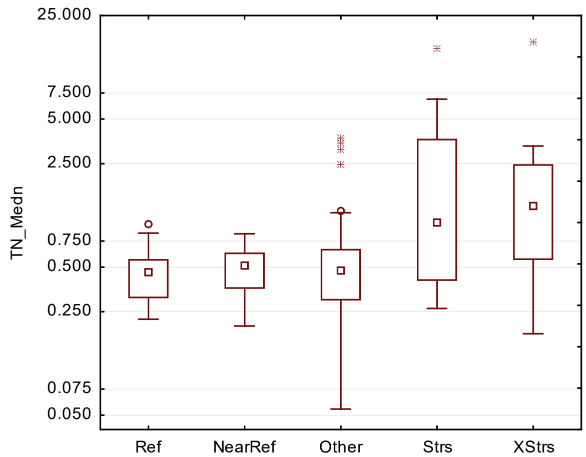
DO CPA: NA





Macro Metric	Reg.Int.	CPA
EPTTax	3.70	0.49
EphemTax	2.27	0.49
PlecoTax	3.26	0.56
IntolTax	3.48	0.48
Toler percent	500.8	0.66
EPT percent	398.7	0.97
Pleco percent	0.49	0.35
NonIn percent	28.3	0.72
ShredTax	2.28	0.48
Clngr percent	108.6	1.09

Diatom Metric	Reg.Int.	CPA
wa_OptCat_DisTotMMI	10.4	0.48
wa_OptCat_L1DisTot	18.3	0.50
wa_OptCat_L1Ptl	7.45	0.48
wa_OptCat_LNtl	10.5	0.47
wa_OptCat_NutMMI	9.26	0.47
pi_NAWQA_TN_1	1.28	0.66
pi_Ptpv_TP_all_Hi	7.98	0.52
x_Shan_e	2.26	0.70



TN values were lowest in reference sites in the TN Flat site class and increased most in the stressed and extremely stressed sites (Figure 45). More than half of the stressed and extremely stressed sites were greater than the 90th quantile value (0.69 mg/L TN). Also see Section 4.2.

Figure 4. **Site median TN value distributions along the disturbance gradient for sites in the TN Flat site class.**

Several change-points were identified near 0.50 mg/L for both diatoms and macroinvertebrate metrics (e.g., Figure 46). Also see Section 4.5 and Appendix L.

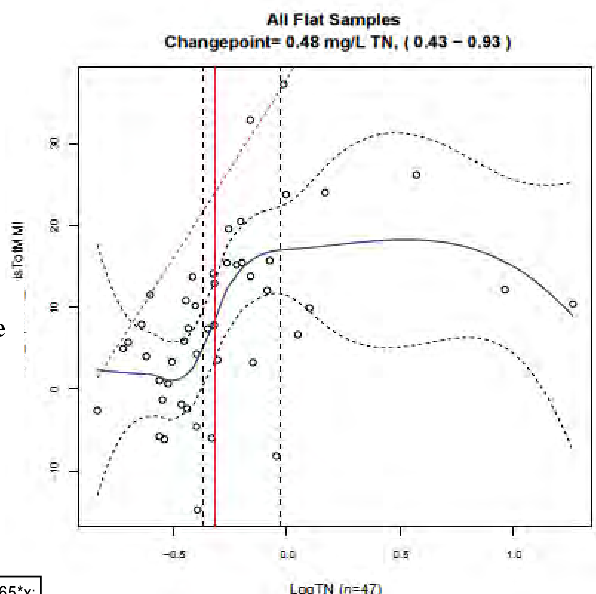
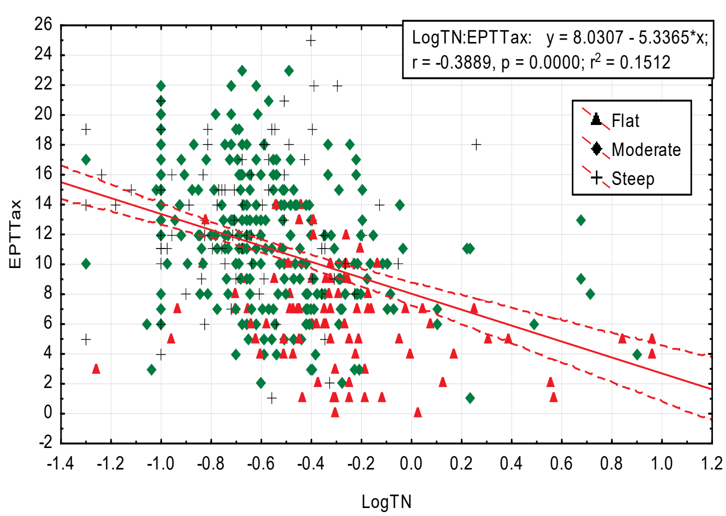


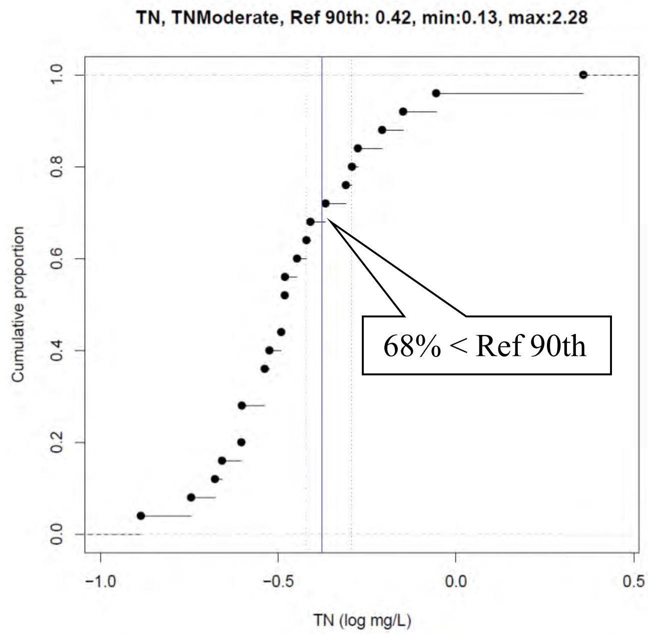
Figure 5. **Change-point plot for TN and the weighted average disturbance index diatom metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).**



While all but one metric had a significant overall regression equation (e.g., Figure 47), the reference quartiles of the metrics in the TN Flat sites were substantially different than those in the other site classes. This resulted in high interpolated values for TN. Also see Section 4.4 and Appendix K.

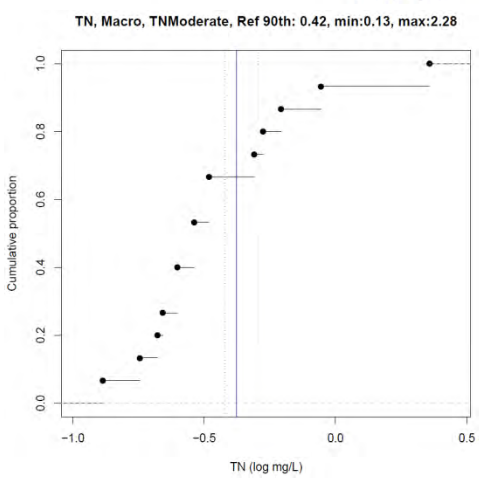
Figure 6. **Regression plot for TN and EPT taxa. In the TN Flat site class, the reference quartile for EPT taxa was 5 taxa, which translates to 3.7 mg/L TN.**

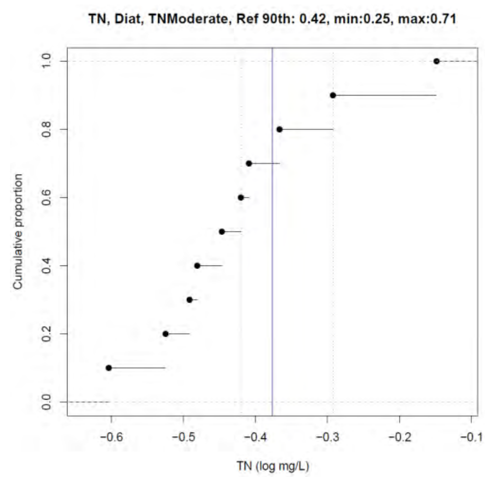
7.2 TN Threshold Synthesis – Moderate Site Class



90th Quantile of Ref: **0.42 mg/L**
90% CI: 0.38 – 0.51 mg/L
Medians:

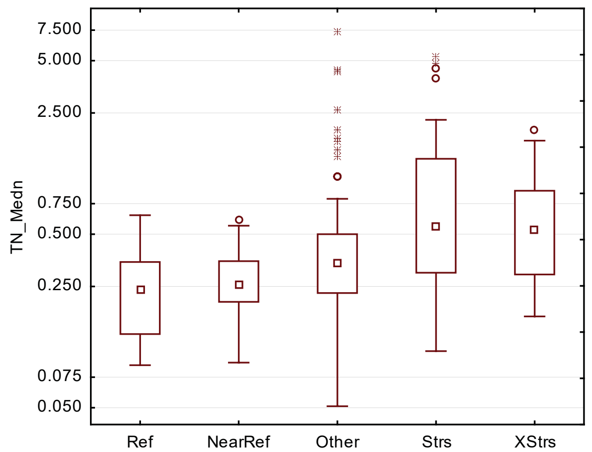
All Measures: 0.33 mg/L
Macro Reg Int: 0.49 mg/L
Macro CPA: 0.27 mg/L
Diatom Reg Int: 0.33 mg/L
Diatom CPA: 0.45 mg/L
DO CPA: 0.36 mg/L





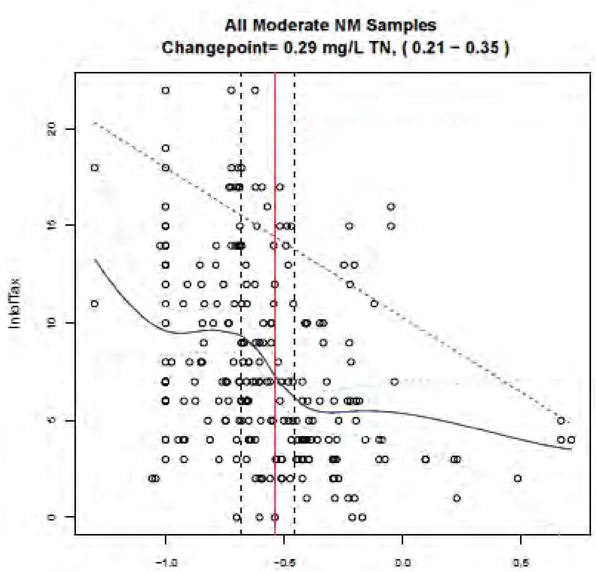
Macro Metric	Reg. Int.	CPA
EPTTax	0.18	0.25
EphemTax	0.62	0.22
PlecoTax	3.26	0.33
IntolTax	0.53	0.29
Toler percent	0.29	0.40
EPT percent	0.13	0.36
Pleco percent	0.49	0.33
NonIn percent	0.21	1.26
ShredTax	2.28	0.25
Clngr percent	0.88	0.49

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.36	0.52
wa_OptCat_L1DisTot	0.30	0.38
wa_OptCat_L1Ptl	0.43	0.52
wa_OptCat_LNtl	0.33	0.39
wa_OptCat_NutMMI	0.32	0.52
pi_NAWQA_TN_1	4.36	0.67
pi_Ptpv_TP_all_Hi	0.25	0.71
x_Shan_e	16.6	0.51



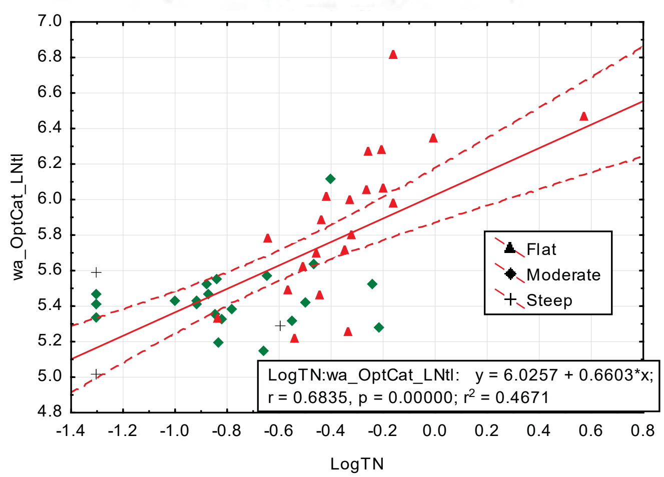
TN values were lowest in reference sites in the TN Moderate site class and increased most in the stressed and extremely stressed sites (Figure 48). More than half of the stressed and extremely stressed sites were greater than the 90th quantile value (0.42 mg/L TN). Also see Section 4.2.

Figure 7. **Site median TN value distributions along the disturbance gradient for sites in the TN Moderate site class.**



Most change-points were identified at TN values slightly less than the 90th quantile of reference sites (e.g., Figure 49). Also see Section 4.5 and Appendix L.

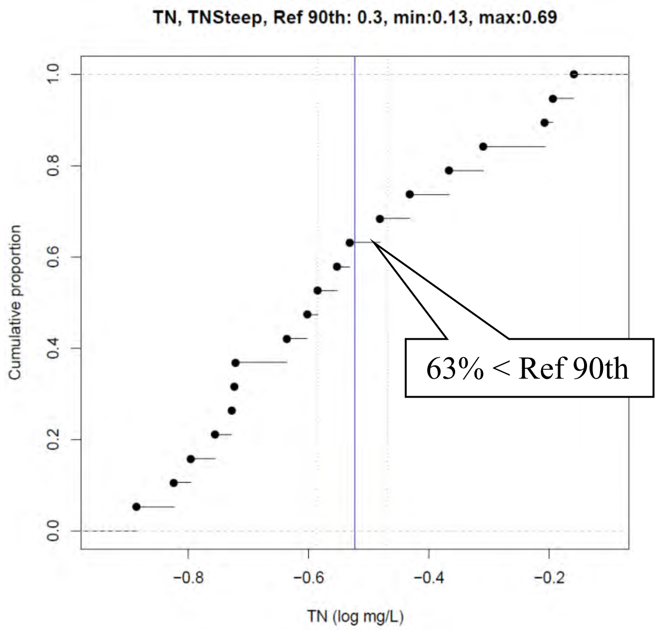
Figure 8. **Change-point plot for TN and the intolerant taxa macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).**



All but one metric had a significant overall regression equation (e.g., Figure 50). The reference quartiles of metrics in the TN Moderate sites were similar to those in the Steep site class. Also see Section 4.4 and Appendix K.

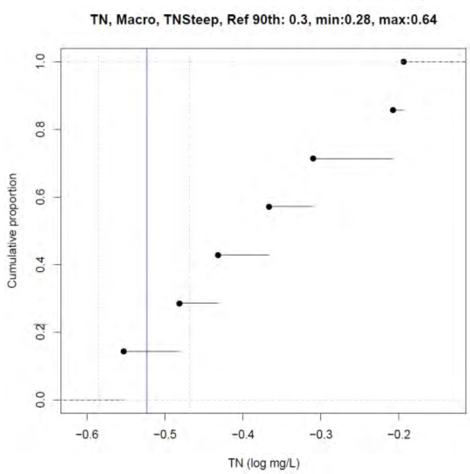
Figure 9. **Regression plot for TN and weighted average diatom nitrogen sensitivity. In the TN Moderate site class, the reference quartile for the metric was 6.0, which translates to 0.33 mg/L TN.**

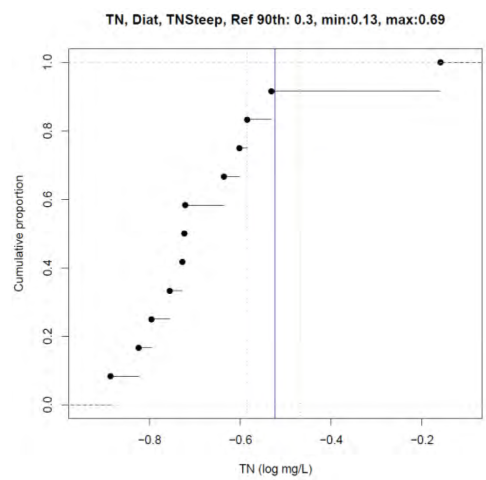
7.3 TN Threshold Synthesis – Steep Site Class



90th Quantile of Ref: **0.30 mg/L**
90% CI: 0.26 – 0.34 mg/L
Medians:

All Measures:	0.26 mg/L
Macro Reg Int:	0.46 mg/L
Macro CPA:	0.21 mg/L
Diatom Reg Int:	0.23 mg/L
Diatom CPA:	0.18 mg/L
DO CPA:	0.30 mg/L

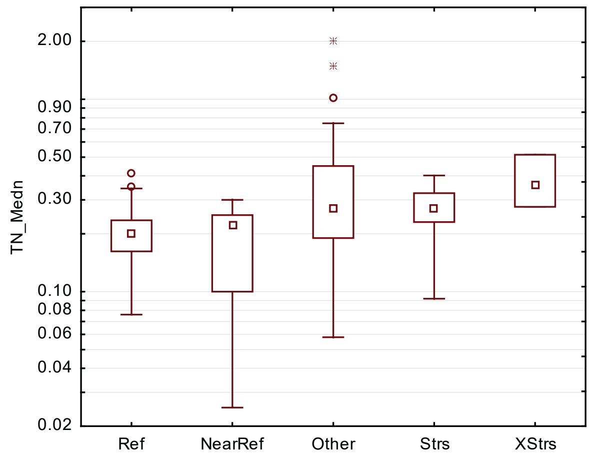




Macro Metric	Reg. Int.	CPA
EPTTax	0.43	0.42
EphemTax	0.62	0.28
PlecoTax	3.26	0.25
IntolTax	0.85	0.39
Toler percent	0.33	0.26
EPT percent	21.5	0.22
Pleco percent	0.49	0.14
NonIn percent	0.37	0.23
ShredTax	0.64	0.23
Clngr percent	2.44	0.28

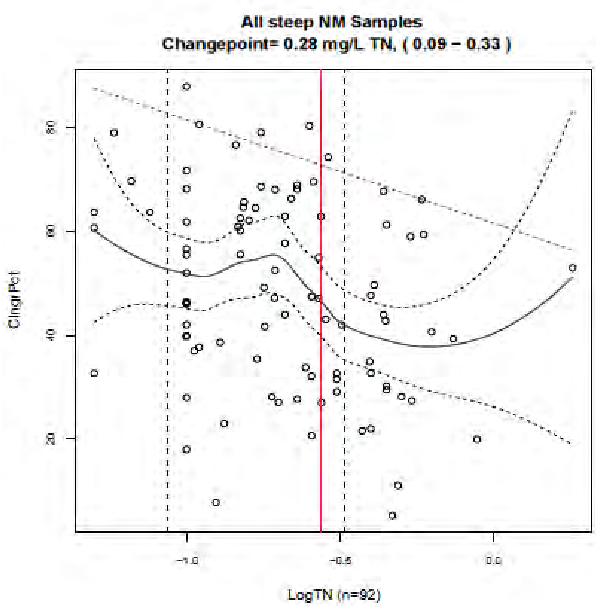
Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.19	0.16
wa_OptCat_L1DisTot	0.19	0.26
wa_OptCat_L1Ptl	0.29	0.13
wa_OptCat_LNtl	0.18	0.19
wa_OptCat_NutMMI	0.23	0.15
pi_NAWQA_TN_1	5.32	0.13
pi_Ptpv_TP_all_Hi	0.69	0.21
x_Shan_e	>10,000	0.25

NMED EXHIBIT 26



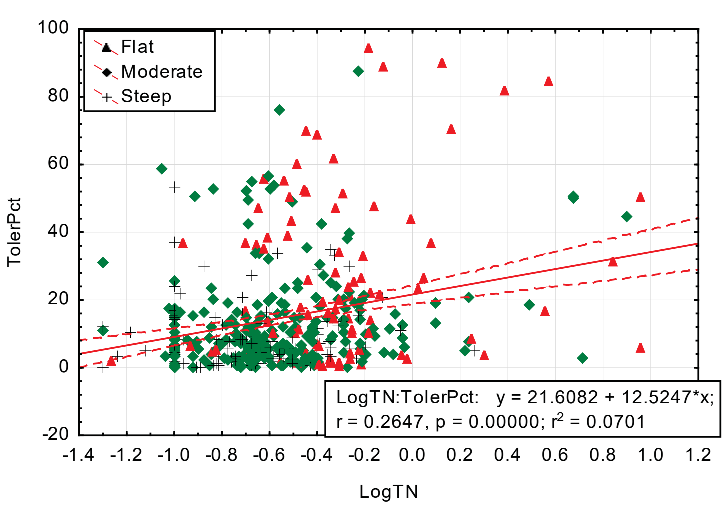
TN values were lowest in reference sites in the TN Steep site class and increased gradually with increasing stress (Figure 51). Approximately half of the stressed and extremely stressed sites were greater than the 90th quantile value (0.30 mg/L TN). Also see Section 4.2.

Figure 10. **Site median TN value distributions along the disturbance gradient for sites in the TN Steep site class.**



Most change-points were identified at TN values slightly less than the 90th quantile of reference sites. Only one macroinvertebrate metric gave acceptable change-point results (Figure 52). Also see Section 4.5 and Appendix L.

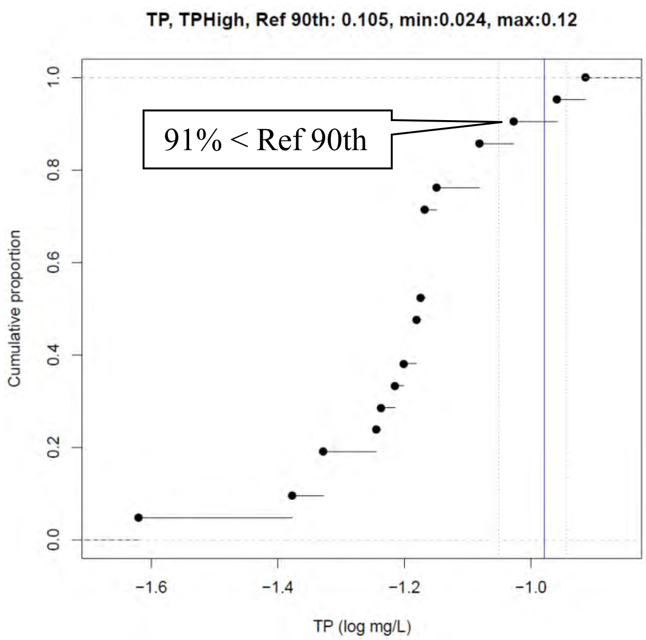
Figure 11. **Change-point plot for TN and the percent clinger macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).**



All but one metric had a significant overall regression equation (e.g., Figure 53). Interpolation results closest to the reference quantile value were for the macroinvertebrate percent tolerance metric. Also see Section 4.4 and Appendix K.

Figure 12. **Regression plot for TN and macroinvertebrate percent tolerance. In the TN Steep site class, the reference quartile for the metric was 15.5%, which translates to 0.33 mg/L TN.**

7.4 TP Threshold Synthesis – High-Volcanic Site Class



90th Quantile of Ref: **0.105 mg/L**
90% CI: 0.89 – 0.114 mg/L
Medians:

All Measures: 0.067 mg/L

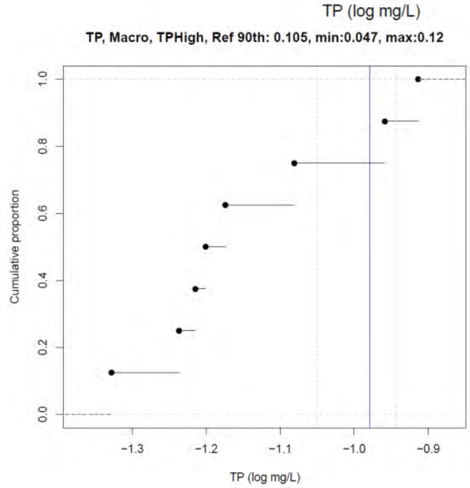
Macro Reg Int: 0.110 mg/L

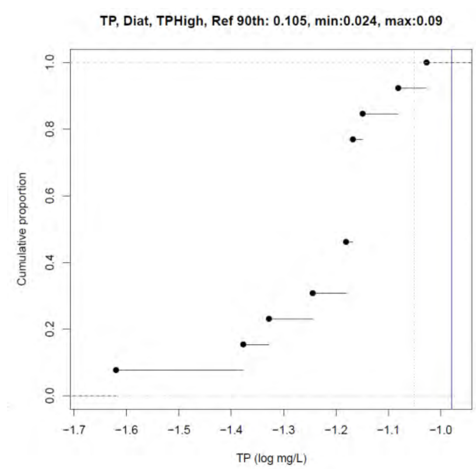
Macro CPA: 0.063 mg/L

Diatom Reg Int: 0.052 mg/L

Diatom CPA: 0.068 mg/L

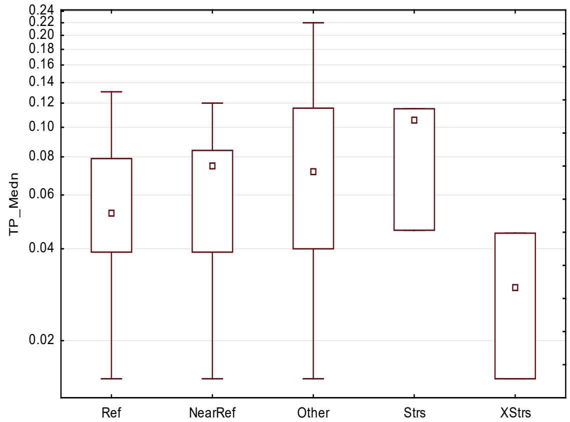
DO CPA: 0.059 mg/L





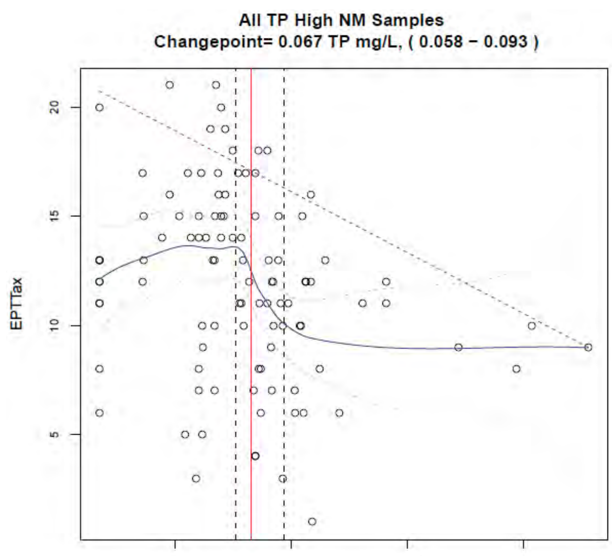
Macro Metric	Reg. Int.	CPA
EPTTax	0.11	0.067
EphemTax	1.00	0.058
PlecoTax	1.61	0.063
IntolTax	0.88	0.061
Toler percent	0.22	0.083
EPT percent	59,102	0.047
Pleco percent	1.74	0.114
NonIn percent	1.46	0.083
ShredTax	56.47	0.047
Clngr percent	13.22	0.122

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.042	0.068
wa_OptCat_L1DisTot	0.024	0.068
wa_OptCat_L1Ptl	0.068	0.066
wa_OptCat_LNtl	0.057	0.068
wa_OptCat_NutMMI	0.047	0.066
pi_NAWQA_TN_1	0.457	0.084
pi_Ptpv_TP_all_Hi	0.083	0.094
x_Shan_e	9.272	0.071



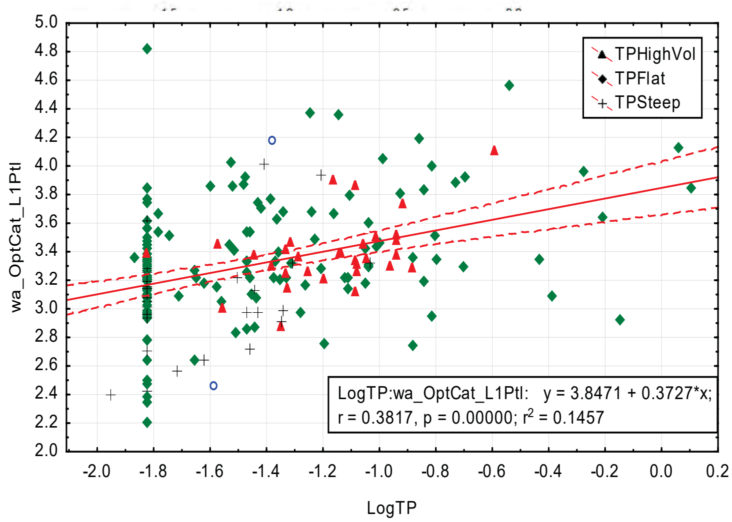
Median TP values in reference sites of the TP High-Volcanic site class were lower than those in the stressed sites and higher than those in the few extremely stressed sites (Figure 54). Most of the sites that were greater than the 90th quantile value (1.05 mg/L TP) were in the Other category. Also see Section 4.2.

Figure 13. **Site median TP value distributions along the disturbance gradient for sites in the TP High-Volcanic site class.**



Most change-points were identified at TP values less than the 90th quantile of reference sites, like the EPT taxa response (Figure 55). Only the percent clinger macroinvertebrate metric had a higher change-point. Also see Section 4.5 and Appendix L.

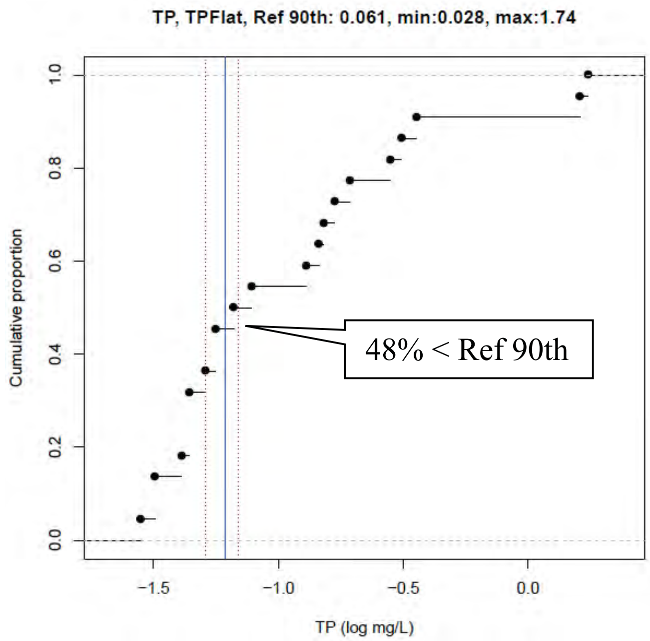
Figure 14. **Change-point plot for TP and the EPT taxa macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).**



All but one diatom metric had interpolated TP values less than the reference 90th quantile, such as the weighted average phosphorus diatom metric (Figure 56). Also see Section 4.4 and Appendix K.

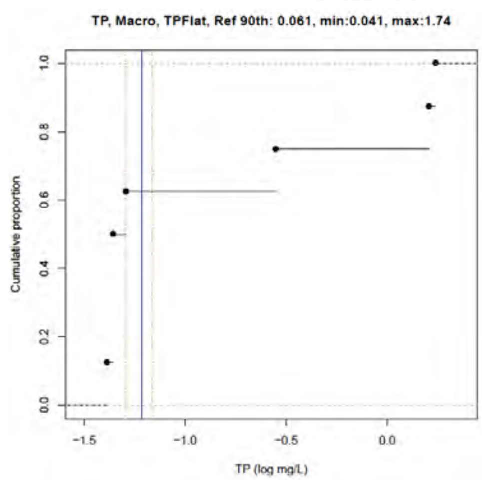
Figure 15. **Regression plot for TP and weighted average diatom phosphorus sensitivity. In the TP High Volcanic sites, the metric upper reference quartile was 3.4, which translates to 0.068 mg/L TP.**

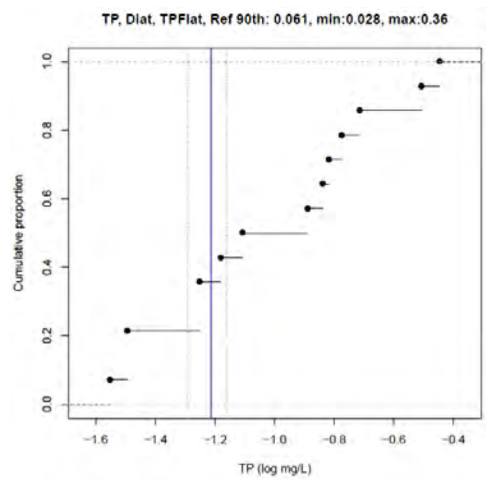
7.5 TP Threshold Synthesis – Flat-Moderate Site Class



90th Quantile of Ref: **0.061 mg/L**
90% CI: 0.051 – 0.069 mg/L
Medians:

All Measures: 0.066 mg/L
Macro Reg Int: 1.675 mg/L
Macro CPA: 0.044 mg/L
Diatom Reg Int: 0.168 mg/L
Diatom CPA: 0.056 mg/L
DO CPA: 0.099 mg/L





Macro Metric	Reg. Int.	CPA
EPTTax	3.39	0.044
EphemTax	211	0.044
PlecoTax	1.61	0.041
IntolTax	6.22	0.051
Toler percent	3.11	0.052
EPT percent	31.91	0.014
Pleco percent	1.74	0.044
NonIn percent	0.281	0.014
ShredTax	56.47	0.151
Clngr percent	5.01	0.051

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.168	0.056
wa_OptCat_L1DisTot	0.358	0.066
wa_OptCat_L1Ptl	0.145	0.032
wa_OptCat_LNtl	0.311	0.078
wa_OptCat_NutMMI	0.193	0.056
pi_NAWQA_TN_1	0.129	0.028
pi_Ptpv_TP_all_Hi	0.152	0.032
x_Shan_e	7.272	0.034

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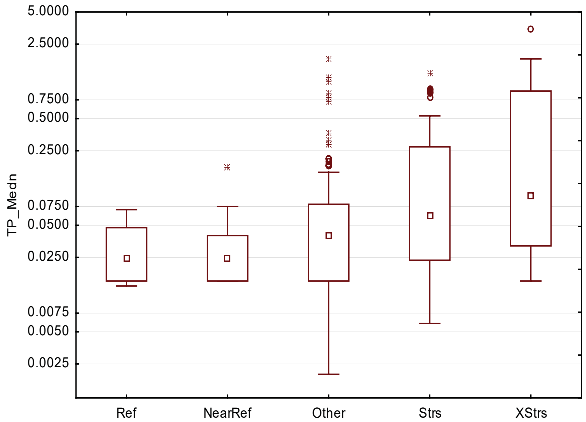
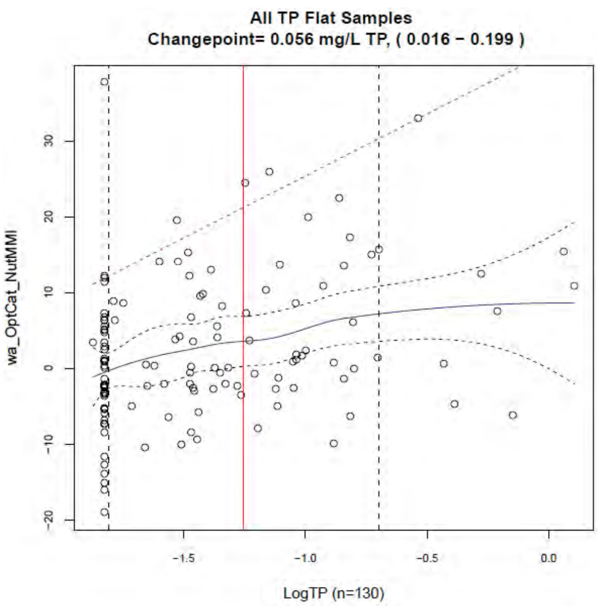


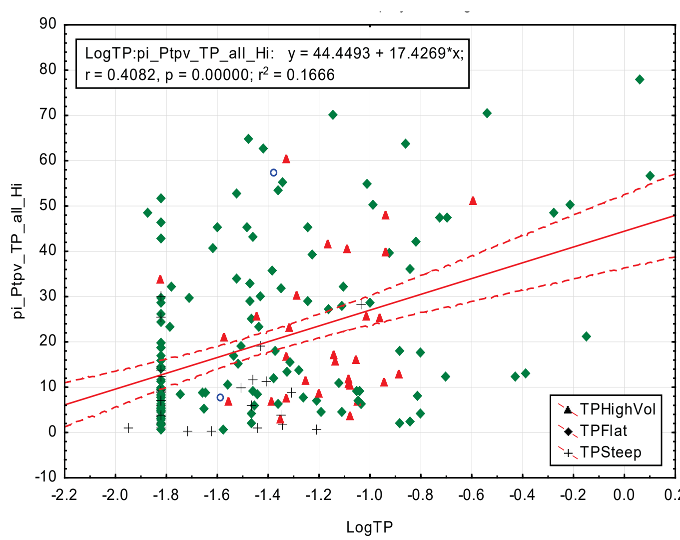
TP values were lowest in reference sites in the TP Flat-Moderate site class and increased gradually with increasing stress (Figure 57). More than half of the stressed and extremely stressed sites were greater than the 90th quantile (0.071 mg/L TP). Also see Section 4.2.

Figure 16. **Site median TN value distributions along the disturbance gradient for sites in the TP Flat-Moderate site class.**



Change-points for macroinvertebrates were lower than the 90th quantile of reference sites. For diatoms, valid change-points bracketed the 90th quantile. The weighted average nutrient index diatom metric had a change-point close to the reference 90th quantile (Figure 58). Also see Section 4.5 and Appendix L.

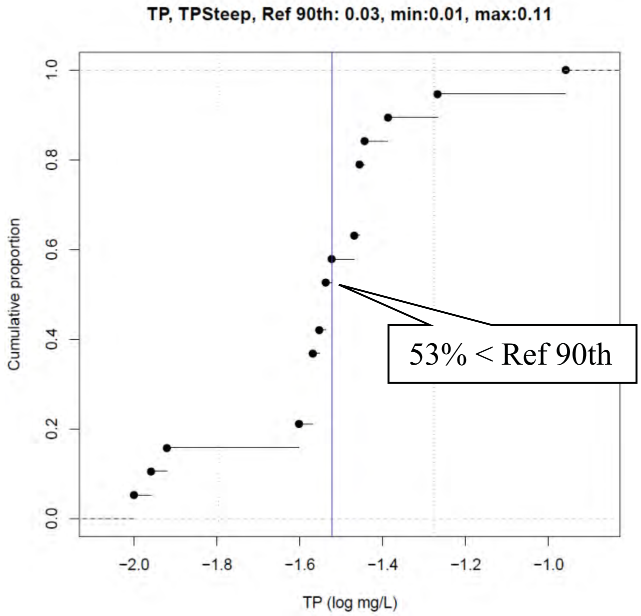
Figure 17. **Change-point plot for TP and the weighted average nutrient index diatom metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).**



Most regression interpolations for macroinvertebrate metrics were unreasonably high. Diatom results were also higher than the 90th quantile of reference sites (e.g., Figure 59). Also see Section 4.4 and Appendix K.

Figure 18. **Regression plot for TP and percent TP tolerant diatom metric. In the TP Flat-Moderate site class, the upper reference quartile for the metric was 30.2, which translates to 0.152 mg/L TP.**

7.6 TP Threshold Synthesis – Steep Site Class



90th Quantile of Ref: **0.030 mg/L**
90% CI: 0.016 – 0.053 mg/L
Medians:

All Measures: 0.029 mg/L

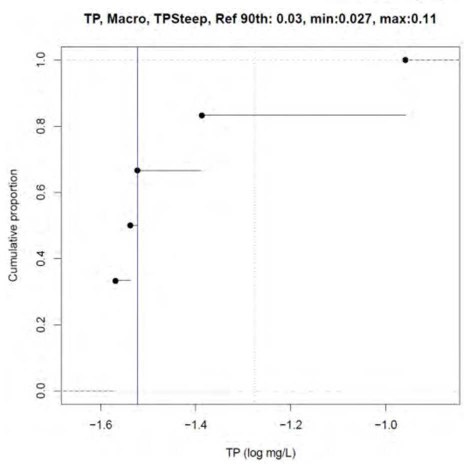
Macro Reg Int: 0.110 mg/L

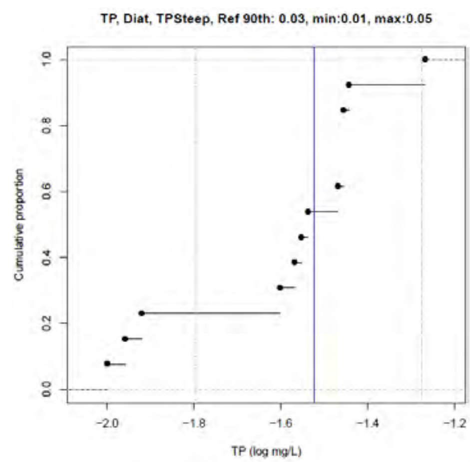
Macro CPA: 0.029 mg/L

Diatom Reg Int: 0.026 mg/L

Diatom CPA: 0.035 mg/L

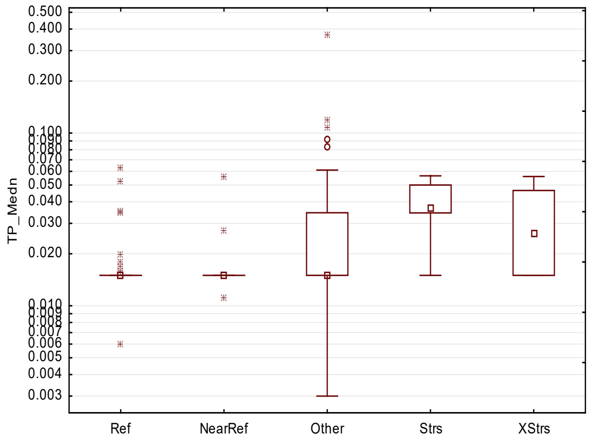
DO CPA: 0.035 mg/L





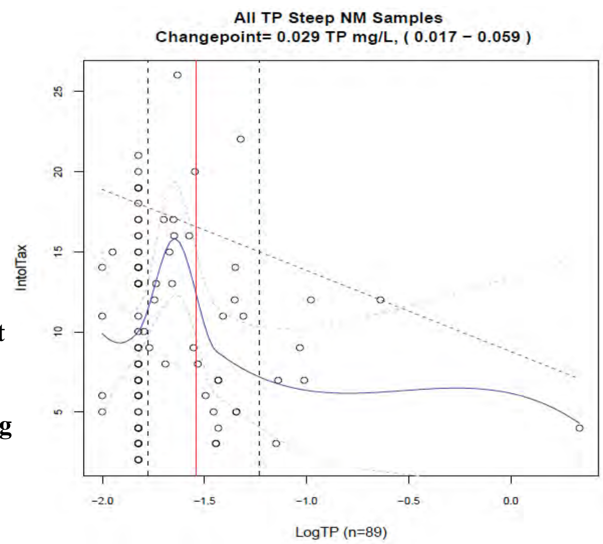
Macro Metric	Reg. Int.	CPA
EPTTax	0.11	0.030
EphemTax	1.00	0.030
PlecoTax	0.15	0.027
IntolTax	0.33	0.029
Toler percent	0.017	0.041
EPT percent	491758	0.029
Pleco percent	0.80	0.027
NonIn percent	0.003	0.018
ShredTax	0.60	0.017
Clngr percent	0.50	0.022

Diatom Metric	Reg. Int.	CPA
wa_OptCat_DisTotMMI	0.028	0.035
wa_OptCat_L1DisTot	0.027	0.034
wa_OptCat_L1Ptl	0.029	0.036
wa_OptCat_LNtl	0.054	0.035
wa_OptCat_NutMMI	0.025	0.035
pi_NAWQA_TN_1	0.010	0.019
pi_Ptpv_TP_all_Hi	0.011	0.029
x_Shan_e	0.012	0.027



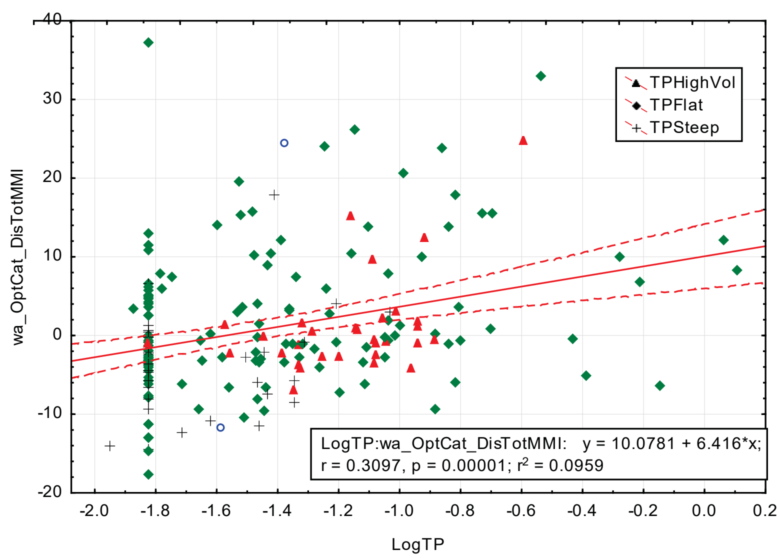
TP values were lowest in reference sites in the TP Steep site class and median values were highest in the stressed and extremely stressed sites (Figure 60). The 90th quantile value (0.054 mg/L TP) is exceeded most often in sites in the Other category. Also see Section 4.2.

Figure 19. **Site median TP value distributions along the disturbance gradient for sites in the TP Steep site class.**



Relatively few change-points were valid, but those that were fell near the 90th quantile of reference sites (e.g., Figure 61). Also see Section 4.5 and Appendix L.

Figure 20. **Change-point plot for TP and the intolerant taxa macroinvertebrate metric, showing the change-point with confidence intervals (vertical solid and dashed lines), the 95th quantile regression line (slanting dashed line), and the LOWESS regression (blue fitted line).**



Most regression interpolations for macroinvertebrate metrics were high. Diatom results were closer to the 90th quantile (e.g., Figure 62). Also see Section 4.4 and Appendix K.

Figure 21. **Regression plot for TP and weighted average disturbance index metric. In the TP Steep site class, the reference quartile for the metric was 1.1, which translates to 0.028 mg/L TP.**

NMED EXHIBIT 26

2018-2020 State of New Mexico Clean Water Act Section 303(d)/ Section 305(b) Integrated Report

Appendix A 303(d)/305(b) List

Prepared by:
New Mexico Environment Department
Surface Water Quality Bureau
1190 St. Francis Drive
Santa Fe, New Mexico 87505
https://www.env.nm.gov/surface-water-quality/

NMED EXHIBIT 27

PREFACE

I. Format and Organization of Integrated List and Assessment Rationale

In 2013, the New Mexico Environment Department (NMED) merged Surface Water Quality Bureau's (SWQB) in-house water quality database with NMED's *Assessment Database* to create the *Surface water QUality Information Database* (SQUID) so both data and assessment conclusions could be housed in one database. SWQB took this opportunity to also re-design and streamline the *CWA §303(d)/§305(b) Integrated Report: Appendix A List of Assessed Waters* (Integrated List) format for ease of review, to incorporate additional information, and to reduce the total number of pages. The associated Assessment Rationale (previously called the *Record of Decision* or ROD) that houses additional details on any water body or Assessment Unit (AU) that is currently or has ever been documented as "impaired" is also now housed in SQUID. If there was no action on a specific impaired AU during a particular listing cycle, there may be no entry for that cycle.

The Canadian and Dry Cimarron River watersheds were surveyed by the SWQB in 2015-2016 and hence are the focus of revised or retained assessment conclusions in the Integrated List. Other datasets that were either submitted or acquired this cycle and assessed as reported include:

- 2015-2017 EPA-collated Gold King Mine dataset,
- 2012-2017 Pajarito Plateau data collected by Los Alamos National Laboratory staff and contractors,
- 2014-2016 data for various stream reaches in and around Taos and Red River collected by Sentinels-Rio de Taos and submitted by Amigos Bravos, and
- 2015 data collected and submitted by the Hermit's Peak Watershed Alliance.

The assessment conclusions in non-focus areas based on data from previous rotational surveys and previously submitted outside data are typically carried over to the next list until more current data are available to assess unless, for example, a water quality standard change necessitates a re-assessment. This was the case with several historic dissolved aluminum listings with concurrent pH > 6.5 because the previous dissolved aluminum criteria are no longer applicable in these waterbodies.

All AUs are assigned IR categories as described in New Mexico's CALM (NMED/SWQB 2017). Assessment units noted with IR Category 5A, 5B, or 5C on the Integrated List in Appendix A comprise New Mexico's official CWA §303(d) List of Impaired Waters. A listing of Category 5-only waters is included in the beginning of Appendix A. To see details on a specific AU, refer to the particular AU entry on the full Integrated List in Appendix A and associated assessment rationale entry. Starting with the 2018-2020 IR, each AU entry on the Integrated List now also contains a "PARAMETER IR CATEGORY." This useful field provides additional planning information regarding each particular cause of impairment or AU_cause pair. For example, a parameter IR category of 5B lets the user know that a review of the applicable water quality standard is needed prior to scheduling TMDL development. New Mexico has several temperature listings that fall under the 5B parameter IR category.

New Mexico's Integrated List also includes an estimated year in the "TMDL DATE" field for all parameter IR category 5A AU_cause pairs. The estimated year is generally based on the SWQB's rotational monitoring schedule, prioritization strategy in the SWQB's long-term vision document (NMED/SWQB

2015), and severity of the impairment. The "TMDL DATE", as well as the projected "MONITORING SCHEDULE" year, is ultimately dependent upon personnel and financial resources which can change on an annual basis. If a TMDL has already been developed for the noted cause of impairment, the EPA TMDL approval date (MM/DD/YYYY) is reported in the TMDL date field.

II. Useful Definitions

INTEGRATED LIST FIELD HEADINGS AND CODES --

ASSESSED	This field notes the last Integrated Reporting Cycle when data for this particular AU or watershed were collated, assessed, and reported. In the case of a non-assessed AU (IR Category 3), this date indicates when there was an attempt to collate data to assess but no assessible data were available.
Assessment Unit (AU)	Descriptive name of a specific waterbody (stream reach or lake). Limited to 60 characters.
ATTAINMENT	The use attainment status for the associated USE (Fully Supporting, Not Supporting, Not Assessed)
ASSESSED	This field generally notes the last Integrated Report Cycle when data for this particular watershed were assessed and reported.
AU ID	An internal database code that is unique to an assessment unit, and is not intended to provide any specific information to the reader of the list.
CAUSE(S)	Parameters and/or constituents that are causing non-attainment of the associated USE
E. coli	Abbreviation of *Escherichia coli*. These bacteria found in the environment, foods, and intestines of people and animals.
FIRST LISTED	This field generally notes the first Integrated Reporting Cycle when the associated impairment was noted.
HUC	8-digit Hydrologic Unit Codes (HUC) that identify various watersheds. The US Geologic Survey defines these codes and associated watershed names.
IR	Integrated Report
IR Category (AU)	Overall water quality standards attainment category for each assessment unit as determined by combining individual designated use support decisions. The unique IR categories for New Mexico are described as

follows as follows:

IR Category (Cause)	Water quality standards attainment category for each listed cause of impairment. The unique IR categories for New Mexico are described as follows as follows:
IR Category 1	Attaining the water quality standards for all designated and existing uses. AUs are listed in this category if there are data and information that meet all requirements of the assessment and listing methodology and support a determination that the water quality criteria are attained.
IR Category 2	Attaining some of the designated or existing uses based on numeric and narrative parameters that were tested, and no reliable monitored data is available to determine if the remaining uses are attained or threatened. AUs are listed in this category if there are data and information that meet requirements of the assessment and listing methodology to support a determination that some, but not all, uses are attained based on numeric and narrative water quality criteria that were tested. Attainment status of the remaining uses is unknown because there is no reliable monitored data with which to make a determination.
IR Category 2A	This indicates a IR Category 2 parameter (currently non-impaired) where an associated Action exists (e.g., Approved TMDL, Alternative Restoration Approach, etc.).
IR Category 3/3A	Insufficient of no reliable monitored data and/or information to determine if any designated or existing use is attained.
IR Category 3/3B	There are insufficient available data and/or information to make a support determination (only one data point available). Data point does not exceed an applicable water quality criterion).
IR Category 3/3C	There are insufficient available data and/or information to make a support determination (only one data point available). Data point exceeds an applicable water quality criterion).
IR Category 4A	Impaired for one or more designated uses, but does not require development of a TMDL because TMDL has been completed. AUs are listed in this subcategory once all TMDL(s) have been developed and approved by USEPA that, when implemented, are expected to result in full attainment of the standard. Where more than one pollutant is associated with the impairment of an AU, the AU remains in IR Category 5A (see below) until all TMDLs for each pollutant have been completed and approved by USEPA.
IR Category 4B	Impaired for one or more designated uses, but does not require development of a TMDL because other pollution control requirements are reasonably expected to result in attainment of the water quality

standard in the near future. Consistent with the regulation under 40 CFR 130.7(b)(i),(ii), and (iii), AUs are listed in this subcategory where other pollution control requirements required by local, state, or federal authority are stringent enough to implement any water quality standard (WQS) applicable to such waters.

IR Category 4C — Impaired for one or more designated uses, but does not require development of a TMDL because impairment is not caused by a pollutant. AUs are listed in this subcategory if a pollutant does not cause the impairment. For example, USEPA considers flow alteration to be "pollution" vs. a "pollutant."

IR Category 5/5A — Impaired for one or more designated or existing uses and a TMDL is underway or scheduled. AUs are listed in this category if the AU is impaired for one or more designated uses by a pollutant. Where more than one pollutant is associated with the impairment of a single AU, the AU remains in IR Category 5A until TMDLs for all pollutants have been completed and approved by USEPA.

IR Category 5/5B — Impaired for one or more designated or existing uses and a review of the water quality standard will be conducted. AUs are listed in this category when it is possible that water quality standards are not being met because one or more current designated use is inappropriate. After a review of the water quality standard is conducted, a Use Attainability Analysis (UAA) will be developed and submitted to USEPA for consideration, or the AU will be moved to IR Category 5A and a TMDL will be scheduled.

IR Category 5/5C — Impaired for one or more designated or existing uses and Additional data will be collected before a TMDL is scheduled. AUs are listed in this category if there is not enough data to determine the pollutant of concern or there is not adequate data to develop a TMDL. For example, AUs with biological impairment will be listed in this category until further research can determine the particular pollutant(s) of concern. When the pollutant(s) are determined, the AU will be moved to IR Category 5A and a TMDL will be scheduled. If it is determined that the current designated uses are inappropriate, it will be moved to IR Category 5B and a UAA will be developed. If it is determined that "pollution" is causing the impairment (vs. a "pollutant"), the AU will be moved to IR Category 4C.

IR Category 5-ALT — Available data and/or information indicate that at least one designated or existing use is not being supported and an alternative restoration approach is in progress or under development.

LOCATION DESCRIPTION — The name of the 8-digit Hydrologic Unit Code (HUC) watershed of the assessment unit as defined by the United States Geologic Survey.

MONITORING SCHEDULE — These proposed dates are primarily based on SWQB's most recent

	rotational watershed monitoring schedule. This date, as well as the "TMDL DATE" date, is ultimately dependent upon personnel, financial, and laboratory resources which change on an annual basis.
NS	Non Support or Not Supporting
PARAMETER(S) OF CONCERN	This includes parameters that are currently not documented as impaired but that have previous TMDLs or other action plans.
PARAMETER IR CATEGORY	*See above definition for "IR Category (Cause)."*
PCBs	Polychlorinated biphenyls; highly-persistent compounds that are fat soluble and accumulate in the food chain
PROBABLE SOURCE(S)	This field contains either 1) "Source Unknown" if no TMDLs have yet been developed, or 2) the Probable Sources noted in associated TMDLs that may be contributing to the noted impairment(s).
SIZE	Streams and/or rivers = Miles, Lakes and/or playas = Acres, per EPA's current reporting requirement
TMDL	Total Maximum Daily Load
TMDL DATE	This field contains either 1) future estimated ("est.") TMDL development year primarily based on SWQB's rotational monitoring schedule, prioritization schedule, date since last intensively surveyed, upcoming permit renewals, etc.; 2) the EPA TMDL approval date (MM/DD/YYYY) if a TMDL has already been developed and approved; or 3) nothing if the water quality standard is under review (IR Category 5B) or additional data are needed (IR Category 5C). This date, as well as the "Monitoring Schedule" date, is ultimately dependent upon personnel and financial resources which change on an annual basis.
USE	Any designated uses specified in the State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) that apply to the given assessment unit and/or any documented existing uses that apply to the given assessment unit. Uses that exist but are not officially designated in NMAC are also listed here with a note in "Assessment Unit Comments."
WATER TYPE	This field contains the EPA-defined water type that most accurately describes the "normal" hydrologic character of the assessment unit to the best of SWQB's knowledge given available flow data, GIS layers, and Hydrology Protocol survey results (where available).
WQS REF	Applicable Water Quality Standard segment as described in the most recent State of New Mexico Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) that applies to the given assessment unit.

III. Abbreviations in Assessment Unit Names

The size of the assessment unit name is limited to 60 characters by the database. Therefore, the following abbreviations were used when necessary:

abv	=	above
AZ	=	Arizona
blw	=	below
bnd	=	boundary
BNSF	=	Burlington Northern – Santa Fe
Campgrd	=	Campground
Ck	=	Creek
Cny	=	Canyon
CO	=	Colorado
CR	=	County Road
confl	=	confluence
Div	=	Diversion
E	=	East
Fk	=	Fork
FS	=	Forest Service (usually road)
hdwtrs	=	headwaters
HWY	=	Highway
I	=	Interstate highway
Irr	=	irrigation
LANL	=	Los Alamos National Laboratory
M	=	Middle
mi	=	mile
N	=	North
NM	=	New Mexico
nr	=	near
NWR	=	National Wildlife Refuge
OK	=	Oklahoma
prt	=	Portion (i.e., reaches)
R	=	River or Rio
rd	=	road
RR	=	railroad
Rsvr	=	Reservoir
S	=	South
SFNF	=	Santa Fe National Forest
Spr	=	Spring
SR	=	state road
trib	=	tributary
TX	=	Texas
VCNP	=	Valles Caldera National Preserve
xing	=	crossing
USFS	=	United States Forest Service
W	=	West
WWTP	=	waste water treatment plant

(Table of Contents of Category 5 waters on the following Integrated §303(d)/§305(b) List)

- Charette Lake (Upper)
- Wheaton Creek (Manuelas Creek to headwaters)

HUC: 11080004 - Mora

- Coyote Creek (Black Lake to headwaters)
- Coyote Creek (Mora River to Amola Ridge)
- Coyote Creek (Williams Canyon to Black Lake)
- Mora River (USGS gage east of Shoemaker to HWY 434)
- Rito Cebolla (Mora River to Rito Morphy)
- Sapello River (Mora River to Arroyo Jara)

HUC: 11080005 - Conchas

- Conchas Reservoir
- Conchas River (Conchas Reservoir to Salitre Creek)

HUC: 11080006 - Upper Canadian-Ute Reservoir

- Canadian River (TX border to Ute Reservoir)
- Canadian River (Ute Reservoir to Conchas Reservoir)
- Pajarito Creek (Perennial prt Canadian R to Vigil Canyon)
- Ute Reservoir

HUC: 11080008 - Revuelto

- Revuelto Creek (Canadian River to headwaters)

HUC: 11100101 - Upper Beaver

- Clayton Lake

HUC: 13010005 - Conejos

- Canada Tio Grande (Rio San Antonio to headwaters)
- Rio San Antonio (CO border to Montoya Canyon)
- Rio San Antonio (Montoya Canyon to headwaters)

HUC: 13020101 - Upper Rio Grande

- Acid Canyon (Pueblo Canyon to headwaters)
- Arroyo del Palacio (Rio Grande to headwaters)
- Bitter Creek (Red River to headwaters)
- Canada Agua (Arroyo La Mina to headwaters)
- DP Canyon (Grade control to upper LANL bnd)
- DP Canyon (Los Alamos Canyon to grade control)
- Embudo Creek (Canada de Ojo Sarco to Picuris Pueblo bnd)

- Embudo Creek (Rio Grande to Canada de Ojo Sarco)
- Graduation Canyon (Pueblo Canyon to headwaters)
- Grassy Creek (Comanche Creek to headwaters)
- Los Alamos Canyon (DP Canyon to upper LANL bnd)
- Los Alamos Canyon (NM-4 to DP Canyon)
- Pioneer Creek (Red River to headwaters)
- Pojoaque River (San Ildefonso bnd to Pojoaque bnd)
- Pueblo Canyon (Acid Canyon to headwaters)
- Pueblo Canyon (Los Alamos Canyon to Los Alamos WWTP)
- Pueblo Canyon (Los Alamos WWTP to Acid Canyon)
- Red River (Placer Creek to headwaters)
- Red River (Rio Grande to Placer Creek)
- Rio Fernando de Taos (R Pueblo d Taos to USFS bnd at canyon)
- Rio Grande (Embudo Creek to Rio Pueblo de Taos)
- Rio Grande (Ohkay Owingeh bnd to Embudo Creek)
- Rio Grande (Red River to CO border)
- Rio Grande (Santa Clara Pueblo bnd to Ohkay Owingeh bnd)
- Rio Grande del Rancho (R Pueblo de Taos to Rito de la Olla)
- Rio Pueblo (Picuris Pueblo bnd to headwaters)
- Rio Pueblo de Taos (Arroyo del Alamo to R Grande del Rancho)
- Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)
- Rio Santa Barbara (non-pueblo Embudo Ck to USFS bnd)
- Santa Cruz Lake
- Santa Cruz River (San Clara Pueblo bnd to Santa Cruz Dam)
- South Fork Acid Canyon (Acid Canyon to headwaters)
- Unnamed Arroyo (Rio Pueblo de Taos to Taos WWTP)
- Vidal Creek (Comanche Creek to headwaters)
- Walnut Canyon (Pueblo Canyon to headwaters)

HUC: 13020102 - Rio Chama

- Abiquiu Creek (Rio Chama to headwaters)
- Abiquiu Reservoir
- Arroyo del Toro (Rio Chama to headwaters)
- Burns Lake (Rio Arriba)
- Canada de Horno (Rio Chama to headwaters)
- Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)
- Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)
- Canones Creek (Rio Chama to Jicarilla Apache bnd)
- Chihuahuenos Creek (Canones Creek to headwaters)

- Coyote Creek (Rio Puerco de Chama to headwaters)
- El Rito Creek (Perennial reaches above HWY 554)
- El Rito Creek (Perennial reaches below HWY 554)
- Heron Reservoir
- Hopewell Lake
- Placer Creek (Hopewell Lake to headwaters)
- Poleo Creek (Rio Puerco de Chama to headwaters)
- Rio Nutrias (Perennial prt Rio Chama to headwaters)
- Rio Ojo Caliente (Arroyo El Rito to Rio Vallecitos)
- Rio Puerco de Chama (Abiquiu Reservoir to HWY 96)
- Rio Tusas (Perennial prt Rio Vallecitos to headwaters)
- Rio Vallecitos (Rio Tusas to headwaters)
- Rio del Oso (Perennial prt Rio Chama to headwaters)
- Rito Encino (Rio Puerco de Chama to headwaters)
- Rito de Tierra Amarilla (HWY 64 to headwaters)
- Rito de Tierra Amarilla (Rio Chama to HWY 64)
- Sixto Creek (Rio Chamita to CO border)

HUC: 13020201 - Rio Grande-Santa Fe

- Ancho Canyon (North Fork to headwaters)
- Ancho Canyon (Rio Grande to North Fork Ancho)
- Arroyo de la Delfe (Pajarito Canyon to headwaters)
- Canada del Buey (within LANL)
- Canon de Valle (LANL gage E256 to Burning Ground Spr)
- Canon de Valle (below LANL gage E256)
- Canon de Valle (upper LANL bnd to headwaters)
- Chaquehui Canyon (within LANL)
- Mortandad Canyon (within LANL)
- North Fork Ancho Canyon (Ancho Canyon to headwaters)
- Pajarito Canyon (Lower LANL bnd to Two Mile Canyon)
- Pajarito Canyon (Two Mile Canyon to Arroyo de La Delfe)
- Pajarito Canyon (upper LANL bnd to headwaters)
- Pajarito Canyon (within LANL above Starmers Gulch)
- Potrillo Canyon (above Water Canyon)
- Rio Grande (Cochiti Reservoir to San Ildefonso bnd)
- Rio Grande (non-pueblo Angostura Div to Cochiti Rsrv)
- Rito de los Frijoles (Rio Grande to headwaters)
- Sandia Canyon (Sigma Canyon to NPDES outfall 001)
- Sandia Canyon (within LANL below Sigma Canyon)

- Santa Fe River (Cienega Creek to Santa Fe WWTP)
- Santa Fe River (Cochiti Pueblo bnd to Cienega Creek)
- Santa Fe River (Guadalupe St to Nichols Rsvr)
- Santa Fe River (Nichols Reservoir to headwaters)
- Santa Fe River (Santa Fe WWTP to Guadalupe St)
- Ten Site Canyon (Mortandad Canyon to headwaters)
- Three Mile Canyon (Pajarito Canyon to headwaters)
- Two Mile Canyon (Pajarito to headwaters)
- Water Canyon (upper LANL bnd to headwaters)
- Water Canyon (within LANL below Area-A Cyn)

HUC: 13020202 - Jemez

- Calaveras Creek (Rio Cebolla to headwaters)
- Clear Creek (Rio de las Vacas to San Gregorio Lake)
- Clear Creek (San Gregorio Lake to headwaters)
- East Fork Jemez (San Antonio Creek to VCNP bnd)
- East Fork Jemez (VCNP to headwaters)
- Fenton Lake
- Jaramillo Creek (East Fork Jemez to headwaters)
- Jemez River (Jemez Pueblo bnd to Rio Guadalupe)
- Jemez River (Soda Dam nr Jemez Springs to East Fork)
- Jemez River (Zia Pueblo bnd to Jemez Pueblo bnd)
- La Jara Creek (East Fork Jemez to headwaters)
- Redondo Creek (Sulphur Creek to headwaters)
- Rio Cebolla (Fenton Lake to headwaters)
- Rio Cebolla (Rio de las Vacas to Fenton Lake)
- Rio Guadalupe (Jemez River to confl with Rio Cebolla)
- Rio de las Vacas (Clear Creek to headwaters)
- Rito Penas Negras (Rio de las Vacas to headwaters)
- Rito de las Palomas (Rio de las Vacas to headwaters)
- Rito de los Indios (San Antonio Creek to headwaters)
- San Antonio Creek (East Fork Jemez to VCNP bnd)
- San Antonio Creek (VCNP bnd to headwaters)
- San Gregorio Lake
- Sulphur Creek (Redondo Creek to headwaters)
- Sulphur Creek (San Antonio Creek to Redondo Creek)
- Vallecito Ck (Jemez Pueblo bnd to Div abv Ponderosa)
- Vallecito Ck (Perennial Prt Div abv Ponderosa to headwaters)

HUC: 13020203 - Rio Grande-Albuquerque

- Rio Grande (Arroyo de las Canas to Rio Puerco)
- Rio Grande (Isleta Pueblo boundary to Tijeras Arroyo)
- Rio Grande (Rio Puerco to Isleta Pueblo bnd)
- Rio Grande (San Marcial at USGS gage to Arroyo de las Canas)
- Rio Grande (Tijeras Arroyo to Alameda Bridge)
- Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)

HUC: 13020204 - Rio Puerco

- Rio Puerco (Arroyo Chijuilla to northern bnd Cuba)
- Rio Puerco (non-pueblo Rio Grande to Arroyo Chico)

HUC: 13020207 - Rio San Jose

- Arroyo del Valle (Laguna Pueblo bnd to headwaters)
- Bluewater Lake

HUC: 13020209 - Rio Salado

- Rio Salado (Rio Grande to Alamo Navajo bnd)

HUC: 13020211 - Elephant Butte Reservoir

- Elephant Butte Reservoir
- Rio Grande (Elephant Butte Rsvr to San Marcial at USGS)

HUC: 13030101 - Caballo

- Caballo Reservoir
- Las Animas Ck (perennial prt Animas Gulch to headwaters)
- Rio Grande (Caballo Reservoir to Elephant Butte Reservoir)

HUC: 13030102 - El Paso-Las Cruces

- Rio Grande (International Mexico bnd to Anthony Bridge)

HUC: 13030202 - Mimbres

- Bear Canyon Reservoir
- Gallinas Creek (Mimbres River to headwaters)
- San Vicente Creek (Perennial prt Maudes Cny to Silva Creek)

HUC: 13050003 - Tularosa Valley

- Dog Canyon Creek (perennial portions)
- Fresnal Canyon (La Luz Creek to Salado Canyon)
- Karr Canyon (Fresnal Canyon to headwaters)

- Lake Holloman
- Nogal Creek (Tularosa Creek to Mescalero Apache bnd)

HUC: 13050004 - Salt Basin

- Sacramento R (Perennial prt Scott Able Canyon to headwaters)

HUC: 13060001 - Pecos Headwaters

- El Porvenir Creek (Gallinas River to SFNF bnd)
- El Rito (Pecos River to headwaters)
- Gallinas River (Pecos River to Aguilar Creek)
- Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)
- Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)
- McAllister Lake
- Pecos River (Sumner Reservoir to Santa Rosa Reservoir)
- Pecos River (Tecolote Creek to Villanueva State Park)
- Santa Rosa Reservoir
- Storrie Lake
- Sumner Reservoir
- Tecolote Creek (I-25 to Blue Creek)
- Tres Lagunas (Northeast)

HUC: 13060003 - Upper Pecos

- Pecos River (Salt Creek to Crockett Draw)

HUC: 13060007 - Upper Pecos-Long Arroyo

- Figure Eight Lake
- Lake Van
- Pecos River (Eagle Creek to Rio Felix)
- Pecos River (Rio Felix to Rio Hondo)
- Pecos River (Rio Hondo to Salt Creek)
- Pecos River (Rio Penasco to Eagle Creek)

HUC: 13060008 - Rio Hondo

- Grindstone Canyon Reservoir
- Rio Bonito (Perennial prt NM 48 near Angus to headwaters)

HUC: 13060010 - Rio Penasco

- Agua Chiquita (perennial portions McEwan Cny to headwaters)

HUC: 13060011 - Upper Pecos-Black

- Brantley Reservoir
- Lower Tansil Lake/Lake Carlsbad (Carlsbad Municipal Lake)
- Pecos River (Avalon Reservoir to Brantley Reservoir)
- Pecos River (Black River to Six Mile Dam Lake)
- Pecos River (Brantley Reservoir to Rio Penasco)
- Pecos River (Six Mile Dam Lake to Lower Tansil Lake)
- Pecos River (TX border to Black River)
- Six Mile Dam Lake

HUC: 14080101 - Upper San Juan
- Navajo Reservoir
- Navajo River (Jicarilla Apache Nation to CO border)

HUC: 14080104 - Animas
- Animas River (Estes Arroyo to So. Ute Indian Tribe bnd)
- Lake Farmington (Beeline Reservoir)

HUC: 14080105 - Middle San Juan
- La Plata R (McDermott Arroyo to So. Ute Indian Tribe bnd)
- La Plata River (San Juan River to McDermott Arroyo)
- San Juan River (Navajo bnd at Hogback to Animas River)

HUC: 15020003 - Carrizo Wash
- Quemado Lake

HUC: 15020004 - Zuni
- McGaffey Lake
- Ramah Reservoir

HUC: 15020006 - Upper Puerco
- Puerco River (non-tribal AZ border to Gallup WWTP)

HUC: 15040001 - Upper Gila
- Beaver Creek (Perennial prt Taylor Ck to Mule Canyon)
- East Fork Gila River (Gila River to headwaters)
- Gila River (Mogollon Ck to East and West Forks of Gila R)
- Gilita Creek (Middle Fork Gila R to Willow Creek)
- Iron Creek (Middle Fork Gila R to headwaters)
- Lake Roberts
- Middle Fork Gila River (Canyon Creek to headwaters)

- Middle Fork Gila River (West Fork Gila R to Canyon Creek)
- Snow Lake
- Taylor Creek (Perennial reaches Beaver Creek to headwaters)
- Turkey Creek (Gila River to headwaters)
- West Fork Gila R (East Fork to Middle Fork)
- West Fork Gila R (Middle Fork to headwaters)
- Willow Creek (Gilita Creek to headwaters)

HUC: 15040002 - Upper Gila-Mangas

- Bill Evans Lake
- Gila River (AZ border to Red Rock)
- Gila River (Mangas Creek to Mogollon Creek)
- Gila River (Red Rock to Mangas Creek)
- Mangas Creek (Gila River to Mangas Springs)

HUC: 15040004 - San Francisco

- Centerfire Creek (San Francisco R to headwaters)
- Mule Creek (San Francisco R to Mule Springs)
- Negrito Creek (Tularosa River to confl of N and S forks)
- San Francisco River (Box Canyon to Whitewater Creek)
- San Francisco River (Centerfire Creek to AZ border)
- San Francisco River (NM 12 at Reserve to Centerfire Creek)
- San Francisco River (Whitewater Ck to Pueblo Ck)
- Trout Creek (Perennial prt San Francisco R to headwaters)
- Tularosa River (San Francisco R to Apache Creek)

Uses Abbreviation Key	
ColdWAL	Coldwater Aquatic Life
CoolWAL	Coolwater Aquatic Life
DWS	Domestic Water Supply
FC	Fish Culture
HQColdWAL	High Quality Coldwater Aquatic Life
IW Storage	Industrial Water Storage
IW Supply	Industrial Water Supply
IRR	Irrigation
IRR Storage	Irrigation Storage
LAL	Limited Aquatic Life
LW	Livestock Watering
MCWAL	Marginal Coldwater Aquatic Life
MWWAL	Marginal Warmwater Aquatic Life
MWS	Municipal Water Storage
PC	Primary Contact
PWS	Public Water Supply
SC	Secondary Contact
WWAL	Warmwater Aquatic Life
WH	Wildlife Habitat

NMED EXHIBIT 27

HUC: 11040001 Cimarron Headwaters

Archuleta Creek (Dry Cimarron R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_50	20.6.4.99	STREAM, PERENNIAL	8.22 MILES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Carrizozo Creek (OK bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_40	20.6.4.702	STREAM, PERENNIAL	44.85 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: This AU may not be entirely perennial.					

Dry Cimarron R (Perennial reaches OK bnd to Long Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_00	20.6.4.702	STREAM, PERENNIAL	54.59 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Temperature Nutrients	2004 2018	2018 (est.) 2018 (est.)	5/5A 5/5A
IRR	Not Supporting	Sulfate Total Dissolved Solids (TDS)	2008 2004	6/2/2009 6/2/2009	4A 4A
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDLs were prepared for sulfate and TDS (2009).					

NMED EXHIBIT 27

Dry Cimarron River (Long Canyon to Oak Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_02	20.6.4.702	STREAM, PERENNIAL	23.12 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Nutrients	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDLs were prepared for E. coli and TDS (2009).					

Dry Cimarron River (Oak Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_01	20.6.4.701	STREAM, PERENNIAL	26.53 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature Nutrients	2018 2018	 2018 (est.)	5/5B 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Long Canyon (Perennial reaches abv Dry Cimarron)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_20	20.6.4.702	STREAM, PERENNIAL	8.33 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Selenium, Total Recoverable	2008	6/2/2009	4A
		Temperature	2004	2018 (est.)	5/5A
		Nutrients	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	6/2/2009	4A
WH	Not Supporting	Selenium, Total Recoverable	2008	6/2/2009	4A

AU Comment: TMDLs were prepared for E. coli and selenium (2009).

Oak Creek (Perennial prt Dry Cimarron to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11040001 Cimarron Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2701_10	20.6.4.701	STREAM, PERENNIAL	11.72 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2008	6/2/2009	4A
		Flow Regime Modification	2018		4C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	6/2/2009	4A
WH	Fully Supporting				

AU Comment: TMDLs were prepared for E. coli and nutrients (2009).

HUC: 11080001 Canadian Headwaters

Bracket Canyon (Vermejo R to hdwtrs)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_008	20.6.4.97	STREAM, EPHEMERAL	1.97 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Chevron Mining Inc. Ancho Mine permit NM0030180

Caliente Canyon (Vermejo River to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_151	20.6.4.309	STREAM, PERENNIAL	17.39 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Specific Conductance	2004	9/21/2007	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: HQCWAL is probably not attainable due to low flows and high background temperatures. TMDL for specific conductance.

Canadian River (Chicorica Creek to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_201	20.6.4.305	STREAM, PERENNIAL	58.29 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2018		5/5B
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Canadian River (Cimarron River to Chicorica Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_200	20.6.4.305	STREAM, PERENNIAL	37.99 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	2008	11/21/2011	4A
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: A TMDL was prepared for nutrients (2011).					

Chicorica Creek (Canadian River to East Fork Chicorica)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_250	20.6.4.305	STREAM, PERENNIAL	20.22 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Chicorica Creek (East Fork Chicorica to Lake Maloya)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_251	20.6.4.305	STREAM, PERENNIAL	2.18 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Doggett Creek (Raton Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_255	20.6.4.99	STREAM, PERENNIAL	3.02 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	2018 (est.)	5/5A
WWAL	Not Supporting	Nutrients	1998	2018 (est.)	5/5A
WH	Fully Supporting				

AU Comment: None.

East Fork Chicorica Creek (Chicorica Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_252	20.6.4.98	STREAM, INTERMITTENT	7.52 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2018	2018 (est.)	5/5A
WH	Fully Supporting				

AU Comment: This AU went dry during the 2015-2016 survey. No diversions visible from aerial photograph.

Gachupin Canyon (Vermejo R to w trib nr mine outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_010	20.6.4.97	STREAM, EPHEMERAL	2.74 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Chevron Mining Inc. Ancho Mine permit NM0030180

Hunter Creek (Throttle Reservoir to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_040	20.6.4.98	STREAM, INTERMITTENT	6.03 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Laguna Madre			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_058	20.6.4.99	LAKE, PLAYA	302.17 ACRES	2010	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Lake Alice (Sugarite Canyon)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.B_10	20.6.4.311	RESERVOIR	6.05 ACRES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Lake Maloya			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.B_20	20.6.4.312	RESERVOIR	117.49 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients Mercury - Fish Consumption Advisory	2018 2018	2018 (est.)	5/5A 5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Leandro Creek (Vermejo River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_161	20.6.4.309	STREAM, PERENNIAL	11.25 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Rio Grande Cutthroat Trout restoration in 1998 by NMG&F.

Maxwell Lake 12			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_080	20.6.4.99	LAKE, PLAYA	226.69 ACRES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: Marginal Coldwater, Warmwater Aquatic Life and Irrigation are existing uses.

Maxwell Lake 13			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_081	20.6.4.99	LAKE, PLAYA	301.4 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	pH	2018		5/5C
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Maxwell Lake 14			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_082	20.6.4.99	LAKE, PLAYA	80.46 ACRES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.

Raton Creek (Chicorica Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_253	20.6.4.305	STREAM, PERENNIAL	17.6 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	1998	2018 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Stubblefield Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_101	20.6.4.99	LAKE, PLAYA	907.26 ACRES	2010	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Tinaja Creek (Canadian R to West Fork Tinaja Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_018	20.6.4.98	STREAM, INTERMITTENT	5.96 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 6/9/09) indicate this assessment unit is intermittent (Hydrology Protocol score of 14.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Tinaja Creek (West Fork Tinaja Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_019	20.6.4.98	STREAM, INTERMITTENT	19.46 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2018	2018 (est.)	5/5A
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 6/9/09) indicate this assessment unit is intermittent (Hydrology Protocol score of 14.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Una de Gato Creek (Chicorica Creek to HWY 64)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_254	20.6.4.305	STREAM, PERENNIAL	10.62 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	2008	11/21/2011	4A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: A TMDL was prepared for nutrients (2011).

Una de Gato Creek (HWY 64 to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_030	20.6.4.305	STREAM, PERENNIAL	20.84 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	2008	11/21/2011	4A
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: A TMDL was prepared for nutrients (2011).					

Unnamed tributary (Bracket Cny to mine area)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_009	20.6.4.97	STREAM, EPHEMERAL	1.72 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				
AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013. Chevron Mining Inc. Ancho Mine permit NM0030180					

VanBremmer Creek (HWY 64 to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_140	20.6.4.309	STREAM, PERENNIAL	34.79 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Turbidity	2004		5/5B
		Temperature	2004		5/5B
		Specific Conductance	2004		5/5B
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Vermejo River (Canadian River to Rail Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_210	20.6.4.305	STREAM, PERENNIAL	25.38 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Flow Regime Modification			4C
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Often extremely low or no flow due to diversion. Application of the SWQB Hydrology Protocol (survey date 6/9/2009) indicate this assessment unit should be perennial (Hydrology Protocol score of 30.0 but 0.3% no flow days at USGS gage 07203000 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Vermejo River (Rail Canyon to York Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_220	20.6.4.309	STREAM, PERENNIAL	23.53 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2018		5/5B
		Temperature	2006	9/21/2007	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Vermejo River (Rock Creek to North Fork Vermejo R)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_231	20.6.4.309	STREAM, PERENNIAL	9.08 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2006	9/21/2007	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Vermejo River (York Canyon to Rock Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_230	20.6.4.309	STREAM, PERENNIAL	11.37 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2006	9/21/2007	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

York Canyon (Vermejo R to Left Fork York Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080001 Canadian Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_153	20.6.4.309	STREAM, PERENNIAL	7.76 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2004		5/5B
		Specific Conductance	2004	9/21/2007	4A
		Temperature	2018		5/5B
		Dissolved oxygen	2018		5/5B
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDL for specific conductance (2007).					

HUC: 11080002 Cimarron

American Creek (Cieneguilla Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_066	20.6.4.309	STREAM, PERENNIAL	4.5 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable Temperature	2018 2018	2018 (est.) 2018 (est.)	5/5A 5/5A
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Bonito Creek (Rayado Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.1.A_20	20.6.4.309	STREAM, PERENNIAL	5.68 MILES	2000	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Cieneguilla Creek (Eagle Nest Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_065	20.6.4.309	STREAM, PERENNIAL	14.61 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	1998	5/19/2004	4A
		Sedimentation/Siltation	1998	5/19/2004	4A
		Nutrients	2008	9/3/2010	4A
		Temperature	2008	9/3/2010	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	9/3/2010	4A
WH	Fully Supporting				

AU Comment: TMDLs were prepared/updated for turbidity, sedimentation/siltation, fecal coliform, and dissolved Al chronic (2004); and nutrients, e. coli, and temperature (2010). Dissolved Al TMDL removed 2017 because WQC no longer applicable.

Cimarron River (Canadian River to Ponil Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.1.A_10	20.6.4.306	STREAM, PERENNIAL	27.24 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Temperature	2018		5/5B
		Nutrients	2008	9/3/2010	4A
WH	Fully Supporting				

AU Comment: TMDL for chronic aluminum (assessed incorrectly -- aluminum was de-listed). TMDLs were prepared for nutrients in 2010.

NMED EXHIBIT 27

Cimarron River (Cimarron Village to Turkey Creek)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_040	20.6.4.309	STREAM, PERENNIAL	4.27 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Turbidity	2008 2018	9/3/2010 2018 (est.)	4A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDL for chronic dissolved aluminum. TMDLs for temperature and arsenic (2010).					

Cimarron River (Ponil Creek to Cimarron Village)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.1.A_11	20.6.4.306	STREAM, PERENNIAL	10.6 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2008	9/3/2010	4A
WH	Fully Supporting				
AU Comment: TMDL for chronic aluminum (assessed incorrectly -- aluminum was de-listed). TMDLs were prepared for nutrients in 2010.					

NMED EXHIBIT 27

Cimarron River (Turkey Creek to Eagle Nest Lake)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_130	20.6.4.309	STREAM, PERENNIAL	18.24 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Nutrients Turbidity	2018 2008 2018	2018 (est.) 9/3/2010 2018 (est.)	5/5A 4A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: De-list letter for total phosphorus. TMDLs for nutrients and arsenic (2010).

Clear Creek (Cimarron River to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_131	20.6.4.309	STREAM, PERENNIAL	3.57 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Eagle Nest Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.B_00	20.6.4.315	RESERVOIR	1331.97 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Greenwood Creek (Middle Ponil Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_122	20.6.4.309	STREAM, PERENNIAL	4.63 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.					

McCrystal Creek (North Ponil to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_112	20.6.4.309	STREAM, PERENNIAL	8.84 MILES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2010	2017 (est.)	5/5A
		Temperature	1998	2017 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.

Middle Ponil Creek (Greenwood Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_124	20.6.4.309	STREAM, PERENNIAL	10.96 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006. TMDL for nutrients (2011).

Middle Ponil Creek (South Ponil to Greenwood Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_121	20.6.4.309	STREAM, PERENNIAL	10 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2018	9/27/2001	4A
		Temperature	2004	9/27/2001	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature and turbidity (2010); de-list letter for total phosphorus.

Moreno Creek (Eagle Nest Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_060	20.6.4.309	STREAM, PERENNIAL	8.96 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2008	9/3/2010	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for turbidity and fecal coliform. TMDLs for temperature and plant nutrients (2010).

North Ponil Creek (Seally Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_162	20.6.4.309	STREAM, PERENNIAL	7.03 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Supporting	Gross Alpha, Adjusted	2008		5/5C
		Radium	2008		5/5C
HQColdWAL	Not Supporting	Turbidity	2010	9/30/1999	4A
		Temperature	2008	11/8/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006. TMDL for turbidity (1999) and temperature (2011).

North Ponil Creek (South Ponil Creek to Seally Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_110	20.6.4.309	STREAM, PERENNIAL	14.78 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2004	5/19/2004	4A
		Temperature	2004	12/31/1999	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	9/3/2010	4A
WH	Fully Supporting				

AU Comment: TMDL for temp, turbidity, SBD (sedimentation/siltation), and total phosphorus; de-list letter for total phosphorus. TMDLs for e. coli (2010).

Ponil Creek (Cimarron River to HWY 64)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_100	20.6.4.306	STREAM, PERENNIAL	9.7 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Dissolved oxygen	2018		5/5C
WH	Fully Supporting				

AU Comment: TMDL for turbidity, temp, and Al chronic; de-list letter for total phosphorus. TMDL for e. coli (2010).

Ponil Creek (HWY 64 to confl of North and South Ponil)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_101	20.6.4.309	STREAM, PERENNIAL	6.78 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	1998	9/27/2001	4A
		Nutrients	2008	9/3/2010	4A
		Turbidity	1998	9/27/2001	4A
		Specific Conductance	2018		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	9/3/2010	4A
WH	Fully Supporting				

AU Comment: TMDL for turbidity, temp, and Al chronic; de-list letter for total phosphorus. De-listed for Al chronic in 2008. TMDLs for e. coli and plant nutrients (2010).

Rayado Creek (Cimarron River to Miami Lake Diversion)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_80	20.6.4.307	STREAM, PERENNIAL	18.85 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Sedimentation/Siltation Nutrients	2004 2008	2/16/2001 9/3/2010	4A 4A
PC	Not Supporting	E. coli	2018	2018 (est.)	5/5A
WWAL	Not Supporting	Sedimentation/Siltation	2004	2/16/2001	4A
WH	Fully Supporting				

AU Comment: TMDL for SBD (sedimentation/siltation). TMDLs for nutrients (2010).

Rayado Creek (Miami Lake Diversion to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_051	20.6.4.309	STREAM, PERENNIAL	20.74 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2008	9/3/2010	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs for temperature and e. coli (2010).

Saladon Creek (Cieneguilla Creek to headwaters			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_069	20.6.4.309	STREAM, PERENNIAL	5.73 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2018	2018 (est.)	5/5A
WH	Fully Supporting				
AU Comment: None.					

Seally Canyon (North Ponil to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_111	20.6.4.309	STREAM, PERENNIAL	4.74 MILES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.					

Shuree Pond (North)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.B_30	20.6.4.314	RESERVOIR	5.53 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Shuree Pond (South)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.B_31	20.6.4.133	RESERVOIR	3.59 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Sixmile Creek (Eagle Nest Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_064	20.6.4.309	STREAM, PERENNIAL	5.08 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity Temperature	1998 2008	5/19/2004 9/3/2010	4A 4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	9/3/2010	4A
WH	Fully Supporting				

AU Comment: TMDL for turbidity and fecal coliform. TMDLs for temperature, e. coli, and nutrients (2010).

South Ponil Creek (Middle Ponil Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_123	20.6.4.309	STREAM, PERENNIAL	10.14 MILES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Rio Grande Cutthroat Trout restoration in 2000 by NMG&F.

South Ponil Creek (Ponil Creek to Middle Ponil Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_120	20.6.4.309	STREAM, PERENNIAL	5.24 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2008	9/3/2010	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature (2010).

Springer Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.1.B_10	20.6.4.317	RESERVOIR	459.06 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Tolby Creek (Cimarron River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_132	20.6.4.309	STREAM, PERENNIAL	5.89 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Turkey Creek (Cimarron River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_129	20.6.4.309	STREAM, PERENNIAL	5.42 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Ute Creek (Perennial prt Cimarron River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_068	20.6.4.309	STREAM, PERENNIAL	8.06 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	9/3/2010	4A
WH	Fully Supporting				

AU Comment: TMDLs for arsenic, e. coli, and temperature (2010).

West Agua Fria Creek (Cieneguilla Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080002 Cimarron	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_067	20.6.4.309	STREAM, PERENNIAL	5.39 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

HUC: 11080003 Upper Canadian

Canadian River (Conchas Reservoir to Mora River)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_000	20.6.4.305	RIVER	36.53 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: A TMDL was prepared for e. coli (2011).

Canadian River (Mora River to Cimarron River)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_100	20.6.4.305	RIVER	74.21 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Charette Lake (Lower)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.5_10	20.6.4.308	RESERVOIR	241.77 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
		Temperature	2018		5/5B
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Charette Lake (Upper)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.5_20	20.6.4.308	RESERVOIR	62.25 ACRES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Mercury - Fish Consumption Advisory	2016		5/5C
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2016		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Manueles Creek (Ocate Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_090	20.6.4.309	STREAM, PERENNIAL	8.88 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Ocate Ck (Perennial prt Canadian R to Sweetwater Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_70	20.6.4.307	STREAM, INTERMITTENT	21.6 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Supporting	Flow Regime Modification	2018		4C
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Ocate Ck (Perennial prt Charette Lakes Div to Ocate Village)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_72	20.6.4.307	STREAM, PERENNIAL	10.63 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Supporting	Flow Regime Modification	2018		4C
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Ocate Ck (Perennial prt Sweetwater Ck to Charette Lakes Div)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_71	20.6.4.307	STREAM, INTERMITTENT	14.21 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Supporting	Flow Regime Modification	2018		4C
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

NMED EXHIBIT 27

Ocate Creek (Ocate Village to Wheaton Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_070	20.6.4.309	STREAM, PERENNIAL	4.22 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Flow Regime Modification			4C
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Wagon Mound Salt Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_106	20.6.4.99	LAKE, PLAYA	184.3 ACRES	1998	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Wheaton Creek (Manuelas Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080003 Upper Canadian	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_091	20.6.4.309	STREAM, PERENNIAL	9.75 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2018		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

HUC: 11080004 Mora

Coyote Creek (Amola Ridge to Williams Canyon)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_023	20.6.4.309	STREAM, PERENNIAL	11.5 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: HQCWAL may not be attainable in this AU - WQS review needed.

Coyote Creek (Black Lake to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_021	20.6.4.309	STREAM, PERENNIAL	7.73 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2018		5/5C
WH	Fully Supporting				

AU Comment: None.

Coyote Creek (Mora River to Amola Ridge)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_020	20.6.4.309	STREAM, PERENNIAL	13.7 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Specific Conductance	1998	9/21/2007	4A
		Temperature	1998	9/21/2007	4A
		Nutrients	2018	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: HQCWAL may not be attainable in this AU - WQS review needed.					

Coyote Creek (Williams Canyon to Black Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_022	20.6.4.309	STREAM, PERENNIAL	11.41 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2018	2018 (est.)	5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Encantada (Enchanted) Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.B_10	20.6.4.313	LAKE, FRESHWATER	2.36 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

La Jara Creek (Coyote Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_54	20.6.4.98	STREAM, INTERMITTENT	15.78 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Little Coyote Creek (Black Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_024	20.6.4.309	STREAM, PERENNIAL	4.66 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2004	9/21/2007	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Lujan Creek (Luna Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_002	20.6.4.309	STREAM, PERENNIAL	7.57 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Luna Creek (Mora River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_001	20.6.4.309	STREAM, PERENNIAL	4.03 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Maestas (Lost) Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.B_20	20.6.4.313	LAKE, FRESHWATER	2.91 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Maestas Creek (Manuelitas Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_81	20.6.4.307	STREAM, PERENNIAL	4.26 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Manuelitas Creek (Rito San Jose to Maestas Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_25	20.6.4.307	STREAM, PERENNIAL	3.37 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Manuelitas Creek (Sapello River to Rito San Jose)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_21	20.6.4.307	STREAM, PERENNIAL	13.83 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Middle Fork Lake of Rio de la Casa			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.B_10	20.6.4.313	LAKE, FRESHWATER	4.54 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Mora River (Canadian River to USGS gage east of Shoemaker)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_020	20.6.4.305	STREAM, PERENNIAL	40.99 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Mora River (HWY 434 to Luna Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_000	20.6.4.309	STREAM, PERENNIAL	16.67 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Specific Conductance	1998	9/21/2007	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for specific conductance (SC) and sedimentation/siltation (2007, updated 2011). SC impairment may be due to natural sources - WQS needed.

Mora River (USGS gage east of Shoemaker to HWY 434)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_00	20.6.4.307	STREAM, PERENNIAL	53.44 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Nutrients	2004	7/22/2015	4A
PC	Not Supporting	E. coli	2018	2018 (est.)	5/5A
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs for DO (2010) and plant nutrients (2015).

Morphy (Murphy) Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.B_30	20.6.4.99	RESERVOIR	13.21 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

North Fork Lake of Rio de la Casa			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.B_20	20.6.4.313	LAKE, FRESHWATER	4.46 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Pacheco Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_093	20.6.4.313	LAKE, FRESHWATER	1.64 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Rio la Casa (Mora River to confl of North and South Forks)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2306.A_030	20.6.4.309	STREAM, PERENNIAL	5.74 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rito Cebolla (Mora River to Rito Morphy)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_40	20.6.4.307	STREAM, PERENNIAL	9.97 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Dissolved oxygen	2018		5/5B
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rito Morphy (Rito Cebolla to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_42	20.6.4.307	STREAM, PERENNIAL	7.54 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: Dry during spring and summer 2002 sampling.

Rito San Jose (Manuelitas Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_22	20.6.4.307	STREAM, PERENNIAL	8.27 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rito de Gascon (Rito San Jose to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_24	20.6.4.307	STREAM, PERENNIAL	3.76 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Santiago Creek (Rito Cebolla to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_41	20.6.4.307	STREAM, PERENNIAL	9.66 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Supporting	Flow Regime Modification	2018		4C
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Sapello River (Arroyo Jara to Manuelitas Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_23	20.6.4.307	STREAM, PERENNIAL	18.78 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Sapello River (Manuelitas Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_30	20.6.4.307	STREAM, PERENNIAL	17.53 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Sapello River (Mora River to Arroyo Jara)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_20	20.6.4.307	STREAM, PERENNIAL	8.64 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Dissolved oxygen Sedimentation/Siltation Temperature	2018 2006 2018	 9/21/2007 	5/5C 4A 5/5B
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Sparks Creek (Maestas Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_26	20.6.4.307	STREAM, PERENNIAL	3.9 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Wolf Creek (Mora River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 11080004 Mora	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.3.A_10	20.6.4.307	STREAM, PERENNIAL	24.48 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Supporting	Flow Regime Modification			4C
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: According to the manager of the Black Willow Ranch, Wolf Cr. used to be perennial, but then the well serving the facility at Valmora was deepened or otherwise improved and pumping has increased. Now Wolf Cr. goes dry.

HUC: 11080005 Conchas

Conchas Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080005 Conchas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2304_00	20.6.4.304	RESERVOIR	8768.43 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
		PCBS - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" and "PCBs in fish tissue" listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Conchas River (Conchas Reservoir to Salitre Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080005 Conchas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_010	20.6.4.305	STREAM, PERENNIAL	37.49 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	2018	2018 (est.)	5/5A
		Aluminum, Total Recoverable	2018	2018 (est.)	5/5A
PC	Not Supporting	E. coli	2018	2018 (est.)	5/5A
WH	Fully Supporting				
AU Comment: This entire AU may not be perennial.					

Conchas River (Salitre Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080005 Conchas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2305.A_011	20.6.4.305	STREAM, PERENNIAL	26.66 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: This entire AU may not be perennial.					

HUC: 11080006 Upper Canadian-Ute Reservoir

Canadian River (TX border to Ute Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2301_00	20.6.4.301	RIVER	40.49 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2018		5/5B
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Canadian River (Ute Reservoir to Conchas Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_00	20.6.4.303	RIVER	60.83 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2018	2018 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 7/1/09) indicate this assessment unit is perennial (Hydrology Protocol score of 20.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). A TMDL was prepared for e. coli (2011).

No Name Creek (Pajarito Creek to Breen's Pond)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_11	20.6.4.303	STREAM, PERENNIAL	1.07 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: This AU receives effluent from Tucumcari WWTP via an underground pipe to Breen's Pond.

Pajarito Creek (Perennial prt Canadian R to Vigil Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_10	20.6.4.303	STREAM, PERENNIAL	27.6 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature Nutrients	2018 2008	2018 (est.) 11/21/2011	5/5A 4A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for e. coli and nutrients (2011).

Pajarito Creek (Vigil Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_12	20.6.4.98	STREAM, INTERMITTENT	28.32 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Tucumcari Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_103	20.6.4.99	LAKE, PLAYA	349.28 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Ute Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 11080006 Upper Canadian-Ute Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2302_00	20.6.4.302	RESERVOIR	3759.46 ACRES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
		PCBS - Fish Consumption Advisory	2016		5/5C
WH	Fully Supporting				

AU Comment: The mercury and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

HUC: 11080007 Ute

Chicosa Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 11080007 Ute	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_029	20.6.4.98	LAKE, PLAYA	18.75 ACRES	1998	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Part of playa lake study. Data are old.

Palo Blanco Creek (Ute Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080007 Ute	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_22	20.6.4.98	STREAM, INTERMITTENT	25.88 MILES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Ute Creek (Perennial prt Bueyeros Ck to Palo Blanco Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 11080007 Ute	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_20	20.6.4.303	STREAM, PERENNIAL	50.66 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: This is a reference AU.

Ute Creek (Ute Reservoir to Bueyeros Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 11080007 Ute	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2303_23	20.6.4.98	STREAM, PERENNIAL	64.93 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 11080008 Revuelto

Revuelto Creek (Canadian River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 11080008 Revuelto	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2301_10	20.6.4.98	STREAM, INTERMITTENT	22.85 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2018		5/5B
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Often dry except for irrigation return flows and stormwater runoff. Application of the SWQB Hydrology Protocol (survey date 7/1/09) indicate this assessment unit is intermittent - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). A TMDL was prepared for boron (2011). There is an inconsistency between the marginal warmwater ALU description in 20.6.4.7.M(2) and the associated temperature criterion in 20.6.4.900.H(6) NMAC that needs review.

HUC: 11100101 Upper Beaver

Clayton Lake

AU IR CATEGORY	LOCATION DESCRIPTION
5/5C	HUC: 11100101 Upper Beaver

AU ID	WQS REF	WATER TYPE	SIZE	ASSESSED	MONITORING SCHEDULE
NM-9000.B_030	20.6.4.316	RESERVOIR	148.57 ACRES	2018	2023

USE	ATTAINMENT	CAUSE(S)	FIRST LISTED	TMDL DATE	PARAMETER IR CATEGORY
CoolWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
		Nutrients	2018	2018 (est.)	5/5A
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Corrumpa Creek (OK border to headwaters)

AU IR CATEGORY	LOCATION DESCRIPTION
3/3A	HUC: 11100101 Upper Beaver

AU ID	WQS REF	WATER TYPE	SIZE	ASSESSED	MONITORING SCHEDULE
NM-2701_30	20.6.4.310	STREAM, PERENNIAL	73.96 MILES	2008	2023

USE	ATTAINMENT	CAUSE(S)	FIRST LISTED	TMDL DATE	PARAMETER IR CATEGORY
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Seneca Creek (Perennial reaches abv Clayton Lake)

AU IR CATEGORY	LOCATION DESCRIPTION
3/3A	HUC: 11100101 Upper Beaver

AU ID	WQS REF	WATER TYPE	SIZE	ASSESSED	MONITORING SCHEDULE
NM-9000.A_904	20.6.4.99	STREAM, PERENNIAL	12.56 MILES	2018	2023

USE	ATTAINMENT	CAUSE(S)	FIRST LISTED	TMDL DATE	PARAMETER IR CATEGORY
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol (6/30/09 survey date) indicate this assessment unit is perennial (Hydrology Protocol score of 23.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

NMED EXHIBIT 27

HUC: 12050001 Yellow House Draw

Little Tule Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12050001 Yellow House Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_076	20.6.4.98	LAKE, PLAYA	7.62 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Tule Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 12050001 Yellow House Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_104	20.6.4.98	LAKE, PLAYA	45.64 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Part of playa lake study. Data are old.

HUC: 12050002 Blackwater Draw

Dennis Chavez Lake (Curry)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 12050002 Blackwater Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_036	20.6.4.99	LAKE, PLAYA	3.8 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Green Acres Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12050002 Blackwater Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_046	20.6.4.99	LAKE, PLAYA	10.94 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Irrigation is an existing use.

Ingram Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 12050002 Blackwater Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_050	20.6.4.99	LAKE, PLAYA	11.59 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Oasis Park Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12050002 Blackwater Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_092	20.6.4.99	RESERVOIR	1.32 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.

Williams Playa (Curry)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12050002 Blackwater Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_108	20.6.4.98	LAKE, PLAYA	17.87 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 12050005 Running Water Draw

Ned Houk Park Lakes			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12050005 Running Water Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_089	20.6.4.99	RESERVOIR	44.35 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses. This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. An n=1 is insufficient to assess for impairments. Applicable criteria for E. coli, aluminum, and temperature were exceeded.

HUC: 12080003 Monument-Seminole Draws

Chaparral (Park) Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12080003 Monument-Seminole Draws	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_028	20.6.4.99	RESERVOIR	10.83 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.

Green Meadows Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12080003 Monument-Seminole Draws	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_047	20.6.4.99	RESERVOIR	12.42 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.					

Lea County Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12080003 Monument-Seminole Draws	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_073	20.6.4.99	RESERVOIR	0.43 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

HUC: 12080004 Mustang Draw

Lane Salt Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12080004 Mustang Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_072	20.6.4.98	LAKE, PLAYA	369.97 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Part of playa lake study. Data are old.					

Middle Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 12080004 Mustang Draw	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_084	20.6.4.98	LAKE, PLAYA	9.19 ACRES	2016	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

HUC: 13010005 Conejos

Beaver Creek (Rio de los Pinos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_904	20.6.4.123	STREAM, PERENNIAL	6.58 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: n=1 (limited parameters) during the URG 2009 survey.					

Canada Tio Grande (Rio San Antonio to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_903	20.6.4.123	STREAM, PERENNIAL	9.39 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2012	2020 (est.)	5/5A
		Nutrients	2014	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Laguna Larga			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_057	20.6.4.99	RESERVOIR	34.45 ACRES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater Aquatic Life is an existing use.

Lagunitas Lake No. 1			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_063	20.6.4.123	RESERVOIR	3.2 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Lagunitas Lake No. 2			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_064	20.6.4.123	RESERVOIR	4.01 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Lagunitas Lake No. 3			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_065	20.6.4.123	RESERVOIR	1.81 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio Nutritas (Rio San Antonio to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_905	20.6.4.123	STREAM, PERENNIAL	6.62 MILES	2016	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio San Antonio (CO border to Montoya Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_902	20.6.4.123	STREAM, PERENNIAL	11.83 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Dissolved oxygen	2012 2012	2020 (est.)	5/5A 5/5C
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Further evaluation is needed to determine if excessive nutrients is the cause of the DO impairment.

Rio San Antonio (Montoya Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_901	20.6.4.123	STREAM, PERENNIAL	17.92 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Dissolved oxygen	2004 2012	12/17/2004	4A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/13/2012	4A
WH	Fully Supporting				

AU Comment: TMDL for temperature. Further evaluation is needed to determine if excessive nutrients is the cause of the DO impairment.

Rio de los Pinos (New Mexico reaches)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13010005 Conejos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_900	20.6.4.123	STREAM, PERENNIAL	21.3 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2004	12/17/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature.

HUC: 13020101 Upper Rio Grande

Acid Canyon (Pueblo Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_002	20.6.4.98	STREAM, EPHEMERAL	0.36 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
MWWAL	Not Supporting	Aluminum, Total Recoverable Polychlorinated Biphenyls (PCBs) Copper, Dissolved	2018 2010 2010		5/5B 5/5C 5/5B
PC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC. Metals listings based on exceedences of acute criteria.

NMED EXHIBIT 27

Agua Caliente (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_430	20.6.4.123	STREAM, PERENNIAL	5.15 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Alamitos Creek (Rio Pueblo to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_411	20.6.4.123	STREAM, PERENNIAL	5.59 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: There are threatened Rio Grande cutthroat trout in this reach.					

Apache Canyon (Rio Fernando de Taos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_002	20.6.4.123	STREAM, PERENNIAL	1.45 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Supporting	E. coli	2010	9/13/2012	4A
WH	Not Assessed				

AU Comment: NMEDs Hydrology Protocol (http://www.nmenv.state.nm.us/swqb/Hydrology/) was performed at this AU on 5/23/11. According to the protocol and supporting information, this AU falls under the "perennial" definition in 20.6.4.7 NMAC.

Arroyo Seco Creek (perennial prt HWY 522 to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2119_31	20.6.4.99	STREAM, PERENNIAL	8.25 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Fully Supporting				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Arroyo del Palacio (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_004	20.6.4.98	STREAM, EPHEMERAL	9.86 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Bayo Canyon (San Ildefonso bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_007	20.6.4.98	STREAM, EPHEMERAL	5.81 MILES	2018	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Bernardin Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_013	20.6.4.99	RESERVOIR	2.65 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater Aquatic Life is an existing use.

Bitter Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_705	20.6.4.123	STREAM, PERENNIAL	8.33 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2012	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for SBD (sedimentation/siltation) and Al acute.

Bobcat Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_716	20.6.4.123	STREAM, PERENNIAL	5.31 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Bull Creek Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_023	20.6.4.133	LAKE, FRESHWATER	0.78 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Cabresto Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_701	20.6.4.123	STREAM, PERENNIAL	17.34 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Cabresto Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_20	20.6.4.134	RESERVOIR	15.66 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled twice in 1991. No impairments were identified. Data are old -- changed to Not Assessed (2012).

Canada Agua (Arroyo La Mina to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_003	20.6.4.98	STREAM, EPHEMERAL	1.15 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Capulin Creek (R Fernando de Taos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_514	20.6.4.98	STREAM, INTERMITTENT	4.07 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Fully Supporting				
WH	Not Assessed				

AU Comment: NMEDs Hydrology Protocol (http://www.nmenv.state.nm.us/swqb/Hydrology/) was performed at this AU on 5/23/11. According to the protocol and supporting information, this AU falls under the "intermittent" definition in 20.6.4.7 NMAC.

Casias Creek (Costilla Reservoir to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_831	20.6.4.123	STREAM, PERENNIAL	7.36 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Chamisal Creek (abv Embudo Creek except Picuris Pueblo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_402	20.6.4.123	STREAM, PERENNIAL	8.5 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Chuckwagon Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_833	20.6.4.123	STREAM, PERENNIAL	2.3 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Columbine Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_702	20.6.4.123	STREAM, PERENNIAL	4.71 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Comanche Creek (Costilla Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_827	20.6.4.123	STREAM, PERENNIAL	10.29 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	1998	12/17/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature. ONRW status for surface waters in the Valle Vidal as of February 2006. Rio Grande Cufthroat trout re-introduction area.

Cordova Creek (Costilla Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_823	20.6.4.123	STREAM, PERENNIAL	5.58 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Sedimentation/Siltation	2004	12/17/1999	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for total phosphorus, SBD (sedimentation/siltation), and turbidity.					

Costilla Creek (CO border to Diversion abv Costilla)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_810	20.6.4.123	STREAM, PERENNIAL	3.29 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Flow Regime Modification			4C
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: This AU is de-watered by diversion; thermograph and gage data confirm that channel goes dry.					

Costilla Creek (Comanche Creek to Costilla Dam)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_830	20.6.4.123	STREAM, PERENNIAL	4.39 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.

Costilla Creek (Costilla Reservoir to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_829	20.6.4.123	STREAM, PERENNIAL	7.88 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Costilla Creek (Diversion abv Costilla to Comanche Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_820	20.6.4.123	STREAM, PERENNIAL	17.45 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for temperature.

Costilla Creek (Rio Grande to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_800	20.6.4.123	STREAM, PERENNIAL	2.55 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Flow Regime Modification			4C
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: This reach reportedly goes dry due to irrigation diversion in all but the wettest years.

NMED EXHIBIT 27

Cow Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_40	20.6.4.133	LAKE, FRESHWATER	0.62 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

DP Canyon (Grade control to upper LANL bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_14	20.6.4.128	STREAM, EPHEMERAL	1.01 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Copper, Dissolved Polychlorinated Biphenyls (PCBs) Aluminum, Total Recoverable	2018 2010 2018		5/5B 5/5C 5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: None.

DP Canyon (Los Alamos Canyon to grade control)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_10	20.6.4.128	STREAM, INTERMITTENT	0.82 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs) Aluminum, Total Recoverable	2010 2018		5/5C 5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: None.

Eagle Rock Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_10	20.6.4.122	RESERVOIR	3 ACRES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
FC	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 1991. There was one exceedence of the applicable dissolved zinc criterion at the time. Data are old -- changed to Not Assessed (2012).

East Fk Rio Santa Barbara (R Santa Barbara to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_424	20.6.4.123	STREAM, PERENNIAL	5.51 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: ONRW status was adopted for the Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness.

East Fork Red River (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_715	20.6.4.123	STREAM, PERENNIAL	5.96 MILES	1998	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Elk Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_039	20.6.4.133	LAKE, FRESHWATER	0.68 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Embudo Creek (Canada de Ojo Sarco to Picuris Pueblo bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_40	20.6.4.114	STREAM, PERENNIAL	5.07 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Nutrients	2012	2020 (est.)	5/5A
PC	Not Assessed				
WWAL	Not Supporting	Nutrients	2012	2020 (est.)	5/5A
WH	Fully Supporting				
AU Comment: None.					

Embudo Creek (Rio Grande to Canada de Ojo Sarco)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_41	20.6.4.114	STREAM, PERENNIAL	6.18 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Turbidity Sedimentation/Siltation Temperature	1998 1998 2012	6/2/2005 6/2/2005 2020 (est.)	4A 4A 5/5A
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for turbidity and sedimenation/siltation (SBD).					

Fawn Lake (East)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_60	20.6.4.134	RESERVOIR	1.29 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: .

Fawn Lake (West)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_61	20.6.4.134	RESERVOIR	0.78 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Fernandez Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_834	20.6.4.123	STREAM, PERENNIAL	2.48 MILES	2008	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.

Gold Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_835	20.6.4.123	STREAM, PERENNIAL	2.87 MILES	2008	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2008	11/8/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006. TMDL for temperature (2011).

Goose Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_711	20.6.4.123	STREAM, PERENNIAL	5.12 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Goose Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_12	20.6.4.133	LAKE, FRESHWATER	5.95 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Graduation Canyon (Pueblo Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020101	Upper Rio Grande
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_005	20.6.4.98	STREAM, EPHEMERAL	0.7 MILES	2010	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Copper, Dissolved	2010		5/5B
		Polychlorinated Biphenyls (PCBs)	2010		5/5C
PC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC. Metals listings based on exceedences of acute criteria.

Grassy Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101	Upper Rio Grande
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_836	20.6.4.123	STREAM, PERENNIAL	3.11 MILES	2010	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	2010	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.

Guaje Canyon (San Ildefonso bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101	Upper Rio Grande
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_005	20.6.4.98	STREAM, EPHEMERAL	12.32 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Although the next survey date is noted as 2017, SWQB does not plan monitoring of these watersheds in the next ten years. However, ongoing water quality data will continue to be collected on the Pajarito Plateau by LANL and NMED DOE-OB. Application of the SWQB Hydrology Protocol (survey date 7/22/08) indicate this assessment unit is ephemeral (Hydrology Protocol score of 8.25 with 93.3% days with no flow at LANL gage E089 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to a waterbody under 20.6.4.97 NMAC. Until such time, this waterbody will remain under 20.6.4.98 NMAC.

NMED EXHIBIT 27

Heart Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_70	20.6.4.133	LAKE, FRESHWATER	4.34 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Hidden Lake (Lake Hazel)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_80	20.6.4.133	LAKE, FRESHWATER	3.58 ACRES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Holman Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_837	20.6.4.123	STREAM, PERENNIAL	2.85 MILES	2008	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2008	11/8/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006. TMDL for temperature (2011).

Horseshoe Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_90	20.6.4.133	LAKE, FRESHWATER	6.92 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: High elevation cirque lake (difficult access).

NMED EXHIBIT 27

Horseshoe Lake (Alamitos)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_25	20.6.4.133	LAKE, FRESHWATER	7.89 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Indian Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_35	20.6.4.99	LAKE, FRESHWATER	1.74 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Coldwater Aquatic Life is an existing use.					

Italianos Creek (Rio Hondo to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_440	20.6.4.123	STREAM, PERENNIAL	2.36 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Jicarita Creek (Rio Santa Barbara to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_442	20.6.4.123	STREAM, PERENNIAL	2.59 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Jose Vigil Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.B_20	20.6.4.133	LAKE, FRESHWATER	1.84 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Kwage Canyon (Pueblo Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_003	20.6.4.98	STREAM, EPHEMERAL	1.17 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

La Cueva Creek (Costilla Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_838	20.6.4.123	STREAM, PERENNIAL	2.96 MILES	2008	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.

La Cueva Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_45	20.6.4.99	LAKE, FRESHWATER	1.42 ACRES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater Aquatic Life is an existing use.

LaBelle Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_839	20.6.4.123	STREAM, PERENNIAL	2.57 MILES	2008	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2008	11/8/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006. TMDL for temperature (2011).					

Lake Fork (Cabresto Creek to Cabresto Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_707	20.6.4.123	STREAM, PERENNIAL	1.21 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Lake Fork (Cabresto Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_708	20.6.4.123	STREAM, PERENNIAL	4.1 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Lake Fork Creek (Rio Hondo to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_606	20.6.4.123	STREAM, PERENNIAL	2.15 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Latir Creek (Costilla Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_824	20.6.4.123	STREAM, PERENNIAL	5.58 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: There were 2 of 4 exceedences of the 2007 NMAC dissolved aluminum chronic criterion (87 ug/L).					

Little Costilla Creek (Comanche Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_840	20.6.4.123	STREAM, PERENNIAL	4.65 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.					

Little Tesuque Creek (Rio Tesuque to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_34	20.6.4.121	STREAM, PERENNIAL	8.28 MILES	2018	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDL for aluminum.					

Los Alamos Canyon (DP Canyon to upper LANL bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_063	20.6.4.128	STREAM, EPHEMERAL	4.47 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs) Cyanide, Total Recoverable Selenium, Total Recoverable	2006 2018 2018		5/5C 5/5C 5/5C
LW	Not Supporting	Gross Alpha, Adjusted	2004		5/5C
SC	Not Assessed				
WH	Not Supporting	Mercury, Total Polychlorinated Biphenyls (PCBs) Cyanide, Total Recoverable Selenium, Total Recoverable	2006 2006 2018 2018		5/5C 5/5C 5/5C 5/5C
AU Comment: None.					

Los Alamos Canyon (Los Alamos Rsvr to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-127.A_00	20.6.4.127	STREAM, PERENNIAL	2.75 MILES	2014	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Los Alamos Canyon (NM-4 to DP Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_006	20.6.4.128	STREAM, EPHEMERAL	2.59 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Aluminum, Total Recoverable Polychlorinated Biphenyls (PCBs) Cyanide, Total Recoverable	2018 2006 2018		5/5B 5/5C 5/5C
LW	Not Supporting	Radium Gross Alpha, Adjusted	2018 2004		5/5C 5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs) Mercury, Total Cyanide, Total Recoverable	2006 2006 2018		5/5C 5/5C 5/5C
AU Comment: None.					

Los Alamos Canyon (San Ildefonso bnd to NM-4)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_000	20.6.4.98	STREAM, INTERMITTENT	1.16 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

NMED EXHIBIT 27

Los Alamos Canyon (upper LANL bnd to Los Alamos Rsvr)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_049	20.6.4.98	STREAM, EPHEMERAL	1.04 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Los Alamos Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_077	20.6.4.127	RESERVOIR	2.29 ACRES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Lost Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_13	20.6.4.133	LAKE, FRESHWATER	8.41 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Mallette Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_704	20.6.4.123	STREAM, PERENNIAL	4.25 MILES	2002	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Manzanita Creek (Rio Hondo to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_441	20.6.4.123	STREAM, PERENNIAL	2.81 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Middle Fk Rio Santa Barbara (R Santa Barbara to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_423	20.6.4.123	STREAM, PERENNIAL	4.05 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: ONRW status was adopted for the Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness.

Middle Fork Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_55	20.6.4.133	LAKE, FRESHWATER	8.31 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. Although there were no exceedences, an n=1 is insufficient to assess for impairments.

NMED EXHIBIT 27

Middle Fork Red River (Red River to Middle Fork Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_714	20.6.4.123	STREAM, PERENNIAL	2.69 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Nambe Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.B_10	20.6.4.133	LAKE, FRESHWATER	1.56 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. Although there were no exceedences, an n=1 is insufficient to re-assess for impairments.

Nat Lake II			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_087	20.6.4.133	LAKE, FRESHWATER	0.7 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Nat Lake IV			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_088	20.6.4.133	LAKE, FRESHWATER	0.62 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

No Fish Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_65	20.6.4.133	LAKE, FRESHWATER	1.02 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

North Fork Tesuque Creek (Tesuque Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_32	20.6.4.121	STREAM, PERENNIAL	2.19 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: Industrial water supply and municipal water supply may not be appropriate for this stream reach.					

Pioneer Creek (Red River to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_703	20.6.4.123	STREAM, PERENNIAL	4.88 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity Sedimentation/Siltation	2004 2012	3/17/2006 2020 (est.)	4A 5/5A
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for turbidity.

Pioneer Lake			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_97	20.6.4.133	LAKE, FRESHWATER	1.05 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Placer Creek (Red River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_706	20.6.4.123	STREAM, PERENNIAL	2.75 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for Al acute.					

Placer Fork (Columbine Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_444	20.6.4.123	STREAM, PERENNIAL	3.75 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Pojoaque River (San Ildefonso bnd to Pojoaque bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_20	20.6.4.114	STREAM, PERENNIAL	0.61 MILES	1998	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
PC	Not Assessed				
WWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
WH	Fully Supporting				
AU Comment: This AU was not surveyed during the 2009 URG study. DOE-OB submitted PCB data for the 2012 listing cycle.					

Policarpio Canyon (La Junta Ck to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_443	20.6.4.123	STREAM, PERENNIAL	2.3 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Powderhouse Creek (Costilla Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_832	20.6.4.123	STREAM, PERENNIAL	4.42 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.

Pueblo Canyon (Acid Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_043	20.6.4.98	STREAM, EPHEMERAL	3.59 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2002		5/5B
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2006		5/5C
		Copper, Dissolved	2018		5/5B
		Aluminum, Total Recoverable	2018		5/5B
PC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2006		5/5C

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC. Metals listings based on exceedences of acute criteria.

Pueblo Canyon (Los Alamos Canyon to Los Alamos WWTP)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-99.A_001	20.6.4.98	STREAM, EPHEMERAL	2.31 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5C
MWWAL	Not Supporting	Aluminum, Total Recoverable	2018		5/5B
		Polychlorinated Biphenyls (PCBs)	2010		5/5C
		Selenium, Total Recoverable	2018		5/5C
PC	Not Assessed				
WH	Not Supporting	Selenium, Total Recoverable	2018		5/5C
		Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC. Metals ALU listings based on exceedences of acute criteria.

Pueblo Canyon (Los Alamos WWTP to Acid Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_006	20.6.4.98	STREAM, EPHEMERAL	3.25 MILES	2014	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
PC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: Application of the SWQB Hydrology Protocol (survey date 7/21/08) indicate this assessment unit is ephemeral (Hydrology Protocol score of 3.75 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to a waterbody under 20.6.4.97 NMAC. Until such time, this waterbody will remain under 20.6.4.98 NMAC.

Red River (Placer Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_710	20.6.4.123	STREAM, PERENNIAL	5.6 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2012	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Red River (Rio Grande to Placer Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2119_10	20.6.4.122	STREAM, PERENNIAL	20.72 MILES	2018	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Aluminum, Total Recoverable	2018	2019 (est.)	5/5C
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for dissolved aluminum 2006 (withdrawn in 2013).

Rendija Canyon (Guaje Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_045	20.6.4.98	STREAM, EPHEMERAL	8.1 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Rio Chiquito (Picuris Pueblo bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_421	20.6.4.123	STREAM, PERENNIAL	9.73 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Rio Chiquito (Rio Grande del Rancho to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_502	20.6.4.123	STREAM, PERENNIAL	17.38 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Rio Chupadero (USFS bnd to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_40	20.6.4.121	STREAM, PERENNIAL	2.3 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Fernando de Taos (R Pueblo d Taos to USFS bnd at canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_512	20.6.4.123	STREAM, PERENNIAL	4.96 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Specific Conductance	1998	12/17/2004	4A
		Sedimentation/Siltation	2012	2020 (est.)	5/5A
		Temperature	1998	12/17/2004	4A
		Nutrients	2012	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	9/13/2012	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs for temperature and specific conductance.

Rio Fernando de Taos (Tienditas Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_001	20.6.4.123	STREAM, PERENNIAL	5.84 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2008	9/13/2012	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: The SWQB Watershed Protection Section completed a special study of E. coli levels with associated flow observations in the upper 3 miles of Rio Fernando de Taos and the Apache Canyon tributary to assess potential impacts from livestock grazing in 2006. The study demonstrated instances when grazing on the Flechado Allotment probably increased E. coli levels in Apache Canyon and this portion of Rio Fernando de Taos in 2006. The USFS Carson National Forest in cooperation with SWQB collected E. coli data in 2007 (combined with 2006 data and assessed for 2008 cycle). NMEDs Hydrology Protocol (http://www.nmenv.state.nm.us/swqb/Hydrology/) was performed at this AU on 5/23/11. According to the protocol and supporting information, this AU falls under the perennial definition in 20.6.4.7 NMAC

Rio Fernando de Taos (UFSF bnd at canyon to Tienditas Creek)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_513	20.6.4.123	STREAM, PERENNIAL	10.85 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Supporting	E. coli	2012	9/13/2012	4A
PWS	Not Assessed				
WH	Not Assessed				

AU Comment: NMEDs Hydrology Protocol (http://www.nmenv.state.nm.us/swqb/Hydrology/) was performed at this AU on 5/23/11. According to the protocol, this AU falls under the "perennial" definition in 20.6.4.7 NMAC.

Rio Frijoles (Rio Medio to Pecos Wilderness)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_60	20.6.4.121	STREAM, PERENNIAL	13.92 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: There were 2 of 4 exceedences of the 2007 NMAC dissolved aluminum chronic criterion (87 ug/L).

NMED EXHIBIT 27

Rio Grande (Embudo Creek to Rio Pueblo de Taos)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_12	20.6.4.114	RIVER	15.19 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Turbidity	2012	2020 (est.)	5/5A
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Grande (Klauer) spring			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-132.S_01	20.6.4.132	SPRING	0 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
DWS	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Not Assessed				
AU Comment: Limted data collection during 2009 URG survey (e. coli, gross alpha, and cyanide only).					

Rio Grande (Ohkay Owingeh bnd to Embudo Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_10	20.6.4.114	RIVER	14.52 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Turbidity	1998	6/2/2005	4A
		PCBS - Fish Consumption Advisory	2006		5/5C
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2006		5/5C
WH	Fully Supporting				

AU Comment: TMDL for turbidity. The "PCB in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Rio Grande (Red River to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2119_05	20.6.4.122	RIVER	28.98 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	pH	2004	2020 (est.)	5/5A
		Temperature	2004	12/17/2004	4A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature.

NMED EXHIBIT 27

Rio Grande (Rio Pueblo de Taos to Red River)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2119_00	20.6.4.122	RIVER	23.14 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio Grande (Santa Clara Pueblo bnd to Ohkay Owingeh bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_11	20.6.4.114	RIVER	0.7 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		Turbidity	1998	6/2/2005	4A
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: TMDL for turbidity. The "PCB in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Rio Grande del Rancho (R Pueblo de Taos to Rito de la Olla)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_501	20.6.4.123	STREAM, PERENNIAL	9.32 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2012	2020 (est.)	5/5A
		Specific Conductance	2004	12/17/2004	4A
		Temperature	2012	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	2019 (est.)	5/5A
WH	Fully Supporting				
AU Comment: TMDL for specific conductance.					

Rio Grande del Rancho (Rito de la Olla to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_500	20.6.4.123	STREAM, PERENNIAL	16.27 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

NMED EXHIBIT 27

Rio Hondo (Lake Fork Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_607	20.6.4.129	STREAM, PERENNIAL	1.74 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: n=1 for metals, nutrients, e. coli, and field parameters during 2009 URG study (no exceedences).

Rio Hondo (Rio Grande to USFS bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_600	20.6.4.129	STREAM, PERENNIAL	8.56 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2002	12/17/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature.

NMED EXHIBIT 27

Rio Hondo (South Fork Rio Hondo to Lake Fork Creek)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_602	20.6.4.129	STREAM, PERENNIAL	3.9 MILES	2002	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: A waste load allocation for nutrients was previously completed for the Rio Hondo in 1981. Stream surveys (2000-2004) have found that the Rio Hondo near the Village of Taos Ski Valley fully supports its designated uses. The Village of Taos Ski Valley has plans to increase their capacity and effluent discharge into the river so the SWQB developed a revised nutrient TMDL for this reach that defines a waste load allocation for the Village of Taos Ski Valley such that increased discharge from the waste water treatment plant will not cause violations of the water quality standards protecting the Rio Hondo.

Rio Hondo (USFS bnd to South Fork Rio Hondo)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_601	20.6.4.129	STREAM, PERENNIAL	4.44 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio Medio (Rio Frijoles to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_53	20.6.4.121	STREAM, PERENNIAL	17.41 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: There were 2 of 4 exceedences of the 2007 NMAC dissolved aluminum chronic criterion (87 ug/L).					

Rio Nambe (Nambe Pueblo bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_43	20.6.4.121	STREAM, PERENNIAL	8.39 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Reach is difficult to access. Watershed impacted by 2012 Santa Fe National Forest Pacheco Fire.					

NMED EXHIBIT 27

Rio Pueblo (Picuris Pueblo bnd to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_410	20.6.4.123	STREAM, PERENNIAL	18.23 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2012	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Rio Pueblo de Taos (Arroyo del Alamo to R Grande del Rancho)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2119_30	20.6.4.122	STREAM, PERENNIAL	5.37 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature Nutrients	2004 2012	12/17/2004 2020 (est.)	4A 5/5A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature and sedimentation/siltation (SBD).

Rio Pueblo de Taos (R Grande del Rancho to Taos Pueblo bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_511	20.6.4.123	STREAM, PERENNIAL	3.05 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2004	12/17/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/13/2012	4A
WH	Fully Supporting				
AU Comment: TMDL for temperature.					

Rio Pueblo de Taos (Rio Grande to Arroyo del Alamo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2119_20	20.6.4.122	STREAM, PERENNIAL	2.34 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature Nutrients	2004 2012	12/17/2004 2020 (est.)	4A 5/5A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for temperature.					

Rio Quemado (Rio Arriba Cnty bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_120	20.6.4.123	STREAM, PERENNIAL	11.2 MILES	2002	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio Quemado (Santa Cruz River to Rio Arriba Cnty bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_52	20.6.4.121	STREAM, PERENNIAL	3.73 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/13/2012	4A
WH	Fully Supporting				
AU Comment: None.					

Rio Santa Barbara (USFS bnd to confl of E and W forks)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_420	20.6.4.123	STREAM, PERENNIAL	5.09 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: ONRW status was adopted for the Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness.

Rio Santa Barbara (non-pueblo Embudo Ck to USFS bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_419	20.6.4.123	STREAM, PERENNIAL	4.2 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2012	2020 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/13/2012	4A
WH	Fully Supporting				

AU Comment: TMDL for turbidity (2005, de-list 2012) and E. coli (2012). The mileage is an over estimate because it includes the non-pueblo portions through the checkerboard area of private in holdrings.

NMED EXHIBIT 27

Rio Tesuque (Pojoaque Pueblo to Tesuque Pueblo bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_30	20.6.4.114	STREAM, PERENNIAL	1.39 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Not Assessed				
MCWAL	Fully Supporting				
PC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: Marginal CWAL and WWAL may not be attainable -- reach may not be perennial.

Rio Tesuque (Tesuque Pueblo to Little Tesuque Creek)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_31	20.6.4.114	STREAM, PERENNIAL	1.99 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio de Truchas (Perennial portions Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_300	20.6.4.123	STREAM, PERENNIAL	22.31 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Rio de las Trampas (Rio Embudo to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_401	20.6.4.123	STREAM, PERENNIAL	17.76 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio en Medio (Aspen Ranch to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_42	20.6.4.121	STREAM, PERENNIAL	0.93 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				
AU Comment: Accessible only by lengthy hike.					

Rio en Medio (non-pueblo lands Pojoaque R to Aspen Ranch)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_41	20.6.4.121	STREAM, PERENNIAL	6.28 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

NMED EXHIBIT 27

Rito de la Olla (Rio Grande del Rancho to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_503	20.6.4.123	STREAM, PERENNIAL	13.66 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Romero Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_05	20.6.4.123	LAKE, FRESHWATER	1.36 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

San Cristobal Creek (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_680	20.6.4.123	STREAM, PERENNIAL	9.68 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

San Leonardo Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_14	20.6.4.133	LAKE, FRESHWATER	3.49 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Sanchez Canyon (Costilla Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_822	20.6.4.123	STREAM, PERENNIAL	5.96 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Santa Clara Creek (Santa Clara Pueblo bnd to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_110	20.6.4.123	STREAM, PERENNIAL	0.87 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Santa Cruz Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.B_00	20.6.4.121	RESERVOIR	100.76 ACRES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2012	2021 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Santa Cruz River (San Clara Pueblo bnd to Santa Cruz Dam)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_50	20.6.4.114	STREAM, PERENNIAL	8.27 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Temperature	2012	2020 (est.)	5/5A
PC	Not Supporting	E. coli	2012	9/13/2012	4A
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Santa Cruz River (Santa Cruz Reservoir to Rio en Medio)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_51	20.6.4.121	STREAM, PERENNIAL	0.96 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Serpent Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_95	20.6.4.133	LAKE, FRESHWATER	0.96 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. Although there were no exceedences, an n=1 is insufficient to assess for impairments.

South Fork Acid Canyon (Acid Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_029	20.6.4.98	STREAM, EPHEMERAL	0.09 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2014		5/5B
MWWAL	Not Supporting	Copper, Dissolved	2014		5/5B
		Polychlorinated Biphenyls (PCBs)	2014		5/5C
PC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2014		5/5C

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC. Metals listings based on exceedences of acute criteria.

South Fork Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_58	20.6.4.133	LAKE, FRESHWATER	0.63 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

South Fork Rio Hondo (Rio Hondo to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_608	20.6.4.129	STREAM, PERENNIAL	4.15 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

South Fork Tesuque Creek (Tesuque Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_33	20.6.4.121	STREAM, PERENNIAL	1.01 MILES	2004	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Tesuque Creek (Rio Tesuque to confl of forks)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_31	20.6.4.121	STREAM, PERENNIAL	6.8 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 6/4/2009) indicate this assessment unit is perennial (Hydrology Protocol score of 31.3 but 0.6% no flow days at USGS gage 08302500 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Tienditas Creek (R Fernando de Taos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_515	20.6.4.98	STREAM, PERENNIAL	4.78 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: No data available. This AU was defaulted to 20.6.4.98. It may be perennial, Hydro Protocol needed to determine.

Trampas Lake (East)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_86	20.6.4.133	LAKE, FRESHWATER	2.62 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Trampas Lake (West)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_85	20.6.4.133	LAKE, FRESHWATER	2.65 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Unnamed Arroyo (Rio Pueblo de Taos to Taos WWTP)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-99.A_005	20.6.4.99	STREAM, PERENNIAL	2.32 MILES	2018	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2012	2020 (est.)	5/5A
WH	Not Assessed				
AU Comment: This channel is effluent-dominated.					

NMED EXHIBIT 27

Ute Creek (Costilla Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_821	20.6.4.123	STREAM, PERENNIAL	7.04 MILES	2012	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Vidal Creek (Comanche Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_841	20.6.4.123	STREAM, PERENNIAL	4.87 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2014	2015 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: ONRW status for surface waters in the Valle Vidal as of February 2006.					

Walnut Canyon (Pueblo Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_004	20.6.4.98	STREAM, EPHEMERAL	0.38 MILES	2014	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
		Copper, Dissolved	2014		5/5B
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC. Metals listings based on exceedences of acute criteria.

West Fk Rio Santa Barbara (R Santa Barbara to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_422	20.6.4.123	STREAM, PERENNIAL	5.54 MILES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: ONRW status was adopted for the Rio Santa Barbara, including the west, middle and east forks from their headwaters downstream to the boundary of the Pecos Wilderness.

NMED EXHIBIT 27

West Fork Red River (Middle Fork Red R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.A_713	20.6.4.123	STREAM, PERENNIAL	1.4 MILES	2000	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Williams Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020101 Upper Rio Grande	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2120.B_75	20.6.4.133	LAKE, FRESHWATER	7.88 ACRES	2014	2017
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. Although there were no exceedences, an n=1 is insufficient to re-assess for impairments.

HUC: 13020102 Rio Chama

Abiquiu Creek (Rio Chama to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2113_50	20.6.4.116	STREAM, PERENNIAL	12.85 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Dissolved oxygen	1998	9/3/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Not Supporting	E. coli	2014	2019 (est.)	5/5A
WWAL	Not Supporting	Dissolved oxygen	1998	9/3/2004	4A
WH	Fully Supporting				

AU Comment: TMDL for dissolved oxygen. Impacts to watershed in 2012.

Abiquiu Reservoir			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2114_00	20.6.4.117	RESERVOIR	1037.97 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Mercury - Fish Consumption Advisory PCBS - Fish Consumption Advisory	2010 2006		5/5C 5/5C
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory Mercury - Fish Consumption Advisory	2006 2010		5/5C 5/5C
WH	Fully Supporting				

AU Comment: The Mercury and PCB in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Arroyo del Toro (Rio Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_006	20.6.4.98	STREAM, EPHEMERAL	6.86 MILES	2012	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012		5/5C
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC..

Beaver Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_012	20.6.4.99	LAKE, FRESHWATER	0.85 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater Aquatic Life is an existing use.

Burns Lake (Rio Arriba)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_025	20.6.4.99	RESERVOIR	1.53 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2014	2021 (est.)	5/5A
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Canada de Horno (Rio Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_005	20.6.4.98	STREAM, EPHEMERAL	2.81 MILES	2012	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012		5/5C
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_030	20.6.4.119	STREAM, PERENNIAL	34.13 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Nutrients	2010		5/5C
		Turbidity	2006		5/5C
		Specific Conductance	2006	8/16/2011	4A
		Temperature	2006	8/16/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs prepared for temperature and SC in 2011.

NMED EXHIBIT 27

Canjilon Lake (a)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_10	20.6.4.134	RESERVOIR	5.85 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Canjilon Lake (b)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_11	20.6.4.119	RESERVOIR	1.6 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Canjilon Lake (c)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_12	20.6.4.134	RESERVOIR	3.07 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Canjilon Lake (d)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_13	20.6.4.119	RESERVOIR	1.27 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Canjilon Lake (e)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_14	20.6.4.134	RESERVOIR	4.1 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Canjilon Lake (f)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_15	20.6.4.134	RESERVOIR	2.31 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled twice in 1991. No impairments were identified. Data are old -- changed to Not Assessed (2012).

Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_010	20.6.4.119	STREAM, PERENNIAL	8.35 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	2019 (est.)	5/5A
WH	Fully Supporting				

AU Comment: TMDLs for Al chronic, turbidity, and fecal coliform.

Canones Creek (Chihuahuenos Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_012	20.6.4.119	STREAM, PERENNIAL	11.27 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Canones Creek (Rio Chama to Jicarilla Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_100	20.6.4.119	STREAM, PERENNIAL	8.35 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2014		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Cecilia Canyon Creek (Rio Capulin to USFS bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_042	20.6.4.119	STREAM, PERENNIAL	5.01 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Chavez Creek (Rio Brazos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_081	20.6.4.119	STREAM, PERENNIAL	12.88 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2004	3/4/2004	4A
IRR	Fully Supporting				
LW	Not Assessed				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for temperature. HQCWAL may not be attainable.					

Chihuahuenos Creek (Canones Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_016	20.6.4.119	STREAM, PERENNIAL	9.28 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable Sedimentation/Siltation	2014 2014	 2019 (est.)	5/5C 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Clear Creek (Rio Gallina to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_043	20.6.4.119	STREAM, PERENNIAL	3.52 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Cold Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_031	20.6.4.99	LAKE, FRESHWATER	0.62 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Coldwater Aquatic Life is an existing use.					

Coyote Creek (Rio Puerco de Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_022	20.6.4.119	STREAM, PERENNIAL	13.74 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Sedimentation/Siltation	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Deep Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_035	20.6.4.99	LAKE, FRESHWATER	0.67 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater Aquatic Life is an existing use.

East Fork Rio Brazos (Jicarilla Apache bnd to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_088	20.6.4.119	STREAM, PERENNIAL	6.74 MILES	2000	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

El Rito Creek (Perennial reaches above HWY 554)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.A_20	20.6.4.115	STREAM, PERENNIAL	22.4 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2014		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	2019 (est.)	5/5A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

El Rito Creek (Perennial reaches below HWY 554)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2113_40	20.6.4.116	STREAM, PERENNIAL	13.07 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2014		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Not Supporting	E. coli	2014	2019 (est.)	5/5A
WWAL	Not Supporting	Nutrients	2014		5/5C
WH	Fully Supporting				

AU Comment: None.

El Vado Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2117_00	20.6.4.120	RESERVOIR	3221.66 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Ensenada Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_040	20.6.4.99	LAKE, FRESHWATER	2.8 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater Aquatic Life is an existing use.

Heron Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2117_10	20.6.4.120	RESERVOIR	4740.8 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	2014	2021 (est.)	5/5A
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Hopewell Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.B_00	20.6.4.134	RESERVOIR	16.13 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2014	2021 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Jarosa Creek (Rio Vallecitos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.A_01	20.6.4.115	STREAM, PERENNIAL	6.67 MILES	2000	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Little Willow Creek (Rio Chama to to Jicarilla Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_120	20.6.4.119	STREAM, PERENNIAL	0.4 MILES	2000	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: Rio Grande Cutthroat Trout restoration in 1992-1996 by NMG&F.					

Nabor Creek (Rio Chamita to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_111	20.6.4.98	STREAM, INTERMITTENT	2.77 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: HP

Nabor Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_20	20.6.4.119	RESERVOIR	4.5 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Nutrias Lake A (Trout Lake A)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_30	20.6.4.119	RESERVOIR	1.03 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Nutrias Lake B (Trout Lake B)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_31	20.6.4.119	RESERVOIR	0.19 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Nutrias Lake C (Trout Lake C)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_32	20.6.4.119	RESERVOIR	4.06 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Nutrias Lake D (Trout Lake D)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_33	20.6.4.119	RESERVOIR	1.15 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Nutrias Lake E (Trout Lake E)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_34	20.6.4.119	RESERVOIR	3.08 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Placer Creek (Hopewell Lake to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.A_03	20.6.4.115	STREAM, PERENNIAL	2.38 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Placer Creek (Rio Vallecitos to Hopewell Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.A_02	20.6.4.115	STREAM, PERENNIAL	2.4 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Poleo Creek (Rio Puerco de Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_023	20.6.4.119	STREAM, PERENNIAL	7.96 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Sedimentation/Siltation	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for turbidity (2004).					

Polvadera Creek (Canones Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_011	20.6.4.119	STREAM, PERENNIAL	13.86 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for temperature (2004).					

Rio Brazos (Chavez Creek to Jicarilla Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_084	20.6.4.119	STREAM, PERENNIAL	22.97 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Rio Brazos (Rio Chama to Chavez Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_080	20.6.4.119	STREAM, PERENNIAL	3.54 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	3/4/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDL for temperature (approved by EPA March 2004)					

Rio Capulin (Rio Gallina to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_041	20.6.4.119	STREAM, PERENNIAL	12.08 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	8/16/2011	4A
WH	Fully Supporting				
AU Comment: TMDL prepared for e. coli (2011).					

Rio Cebolla (Rio Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_050	20.6.4.119	STREAM, PERENNIAL	23.85 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio Chama (Abiquiu Reservoir to El Vado Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2115_00	20.6.4.118	RIVER	37.63 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_003	20.6.4.119	STREAM, PERENNIAL	7.66 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2010	8/16/2011	4A
		Nutrients	2010	8/16/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	8/16/2011	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for e. coli , nutrients, and temperature in 2011.

Rio Chama (Little Willow Creek to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_002	20.6.4.119	STREAM, PERENNIAL	9.09 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2010	8/16/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for e. coli and temperature in 2011.

Rio Chama (Ohkay Owingeh to Abiquiu Dam)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2113_00	20.6.4.116	RIVER	29.14 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio Chama (Rio Brazos to Little Willow Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_001	20.6.4.119	STREAM, PERENNIAL	13.2 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	3/4/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for temperature (2004), and e. coli and nutrients (2011).

Rio Chama (Rito de Tierra Amarilla to Rio Brazos)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_000	20.6.4.119	STREAM, PERENNIAL	6.64 MILES	2010	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Nutrients	2010	8/16/2011	4A
		Temperature	2010	8/16/2011	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	8/16/2011	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for e. coli , nutrients, and temperature in 2011.

Rio Chamita (Rio Chama to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_110	20.6.4.119	STREAM, PERENNIAL	12.86 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Nutrients	2006	8/16/2011	4A
		Temperature	1998	12/31/1999	4A
		Ammonia, Total	1998	9/30/1999	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	8/16/2011	4A
WH	Fully Supporting				

AU Comment: TMDL for ammonia, total phosphorus, fecal coliform, temp (1999), and dissolved aluminum (2004). TMDLs were prepared for e. coli and nutrients (2011). Dissolved Al TMDL withdrawn 2018 because no longer an applicable WQC.

Rio Gallina (HWY 96 to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_040	20.6.4.119	STREAM, PERENNIAL	8.7 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Gallina (Perennial prt Rio Chama to HWY 96)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2115_10	20.6.4.451	STREAM, PERENNIAL	24.32 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio Nutrias (Perennial prt Rio Chama to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_060	20.6.4.119	STREAM, PERENNIAL	34.57 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Turbidity	2004	9/3/2004	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	2019 (est.)	5/5A
WH	Fully Supporting				
AU Comment: TMDL for turbidity (2004).					

Rio Ojo Caliente (Arroyo El Rito to Rio Vallecitos)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2113_10	20.6.4.116	STREAM, PERENNIAL	8.18 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2014	2019 (est.)	5/5A
WH	Fully Supporting				
AU Comment: None.					

NMED EXHIBIT 27

Rio Ojo Caliente (Rio Chama to Arroyo El Rito)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2113_11	20.6.4.116	STREAM, INTERMITTENT	17.19 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Coldwater ALU is liklely not attainable in this lower AU.

Rio Puerco de Chama (Abiquiu Reservoir to HWY 96)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2115_20	20.6.4.118	STREAM, PERENNIAL	13.57 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	1998	8/16/2011	4A
		Nutrients	2010		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	8/16/2011	4A
WWAL	Not Supporting	Nutrients	2010		5/5C
WH	Fully Supporting				

AU Comment: TMDLs prepared for temperature and e. coli (2011).

Rio Puerco de Chama (HWY 96 to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_020	20.6.4.119	STREAM, PERENNIAL	12.08 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio Tusas (Perennial prt Rio Vallecitos to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2113_30	20.6.4.116	STREAM, PERENNIAL	42.73 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature Nutrients	2016 2010	2019 (est.) 8/16/2011	5/5A 4A
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2010	8/16/2011	4A
WH	Fully Supporting				

AU Comment: TMDL was prepared for nutrients (2011).

Rio Vallecitos (Rio Tusas to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.A_00	20.6.4.115	STREAM, PERENNIAL	35.01 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Nutrients	1998 2016	9/3/2004 2019 (est.)	4A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for Al chronic, temperature, and turbidity. HQCWAL may not be attainable - WQS review needed.

Rio del Oso (Perennial prt Rio Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2112.A_10	20.6.4.115	STREAM, PERENNIAL	16.88 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012		5/5C
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: DOE-OB submitted PCB data for the 2012 listing cycle.

Rito Encino (Rio Puerco de Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_021	20.6.4.119	STREAM, PERENNIAL	9.85 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Sedimentation/Siltation	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014		5/5C
WH	Fully Supporting				
AU Comment: None.					

Rito Redondo (Rito Resumidero to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_026	20.6.4.119	STREAM, PERENNIAL	2.08 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_025	20.6.4.119	STREAM, PERENNIAL	2.75 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Supporting	Flow Regime Modification	2014		4C
IRR	Not Assessed				
LW	Not Assessed				
PC	Fully Supporting				
WH	Not Assessed				

AU Comment: The entire stream is diverted just upstream of the SWQB historic sampling station.

Rito de Tierra Amarilla (HWY 64 to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_072	20.6.4.119	STREAM, PERENNIAL	4.97 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable Temperature	2014 2014	 2019 (est.)	5/5C 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Rito de Tierra Amarilla (Rio Chama to HWY 64)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_070	20.6.4.119	STREAM, PERENNIAL	15.78 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Specific Conductance	2014		5/5B
		Nutrients	2016		5/5C
		Turbidity	1998	3/4/2004	4A
		Temperature	1998	3/4/2004	4A
		Sedimentation/Siltation	1998	3/4/2004	4A
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs for temperature, turbidity, and sedimentation/siltation (2004). WQS review recommended-Cool water ALU more appropriate on basis of ecoregion (21d) and fish community.

Sixto Creek (Rio Chamita to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_112	20.6.4.119	STREAM, PERENNIAL	1.12 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2014	2019 (est.)	5/5A
IRR	Not Assessed				
LW	Not Assessed				
PC	Fully Supporting				
WH	Not Assessed				

AU Comment: None.

Tonita Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.B_40	20.6.4.119	LAKE, FRESHWATER	0.63 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

West Fork Rio Brazos (Jicarilla Apache bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_087	20.6.4.119	STREAM, PERENNIAL	5.94 MILES	2000	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Willow Creek (Jicarilla Apache bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_140	20.6.4.119	STREAM, PERENNIAL	13.91 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Not Assessed				
LW	Not Assessed				
PC	Fully Supporting				
WH	Not Assessed				
AU Comment: None.					

Wolf Creek (Rio Chama to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020102 Rio Chama	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2116.A_130	20.6.4.119	STREAM, PERENNIAL	0.81 MILES	2000	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

NMED EXHIBIT 27

HUC: 13020201 Rio Grande-Santa Fe

Alamo Canyon (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_71	20.6.4.121	STREAM, PERENNIAL	14.68 MILES	2004	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Alamo Creek (Cienega Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2110_20	20.6.4.113	STREAM, PERENNIAL	6.48 MILES	2004	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Assessed				
SC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Ancho Canyon (North Fork to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_046	20.6.4.128	STREAM, EPHEMERAL	4.42 MILES	2014	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
LW	Not Assessed				
SC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Ancho Canyon (Rio Grande to North Fork Ancho)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_054	20.6.4.128	STREAM, EPHEMERAL	2.39 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2014		5/5C
LW	Fully Supporting				
SC	Not Assessed				
WH	Not Supporting	Mercury, Total	2018		5/5C
		Polychlorinated Biphenyls (PCBs)	2014		5/5C
AU Comment: None.					

Apache Canyon (perennial prt Galisteo Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_14	20.6.4.121	STREAM, PERENNIAL	9.99 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Arroyo Hondo (south of Old Pecos Trail to headwater)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2110_11	20.6.4.98	STREAM, INTERMITTENT	7.45 MILES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Arroyo de la Delfe (Pajarito Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_16	20.6.4.128	STREAM, EPHEMERAL	0.61 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Copper, Dissolved Polychlorinated Biphenyls (PCBs) Aluminum, Total Recoverable	2018 2018 2018		5/5B 5/5C 5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2018		5/5C

AU Comment: None.

Canada del Buey (San Ildefonso Pueblo to LANL bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_053	20.6.4.98	STREAM, EPHEMERAL	1.65 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

NMED EXHIBIT 27

Canada del Buey (within LANL)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_00	20.6.4.128	STREAM, EPHEMERAL	5.14 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5B
SC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Canada del Rancho (Arroyo Hondo to outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_0121	20.6.4.98	STREAM, EPHEMERAL	4.5 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Receiving water for Ranchland Utility Company - NM0030368.					

Canon de Valle (LANL gage E256 to Burning Ground Spr)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-126.A_00	20.6.4.126	STREAM, PERENNIAL	0.3 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
LW	Fully Supporting				
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
AU Comment: None.					

NMED EXHIBIT 27

Canon de Valle (below LANL gage E256)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_01	20.6.4.128	STREAM, EPHEMERAL	2.39 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Fully Supporting				
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5B
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Canon de Valle (upper LANL bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_051	20.6.4.98	STREAM, INTERMITTENT	3.53 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Canon de Valle (within LANL above Burning Ground Spr)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_02	20.6.4.128	STREAM, EPHEMERAL	1.07 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Capulin Creek (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_72	20.6.4.121	STREAM, PERENNIAL	13.17 MILES	2006	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: The 1996 Dome Fire extensively burned this watershed, leading to increased erosion of the already erosive natural geology in the area (Bandelier Tuff).

Chaquehui Canyon (within LANL)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_03	20.6.4.128	STREAM, EPHEMERAL	2.51 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2018		5/5C
LW	Fully Supporting				
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Cienega Creek (Perennial prt of Santa Fe R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2110_10	20.6.4.113	STREAM, PERENNIAL	3.12 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Middle reaches often go dry due to diversion.

NMED EXHIBIT 27

Cunningham Gulch (CR 55 to above mine area)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_011	20.6.4.97	STREAM, EPHEMERAL	1.33 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
LAC Minerals permit NM0028711

Deer Creek (Galisteo Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_13	20.6.4.98	STREAM, INTERMITTENT	5.49 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Fence Canyon (above Potrillo Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_04	20.6.4.128	STREAM, EPHEMERAL	2.92 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Galisteo Ck (Perennial prt 2.2 mi abv Lamy to hdwts)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_12	20.6.4.121	STREAM, PERENNIAL	9.71 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	1998	8/22/2017	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature (2017).

Galisteo Ck (Perennial prt Kewa bnd to 2.2 mi abv Lamy)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_10	20.6.4.139	STREAM, PERENNIAL	33.28 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Temperature	1998	8/22/2017	4A
DWS	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol at various locations in this AU indicate this AU has perennial, intemittent and ephemeral portions - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). TMDL for temperature (2017).

NMED EXHIBIT 27

Indio Canyon (above Water Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_05	20.6.4.128	STREAM, EPHEMERAL	1.17 MILES	2010	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Las Huertas Ck (Perennial prt Santa Ana bnd to hdwtrs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2108.5_00	20.6.4.111	STREAM, PERENNIAL	14.06 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
HQColdWAL	Not Supporting	Flow Regime Modification	2018		4C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Lummis Canyon (Upper Trail to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_001	20.6.4.98	STREAM, EPHEMERAL	8.28 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

McClure Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.B_50	20.6.4.138	RESERVOIR	85 ACRES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				

AU Comment: This AU was reclassified from segment 121 into a new segment 138. Amendment was effective February 14, 2013. EPA approved the changes June 5, 2013.

Medio Creek (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_73	20.6.4.121	STREAM, PERENNIAL	6.35 MILES	2004	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Mortandad Canyon (within LANL)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_042	20.6.4.128	STREAM, EPHEMERAL	4.25 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Copper, Dissolved Polychlorinated Biphenyls (PCBs)	2010 2014		5/5B 5/5C
LW	Not Supporting	Gross Alpha, Adjusted	2004		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs) Mercury, Total	2014 2018		5/5C 5/5C

AU Comment: None.

Nichols Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.B_40	20.6.4.138	RESERVOIR	27.46 ACRES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				

AU Comment: This AU was reclassified from segment 121 into a new segment 138. Amendment was effective February 14, 2013. EPA approved the changes June 5, 2013.

North Fork Ancho Canyon (Ancho Canyon to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_055	20.6.4.128	STREAM, EPHEMERAL	3.73 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: None.

Pajarito Canyon (Arroyo de La Delfe to Starmers Spring)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-126.A_01	20.6.4.126	STREAM, PERENNIAL	0.51 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
LW	Fully Supporting				
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: Spring fed.

Pajarito Canyon (Lower LANL bnd to Two Mile Canyon)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_08	20.6.4.128	STREAM, EPHEMERAL	4.87 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Aluminum, Total Recoverable Polychlorinated Biphenyls (PCBs) Copper, Dissolved	2018 2010 2018		5/5B 5/5C 5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5B
SC	Not Assessed				
WH	Not Supporting	Cyanide, Total Recoverable Polychlorinated Biphenyls (PCBs)	2018 2010		5/5C 5/5C

AU Comment: Metals listings based on exceedences of acute criteria.

Pajarito Canyon (Rio Grande to LANL bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_040	20.6.4.98	STREAM, EPHEMERAL	2.85 MILES	2014	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Pajarito Canyon (Two Mile Canyon to Arroyo de La Delfe)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_06	20.6.4.128	STREAM, INTERMITTENT	2.06 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
		Silver, Dissolved	2018		5/5C
		Copper, Dissolved	2016		5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5B
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: Metals listings based on exceedences of acute criteria.

Pajarito Canyon (upper LANL bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_048	20.6.4.98	STREAM, INTERMITTENT	2.57 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
PC	Not Assessed				
WWAL	Not Supporting	Cyanide, Total Recoverable	2018		5/5C
		Polychlorinated Biphenyls (PCBs)	2010		5/5C
		Aluminum, Total Recoverable	2018		5/5B
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
		Mercury, Total	2018		5/5C

AU Comment: None.

Pajarito Canyon (within LANL above Starmers Gulch)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_07	20.6.4.128	STREAM, INTERMITTENT	1.09 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Aluminum, Total Recoverable	2018		5/5C
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5C
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Potrillo Canyon (above Water Canyon)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_09	20.6.4.128	STREAM, EPHEMERAL	6.25 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Fully Supporting				
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5C
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Rio Chiquito (Cochiti Pueblo bnd to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_041	20.6.4.98	STREAM, EPHEMERAL	3.29 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Rio Grande (Cochiti Reservoir to San Ildefonso bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2111_00	20.6.4.114	RIVER	18.13 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Supporting	Aluminum, Dissolved	2016	2020 (est.)	5/5A
LW	Not Supporting	Gross Alpha, Adjusted	2012	2020 (est.)	5/5A
MCWAL	Not Supporting	Turbidity	2004	2020 (est.)	5/5A
		Thallium	2016	2020 (est.)	5/5A
		Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
		Selenium, Total Recoverable	2016	2020 (est.)	5/5A
		PCBS - Fish Consumption Advisory	2006		5/5C
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
		PCBS - Fish Consumption Advisory	2006		5/5C
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2020 (est.)	5/5A
		Cyanide, Total Recoverable	2016	2020 (est.)	5/5A

AU Comment: The 2016 assessments were based on primarily stormwater data. It should be noted that the city of Santa Fe has procedures in place that do not allow public water supply withdrawal from the Buckman Diversion during significant storm events. The "PCB in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Rio Grande (non-pueblo Angostura Div to Cochiti Rsrv)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2108_00	20.6.4.110	RIVER	1.54 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	2016	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Not Supporting	Gross Alpha, Adjusted	2016	2019 (est.)	5/5A
PC	Fully Supporting				
WWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2016	2019 (est.)	5/5A
WH	Fully Supporting				

AU Comment: There is only ~1.5 miles of non-pueblo stream reach between Angostura Diversion and Cochiti Reservoir.

Rito de los Frijoles (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_70	20.6.4.121	STREAM, PERENNIAL	13.99 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016	2020 (est.)	5/5A
		DDT - Fish Consumption Advisory	2004		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: DDT levels were measured in fish tissue in 2001. The levels warrant a state fish tissue advisory. The National Park Service continues to have a fishing ban in effect.

San Cristobal Creek (Galisteo Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_11	20.6.4.98	STREAM, INTERMITTENT	13.85 MILES	2004	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

San Pedro Creek (San Felipe bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_004	20.6.4.125	STREAM, PERENNIAL	24.62 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Sandia Canyon (Sigma Canyon to NPDES outfall 001)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_047	20.6.4.126	STREAM, PERENNIAL	2.24 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2006		5/5C
		Aluminum, Total Recoverable	2018		5/5B
		Copper, Dissolved	2010		5/5B
		Temperature	2018		5/5B
LW	Fully Supporting				
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2006		5/5C

AU Comment: None.

Sandia Canyon (within LANL below Sigma Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_11	20.6.4.128	STREAM, EPHEMERAL	3.39 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2006		5/5C
		Aluminum, Total Recoverable	2018		5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5C
SC	Not Assessed				
WH	Not Supporting	Mercury, Total	2006		5/5C
		Polychlorinated Biphenyls (PCBs)	2006		5/5C

AU Comment: None.

Santa Fe Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.B_30	20.6.4.133	LAKE, FRESHWATER	4.86 ACRES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This lake is in the upper portion of the Santa Fe Municipal Watershed. Access is restricted to protect the water supply reservoirs, so primary contact should not be existing uses. This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. Although there were no exceedences, an n=1 is insufficient to assess for impairments.

Santa Fe River (Cienega Creek to Santa Fe WWTP)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2110_00	20.6.4.113	STREAM, PERENNIAL	6.9 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Nutrients	2008	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	5/3/2017	4A
WH	Fully Supporting				

AU Comment: TMDL for SBD (sedimentation/siltation), DO, pH, and chlorine. TMDL for E. coli (2017). Santa Fe River below the WWTP is effluent-dominated.

NMED EXHIBIT 27

Santa Fe River (Cochiti Pueblo bnd to Cienega Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2110_02	20.6.4.113	STREAM, PERENNIAL	5.32 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Nutrients	2008	2018 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for SBD (sedimentation/siltation) (2000), DO, and pH.					

Santa Fe River (Guadalupe St to Nichols Rsvr)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_062	20.6.4.137	STREAM, INTERMITTENT	4.09 MILES	2014	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Aluminum, Total Recoverable	2016	2019 (est.)	5/5A
		Polychlorinated Biphenyls (PCBs)	2018	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	5/3/2017	4A
WH	Fully Supporting				
AU Comment: TMDL for E. coli (2017).					

Santa Fe River (Nichols Reservoir to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2118.A_21	20.6.4.121	STREAM, PERENNIAL	11.18 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: A WQS review may be warranted in this "closed" municipal drinking water supply watershed.

Santa Fe River (Santa Fe WWTP to Guadalupe St)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_061	20.6.4.136	STREAM, EPHEMERAL	9.98 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LAL	Not Supporting	Aluminum, Total Recoverable	2016	2018 (est.)	5/5A
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	5/3/2017	4A
WH	Fully Supporting				

AU Comment: TMDL for E. coli (2017).

Ten Site Canyon (Mortandad Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_17	20.6.4.128	STREAM, EPHEMERAL	1.52 MILES	2014	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: None.

NMED EXHIBIT 27

Three Mile Canyon (Pajarito Canyon to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_091	20.6.4.128	STREAM, EPHEMERAL	2.2 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Fully Supporting				
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5C
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Two Mile Canyon (Pajarito to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_15	20.6.4.128	STREAM, EPHEMERAL	3.36 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs) Aluminum, Total Recoverable Copper, Dissolved	2010 2018 2018		5/5C 5/5B 5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2010		5/5B
SC	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2010		5/5C

AU Comment: Metals listings based on exceedences of acute criteria.

Unnamed tributary (Arroyo Hondo to Oshara outfall)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_012	20.6.4.97	STREAM, EPHEMERAL	0.37 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013. Oshara Village water reclamation facility, permit NM0030813

Unnamed tributary (San Pedro Cr to PAAKO outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_013	20.6.4.97	STREAM, EPHEMERAL	0.79 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
PAA-KO comm sewer assoc, permit NM0029724

Water Canyon (Area-A Canyon to NM 501)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-126.A_03	20.6.4.126	STREAM, PERENNIAL	1.31 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
LW	Fully Supporting				
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Water Canyon (Rio Grande to lower LANL bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201	Rio Grande-Santa Fe
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_044	20.6.4.98	STREAM, EPHEMERAL	0.53 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Water Canyon (upper LANL bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_052	20.6.4.98	STREAM, INTERMITTENT	2.86 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Aluminum, Total Recoverable	2018		5/5C
PC	Not Assessed				
WH	Not Supporting	Mercury, Total	2018		5/5C

AU Comment: Application of the SWQB Hydrology Protocol (survey date 7/21/08) indicate this assessment unit is intermittent (Hydrology Protocol score of 9.8 with 24.1% days with no flow at LANL gage E252 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Water Canyon (within LANL above NM 501)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_12	20.6.4.128	STREAM, INTERMITTENT	0.03 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Water Canyon (within LANL below Area-A Cyn)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020201 Rio Grande-Santa Fe	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-128.A_13	20.6.4.128	STREAM, EPHEMERAL	8.56 MILES	2018	
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Polychlorinated Biphenyls (PCBs) Aluminum, Total Recoverable	2010 2018		5/5C 5/5B
LW	Not Supporting	Gross Alpha, Adjusted	2006		5/5B
SC	Not Assessed				
WH	Not Supporting	Mercury, Total Polychlorinated Biphenyls (PCBs)	2018 2010		5/5C 5/5C

AU Comment: None.

NMED EXHIBIT 27

HUC: 13020202 Jemez

American Creek (Rio de las Palomas to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_44	20.6.4.98	STREAM, INTERMITTENT	4.8 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: De-list for SBD (sedimentation/siltation), temperature, and turbidity. Coldwater ALU is an existing use (salmonids seen during 2013 survey). WQS review needed.

Calaveras Creek (Rio Cebolla to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_53	20.6.4.108	STREAM, PERENNIAL	9.17 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Clear Creek (Rio de las Vacas to San Gregorio Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_54	20.6.4.108	STREAM, PERENNIAL	5.14 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature Nutrients	2016 2016	2019 (est.) 9/23/2016	5/5A 4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WH	Fully Supporting				

AU Comment: TMDL for turbidity and TOC (2003). The lake level dropped and no longer spills water into Clear Creek. Water is drained from the lake into Nacimiento Creek by a stand pipe. This AU is not perennial for its entire length.

Clear Creek (San Gregorio Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_55	20.6.4.108	STREAM, PERENNIAL	3.67 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Nutrients Aluminum, Total Recoverable	2016 2016	9/23/2016	4A 5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

NMED EXHIBIT 27

East Fork Jemez (San Antonio Creek to VCNP bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_13	20.6.4.108	STREAM, PERENNIAL	10.4 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
		Temperature	2008	9/15/2009	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs for turbidity (2003). TMDLs for temperature and arsenic (2009). Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

East Fork Jemez (VCNP to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_10	20.6.4.108	STREAM, PERENNIAL	8.65 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
		Turbidity	1998	12/31/1999	4A
		Nutrients	2016	9/23/2016	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

Fenton Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.B_00	20.6.4.108	RESERVOIR	23.81 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Nutrients	2004	2021 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Jaramillo Creek (East Fork Jemez to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_12	20.6.4.108	STREAM, PERENNIAL	10.03 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
		Turbidity	2004	10/11/2006	4A
		Nutrients	2016	9/23/2016	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs for temperature and turbidity. Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

Jemez River (Jemez Pueblo bnd to Rio Guadalupe)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_71	20.6.4.107	STREAM, PERENNIAL	1.87 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Arsenic, Dissolved	2008	9/15/2009	4A
		Temperature	2016	2019 (est.)	5/5A
		Nutrients	2016	2019 (est.)	5/5A
IRR	Not Supporting	Boron, Dissolved	2008	9/15/2009	4A
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WH	Fully Supporting				

AU Comment: TMDLs for arsenic and boron (2009).

Jemez River (Rio Guadalupe to Soda Dam nr Jemez Springs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105.5_10	20.6.4.107	STREAM, PERENNIAL	9.62 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	2008	9/15/2009	4A
		Aluminum, Total Recoverable	2016	4/27/2018	4A
		Turbidity	1998	7/30/2004	4A
		Nutrients	2008	9/15/2009	4A
		Arsenic, Dissolved	2008	9/15/2009	4A
IRR	Not Supporting	Arsenic, Dissolved	2008	9/15/2009	4A
		Boron, Dissolved	2008	9/15/2009	4A
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WH	Fully Supporting				

AU Comment: TMDL for Al acute (2003), turbidity, and SBD (1999) (sedimentation/siltation). De-listed for SBD in 2008. TMDLs for arsenic, boron, plant nutrients, and temperature (2009). The dissolved aluminum TMDL was revised to a total recoverable aluminum TMDL in 2018 using the current applicable WQC. Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

Jemez River (Soda Dam nr Jemez Springs to East Fork)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_00	20.6.4.108	STREAM, PERENNIAL	3.81 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Supporting	Arsenic, Dissolved	2008	9/15/2009	4A
FC	Not Assessed				
HQColdWAL	Not Supporting	pH	2008		5/5B
		Aluminum, Total Recoverable	2018	4/27/2018	4A
		Temperature	2008		5/5B
		Turbidity	1998	7/30/2004	4A
		Arsenic, Dissolved	2008	9/15/2009	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WH	Fully Supporting				

AU Comment: TMDL for Al (2003), turbidity, and SBD (1999) (sedimentation/siltation); de-list letter for plant nutrients. De-listed for SBD in 2008. TMDL for arsenic (2009). The dissolved aluminum TMDL was revised to a total recoverable aluminum TMDL in 2018 using current applicable WQC. Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels. Temperature and pH may be influenced by geothermal groundwater inputs.

Jemez River (Zia Pueblo bnd to Jemez Pueblo bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_75	20.6.4.106	STREAM, PERENNIAL	1.86 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Supporting	Boron, Dissolved	2008	9/15/2009	4A
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2016	2019 (est.)	5/5A
		Arsenic, Dissolved	2008	9/15/2009	4A
		Sedimentation/Siltation	2016	2019 (est.)	5/5A
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WH	Fully Supporting				

AU Comment: TMDLs for arsenic and boron (2009).

La Jara Creek (East Fork Jemez to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_11	20.6.4.108	STREAM, PERENNIAL	5.32 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

Redondo Creek (Sulphur Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_21	20.6.4.108	STREAM, PERENNIAL	6.01 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Turbidity	1998	6/2/2003	4A
		Temperature	2018	6/2/2003	4A
		pH	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Not Assessed				

AU Comment: TMDL for turbidity, total phosphorus, and temperature. Previously split at the Valles Caldera Boundary, the upper (NM-2016.A_25) and lower AUs were merged back into this AU ID. AU may not be perennial -- HP and WQS review needed

NMED EXHIBIT 27

Rio Cebolla (Fenton Lake to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_52	20.6.4.108	STREAM, PERENNIAL	14.63 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Nutrients Turbidity	2016 2010		5/5C 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature and SBD (sedimentation/siltation). De-listed for temperature 2008. Rio Grande Cutthroat restoration in 1994 by NMG&F.

Rio Cebolla (Rio de las Vacas to Fenton Lake)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_50	20.6.4.108	STREAM, PERENNIAL	6.06 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature Sedimentation/Siltation	2016 1996	2019 (est.) 6/2/2003	5/5A 4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for SBD (sedimentation/siltation).

Rio Guadalupe (Jemez River to confl with Rio Cebolla)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_30	20.6.4.108	STREAM, PERENNIAL	12.6 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Turbidity	2016	12/2/1999	4A
		Specific Conductance	2016	2019 (est.)	5/5A
		Temperature	2008	9/1/2009	4A
		Nutrients	2016	9/23/2016	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for Al chronic (2003), turbidity, and SBD (1999) (sedimentation/siltation); de-list letter for total phosphorus. De-listed for sedimentation/siltaiton in 2008. A TMDL was prepared for temperature (2009).

Rio de las Vacas (Clear Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_46	20.6.4.108	STREAM, PERENNIAL	10.34 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

Rio de las Vacas (Rio Cebolla to Clear Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_40	20.6.4.108	STREAM, PERENNIAL	14.35 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	6/2/2003	4A
		Nutrients	2008	9/15/2009	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature and TOC (2003). A TMDL was prepared for plant nutrients (2009).

Rito Penas Negras (Rio de las Vacas to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_42	20.6.4.108	STREAM, PERENNIAL	11.8 MILES	2008	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	6/2/2003	4A
		Turbidity	2010		5/5B
		Sedimentation/Siltation	1998	6/2/2003	4A
		Nutrients	2008	9/15/2009	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature, TOC, and SBD (sedimentation/siltation) (2003). A TMDL was prepared for plant nutrients (2009). AU may not be perennial -- HP and WQS review needed.

NMED EXHIBIT 27

Rito de las Palomas (Rio de las Vacas to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_43	20.6.4.108	STREAM, PERENNIAL	5.58 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Sedimentation/Siltation Turbidity	1998 2010	9/15/2009	4A 5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for temperature and sedimentation/siltation (2009). AU may not be perennial -- HP and WQS review needed.

Rito de los Indios (San Antonio Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_24	20.6.4.108	STREAM, PERENNIAL	4.47 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature Nutrients Turbidity	2016 2016 2016	2019 (est.) 2019 (est.) 2019 (est.)	5/5A 5/5A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

San Antonio Creek (East Fork Jemez to VCNP bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_20	20.6.4.108	STREAM, PERENNIAL	11.17 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	6/2/2003	4A
		Turbidity	2006	6/2/2003	4A
		Aluminum, Total Recoverable	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for turbidity and temperature (2003). TMDL for arsenic (2009). Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; aluminum criteria are under review to identify appropriate/attainable levels.

San Antonio Creek (VCNP bnd to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_26	20.6.4.108	STREAM, PERENNIAL	15.95 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
		Temperature	1998	6/2/2003	4A
		Nutrients	2016		5/5B
		Turbidity	2016		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for temperature (2003). Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; WQS criteria are under review to identify appropriate/attainable levels. In addition, the low pH in this AU is likely contributing to increased metals concentrations. AU may not be perennial -- HP and WQS review needed.

NMED EXHIBIT 27

San Gregorio Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.B_10	20.6.4.134	RESERVOIR	35.73 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients	2016	2021 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: This reservoir has a headgate on one end of the dam that is the beginning of Nacimiento Creek (Rio Puerco Watershed). The dam also has a spillway that empties into Clear Creek, which is in the Jemez watershed. The water level June 2004 did not reach this spillway.

Sulphur Creek (Redondo Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_22	20.6.4.124	STREAM, PERENNIAL	6.03 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Supporting	Aluminum, Total Recoverable	2016		5/5B
LW	Fully Supporting				
SC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL were previously prepared for pH and conductivity. WQS change to 20.6.4.124 resulted in de-list (pH is naturally low in this watershed). Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; WQS criteria are under review to identify appropriate/attainable levels.

NMED EXHIBIT 27

Sulphur Creek (San Antonio Creek to Redondo Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_27	20.6.4.108	STREAM, PERENNIAL	0.81 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2016		5/5B
		pH	2016		5/5B
		Aluminum, Total Recoverable	2016		5/5B
		Turbidity	2010		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Natural conditions contribute to high aluminum concentrations throughout the Jemez and impacts to aquatic life are unclear; WQS criteria are under review to identify appropriate/attainable levels. In addition, the low pH in this AU is likely contributing to increased metals concentrations. HP needed -- this AU may not be perennial. pH applicable to 20.6.4.108 NMAC not attainable given naturally low pH in upstream AU.

Vallecito Ck (Jemez Pueblo bnd to Div abv Ponderosa)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105.5_20	20.6.4.98	STREAM, INTERMITTENT	3.03 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Arsenic, Dissolved	2016	2019 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Vallecito Ck (Perennial Prt Div abv Ponderosa to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105.5_21	20.6.4.107	STREAM, PERENNIAL	11.74 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Sedimentation/Siltation Turbidity	2016 2010	2019 (est.) 2019 (est.)	5/5A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: Sometimes referred to as Paliza Creek because it flows through Paliza Canyon.					

Virgin Canyon (Rio Guadalupe to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020202 Jemez	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2106.A_31	20.6.4.108	STREAM, PERENNIAL	13.03 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

HUC: 13020203 Rio Grande-Albuquerque

Abo Arroyo (Rio Grande to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_40	20.6.4.103	STREAM, PERENNIAL	37.54 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Canon de Domingo Baca (Arroyo de Domingo Baca to outfall)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_020	20.6.4.98	STREAM, EPHEMERAL	3.44 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Cedro Canyon (Tijeras Arroyo to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_018	20.6.4.98	STREAM, EPHEMERAL	9.46 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Conservancy Park Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_032	20.6.4.99	RESERVOIR	2.42 ACRES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.					

La Canada de la Loma Arena (La Constancia Ditch to outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_021	20.6.4.98	STREAM, EPHEMERAL	0.77 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.					

La Joya Lakes			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.B_10	20.6.4.105	RESERVOIR	166.47 ACRES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio Grande (Arroyo de las Canas to Rio Puerco)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_11	20.6.4.105	RIVER	28.04 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Copper, Dissolved	2016	2019 (est.)	5/5A
		Aluminum, Total Recoverable	2016	4/27/2018	4A
PC	Not Supporting	E. coli	2008	6/30/2010	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs for e. coli and dissolved aluminum (2010). The dissolved aluminum TMDL was revised to a total recoverable aluminum TMDL in 2018 using the current applicable WQC.

Rio Grande (Isleta Pueblo boundary to Tijeras Arroyo)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_50	20.6.4.105	RIVER	8.26 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		Dissolved oxygen	2008		5/5C
PC	Not Supporting	E. coli	2008	6/30/2010	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for E. coli. The "PCB in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Rio Grande (Rio Puerco to Isleta Pueblo bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_40	20.6.4.105	RIVER	38.67 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2010	2019 (est.)	5/5A
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDL for e. coli (2010).					

Rio Grande (San Marcial at USGS gage to Arroyo de las Canas)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_10	20.6.4.105	RIVER	29.31 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Aluminum, Total Recoverable Temperature	2016 2016	4/27/2018 2019 (est.)	4A 5/5A
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDLs for e. coli and dissolved aluminum (2010). The dissolved aluminum TMDL was revised to a total recoverable aluminum TMDL in 2018 using the current applicable WQC.					

Rio Grande (Tijeras Arroyo to Alameda Bridge)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_51	20.6.4.105	RIVER	11.81 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2010	2019 (est.)	5/5A
		Dissolved oxygen	2008	2019 (est.)	5/5A
		PCBS - Fish Consumption Advisory	2010		5/5C
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for E. coli. The "PCB in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105.1_00	20.6.4.106	RIVER	11.74 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Not Supporting	Gross Alpha, Adjusted	2012	2019 (est.)	5/5A
MWWAL	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2019 (est.)	5/5A
		PCBS - Fish Consumption Advisory	2010		5/5C
PC	Fully Supporting				
PWS	Not Assessed				
WH	Not Supporting	Polychlorinated Biphenyls (PCBs)	2012	2019 (est.)	5/5A

AU Comment: TMDL for E. coli (2010). The "PCB in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105.1_02	20.6.4.106	RIVER	2.36 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for fecal coliform. De-listed for fecal coliform because this criteria was replaced with E. coli during the 2005 trienniel.

Tijeras Arroyo (Four Hills Bridge to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_001	20.6.4.99	STREAM, PERENNIAL	15 MILES	2018	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2008	10/12/2017	4A
WH	Fully Supporting				

AU Comment: This entire AU may not be perennial. This upper AU is often referred to as Tijeras Creek or Tijeras Canyon. TMDL for nutrients (2017).

Tijeras Arroyo (Rio Grande to Four Hills Bridge)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_070	20.6.4.98	STREAM, EPHEMERAL	11.49 MILES	2008	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 6/24/09) indicate this assessment unit is ephemeral (Hydrology Protocol score of 3.0 with 89.1% days with no flow at USGS gage 08330600 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to a waterbody under 20.6.4.97 NMAC. Until such time, this waterbody will remain under 20.6.4.98 NMAC.

Unnamed tributary (South Diversion Channel to I-25)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_015	20.6.4.97	STREAM, EPHEMERAL	0.29 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Delta Person Generating station, permit NM0030376

Unnamed tributary (div channel to Fire Academy outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020203 Rio Grande-Albuquerque	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_014	20.6.4.97	STREAM, EPHEMERAL	1.27 MILES	2016	2023
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Firefighters Academy, permit NM0029726 has since been terminated.

HUC: 13020204 Rio Puerco

Arroyo San Jose (Rio Puerco to La Jara Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_39	20.6.4.98	STREAM, INTERMITTENT	6.15 MILES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 9/16/08) indicate this assessment unit is ephemeral (Hydrology Protocol score of 6.5- see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this waterbody will remain under 20.6.4.98 NMAC.

NMED EXHIBIT 27

Canon del Piojo S Fk (main canyon to ranch pond)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_016	20.6.4.97	STREAM, EPHEMERAL	4.56 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013. Resurrection Mining, permit NM0028169

La Jara Creek (Perennial reaches abv Arroyo San Jose)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_46	20.6.4.109	STREAM, PERENNIAL	9.86 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Aluminum, Total Recoverable	2014	6/16/2016	4A
DWS	Fully Supporting				
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for dissolved aluminum (2007).

NMED EXHIBIT 27

Nacimiento Ck (Perennial prt HWY 126 to San Gregorio Rsvr)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_42	20.6.4.109	STREAM, PERENNIAL	6.77 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Aluminum, Total Recoverable	2014	6/16/2016	4A
		Turbidity	2014	6/16/2016	4A
DWS	Not Supporting	Uranium, Dissolved	2014	6/16/2016	4A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDLs for turbidity, aluminum, and uranium (2016).					

Nacimiento Creek (Rio Puerco to HWY 126)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_47	20.6.4.98	STREAM, INTERMITTENT	2.06 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Rio Puerco (Arroyo Chijuilla to northern bnd Cuba)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_40	20.6.4.131	STREAM, PERENNIAL	8.44 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2006	9/21/2007	4A
		Sedimentation/Siltation	2004	8/10/2007	4A
		Ammonia, Total	2006		5/5C
WH	Fully Supporting				

AU Comment: TMDLs were prepared for sedimentation, chronic dissolved Al, and nutrients (2007). Dissolved Al TMDL withdrawn 2018 because no longer an applicable WQC.

Rio Puerco (Perennial prt northern bnd Cuba to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_44	20.6.4.109	STREAM, PERENNIAL	13.99 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Sedimentation/Siltation	2014	6/16/2016	4A
DWS	Fully Supporting				
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for sedimentation/siltation (2016).

NMED EXHIBIT 27

Rio Puerco (non-pueblo Arroyo Chico to Arroyo Chijuilla)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_22	20.6.4.130	STREAM, INTERMITTENT	42.55 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Puerco (non-pueblo Rio Grande to Arroyo Chico)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_20	20.6.4.130	STREAM, INTERMITTENT	106.51 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	2022 (est.)	5/5A
WWAL	Fully Supporting				
WH	Not Supporting	Mercury, Total	2012	2022 (est.)	5/5A
AU Comment: None.					

Rito Leche (Intermittent reaches above HWY 126)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_43	20.6.4.98	STREAM, INTERMITTENT	6.6 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

NMED EXHIBIT 27

Rito Leche (Rio Puerco to Hwy 126)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_53	20.6.4.98	STREAM, INTERMITTENT	1.55 MILES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Rito de los Pinos (Arroyo San Jose to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_45	20.6.4.98	STREAM, EPHEMERAL	8.78 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 9/16/08) indicate this assessment unit is ephemeral (Hydrology Protocol score of 0.0 and 3.5 at two stations - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to a waterbody under 20.6.4.97 NMAC. Until such time, this waterbody will remain under 20.6.4.98 NMAC.

San Miguel Arroyo (San Pablo Canyon to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_51	20.6.4.98	STREAM, INTERMITTENT	9.61 MILES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 6/16/09) indicate this assessment unit is intermittent (Hydrology Protocol score of 17.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

San Pablo Canyon (Rio Puerco to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020204	Rio Puerco
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_41	20.6.4.98	STREAM, INTERMITTENT	11.49 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol on 9/18/08 at the station immediately above the Rio Puerco indicate this AU is ephemeral (Hydrology Protocol of 5.5), while surveys on 9/19/11 and 10/27/11 at FR 20/533 indicate intermittent (Hydrology Protocol scores of 19 and 16.5, respectively). See http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol.

Senorito Creek (Nacimiento Mine to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020204	Rio Puerco
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_54	20.6.4.109	STREAM, PERENNIAL	2.85 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
DWS	Fully Supporting				
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Senorito Creek (San Pablo Canyon to Nacimiento Mine)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020204	Rio Puerco
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_52	20.6.4.98	STREAM, INTERMITTENT	5.27 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Unnamed tributary (Canon del Piojo S Fk to mine outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020204 Rio Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_017	20.6.4.97	STREAM, EPHEMERAL	0.6 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013. Resurrection Mining, permit NM0028169

HUC: 13020205 Arroyo Chico

Arroyo Chico (Rio Puerco to San Isidro Arroyo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020205 Arroyo Chico	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_016	20.6.4.98	STREAM, INTERMITTENT	32.49 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Inditos Draw (breached road berm to hdwtrs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020205 Arroyo Chico	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_021	20.6.4.97	STREAM, EPHEMERAL	3.45 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Lee Ranch Coal Co El Segundo mine, permit NM0030996

NMED EXHIBIT 27

Mulatto Canyon (Arroyo Tinaja to one mi blw USFS bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020205	Arroyo Chico
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_024	20.6.4.97	STREAM, EPHEMERAL	6.81 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Lee Ranch Mine permit NM0029581

San Isidro Arroyo (mine outfall to Tinaja Arroyo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020205	Arroyo Chico
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_022	20.6.4.97	STREAM, EPHEMERAL	0.65 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Lee Ranch Mine permit NM0029581

San Lucas Canyon (San Miguel Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020205	Arroyo Chico
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_014	20.6.4.98	STREAM, INTERMITTENT	13.76 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

San Miguel Creek (Arroyo Chico to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020205 Arroyo Chico	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_015	20.6.4.98	STREAM, INTERMITTENT	28.42 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Tinaja Arroyo (San Isidro Arroyo to Mulatto Cny)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13020205 Arroyo Chico	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_023	20.6.4.97	STREAM, EPHEMERAL	1.24 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Lee Ranch Mine permit NM0029581

HUC: 13020206 North Plains

Laguna Americana			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020206 North Plains	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_053	20.6.4.98	LAKE, PLAYA	25.8 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Part of playa lake study. Data are old.

Laguna Seco			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020206 North Plains	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_060	20.6.4.98	LAKE, PLAYA	1.57 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 13020207 Rio San Jose

Arroyo del Puerto (San Mateo Ck to mine entrance rd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_018	20.6.4.97	STREAM, EPHEMERAL	6.81 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013. Rio Algom Mining/Ambrosia Lake, permit NM0020532

Arroyo del Valle (Laguna Pueblo bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_030	20.6.4.98	STREAM, EPHEMERAL	12.47 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Supporting	Gross Alpha, Adjusted	2018	2021 (est.)	5/5A
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU will remain under 20.6.4.98 NMAC.

Bluewater Creek (Perennial prt Bluewater Rsvr to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_01	20.6.4.109	STREAM, PERENNIAL	16.82 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	1998	9/21/2007	4A
DWS	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for temperature and plant nutrients (2007). WQS temperature review is warranted in this AU.

Bluewater Creek (Perennial prt R San Jose to Bluewater Rsvr)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_00	20.6.4.109	STREAM, PERENNIAL	10.97 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients Temperature	1998 2006	9/21/2007 9/21/2007	4A 4A
DWS	Fully Supporting				
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Non-tribal portions only. TMDLS were completed for temperature and nutrients (2007).

Bluewater Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.B_00	20.6.4.135	RESERVOIR	608.63 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2014	2021 (est.)	5/5A
DWS	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio Moquino (Laguna Pueblo to Seboyettia Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_10	20.6.4.109	STREAM, PERENNIAL	1.98 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients Temperature	2006 1998	9/21/2007 9/21/2007	4A 4A
DWS	Not Assessed				
FC	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: TMDLs were completed for temperature and nutrients (2007). There may not be adequate flow in the lower portions of this reach to sustain a CWAL.

Rio Paguate (Laguna Pueblo bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_30	20.6.4.109	STREAM, PERENNIAL	10.59 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
DWS	Not Assessed				
FC	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: The USGS gage used to make the original impairment determinations is downstream of Jackpile Mine, which is on pueblo land and not in the AU.

Rio San Jose (Grants BNSF RR crossing to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_028	20.6.4.98	STREAM, EPHEMERAL	12.87 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Rio San Jose (non-tribal HWY 117 to Grants BNSF RR crossing)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_003	20.6.4.99	STREAM, PERENNIAL	7.69 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Seboyeta Creek (Rio Moquino to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2107.A_20	20.6.4.109	STREAM, PERENNIAL	17.08 MILES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
DWS	Not Assessed				
FC	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Access issues (not sampled during 2011 Rio Puerco survey).

Unnamed tributary (San Mateo Cr to mine outfall)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13020207 Rio San Jose	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_019	20.6.4.97	STREAM, EPHEMERAL	2.43 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassifie Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Strathmore Roca Honda, permit NM0031020

HUC: 13020209 Rio Salado

Rio Salado (Rio Grande to Alamo Navajo bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020209 Rio Salado	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_10	20.6.4.103	STREAM, PERENNIAL	45.37 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Temperature	2016		5/5C
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: A second thermograph should be deployed to confirm the temperature listing.

Rio Salado (non-pueblo lands)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13020209 Rio Salado	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_002	20.6.4.98	STREAM, INTERMITTENT	5.81 MILES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 9/10/2008) indicate this assessment unit is intermittent (Hydrology Protocol score of 11.25 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

HUC: 13020211 Elephant Butte Reservoir

Alamosa Creek (Perennial reaches abv Monticello diversion)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13020211 Elephant Butte Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_30	20.6.4.103	STREAM, PERENNIAL	13.09 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Elephant Butte Reservoir			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13020211 Elephant Butte Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2104_00	20.6.4.104	RESERVOIR	6433 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		Mercury - Fish Consumption Advisory	2004		5/5C
WH	Fully Supporting				

AU Comment: The mercury and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern. Land management agencies have posted contact recreation warnings due to toxic blue green algae. SWQB does not have water quality standards or assessment procedures related to blue green algae at this time. The actual size of this AU at any given time depends on fluctuating surface area and reservoir volume. The noted acreage is from the USGS NHD 2014 GIS layer. The potential inundation area is almost 40,000 acres.

NMED EXHIBIT 27

Rio Grande (Elephant Butte Rsvr to San Marcial at USGS)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13020211 Elephant Butte Reservoir	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2105_00	20.6.4.105	RIVER	24.5 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Aluminum, Total Recoverable	2016	2019 (est.)	5/5A
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: The actual length of this AU at any given time depends on Elephant Butte's fluctuating surface area.

HUC: 13030101 Caballo

Caballo Reservoir			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2102.B_00	20.6.4.104	RESERVOIR	2943.63 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2016	2021 (est.)	5/5A
		Mercury - Fish Consumption Advisory	2004		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Cuchillo Negro Creek (Rio Grande to Willow Spring Draw)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_012	20.6.4.98	STREAM, EPHEMERAL	10.27 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Las Animas Ck (perennial prt Animas Gulch to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_50	20.6.4.103	STREAM, PERENNIAL	27.03 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Dissolved oxygen Benthic Macroinvertebrates	2014 2010		5/5A 5/5C
SC	Fully Supporting				
WWAL	Not Supporting	Benthic Macroinvertebrates	2010		5/5C
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Las Animas Ck (perennial prt R Grande to Animas Gulch)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_51	20.6.4.103	STREAM, PERENNIAL	12.54 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Assessed				
SC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Palomas Creek (perennial portion R Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_60	20.6.4.103	STREAM, PERENNIAL	23.87 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Percha Ck (Perennial prt Caballo Rsvr to Wicks Gulch)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_21	20.6.4.103	STREAM, PERENNIAL	13.1 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Assessed				
SC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Percha Ck (Perennial prt Wicks Gulch to Middle Percha Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_20	20.6.4.103	STREAM, PERENNIAL	11.74 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

NMED EXHIBIT 27

Rio Grande (Caballo Reservoir to Elephant Butte Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13030101 Caballo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_00	20.6.4.103	RIVER	21.04 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Dissolved oxygen	2006		5/5C
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: The dissolved oxygen impairment may indicate excessive nutrients. Protocols for nutrients in large rivers are under development.

HUC: 13030102 El Paso-Las Cruces

Burn Lake (Dona Ana)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_024	20.6.4.99	RESERVOIR	22.68 ACRES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rio Grande (Anthony Bridge to NM192 bridge W of Mesquite)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2101_01	20.6.4.101	RIVER	13.32 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2006	6/11/2007	4A
WH	Fully Supporting				

AU Comment: TMDL for E. coli.

NMED EXHIBIT 27

Rio Grande (International Mexico bnd to Anthony Bridge)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2101_00	20.6.4.101	RIVER	8.73 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Supporting	Boron, Dissolved	2014	2019 (est.)	5/5A
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2006	6/11/2007	4A
WH	Fully Supporting				

AU Comment: TMDL for E. coli.

Rio Grande (Leasburg Dam to one mile below Percha Dam)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2101_10	20.6.4.101	RIVER	42.17 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2006	6/11/2007	4A
WH	Fully Supporting				

AU Comment: TMDL for e. coli.

Rio Grande (NM192 bridge W of Mesquite to Picacho Bridge)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2101_03	20.6.4.101	RIVER	13.3 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for E. coli.

Rio Grande (Picacho Bridge to Leasburg Dam)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2101_02	20.6.4.101	RIVER	16.61 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for E. coli.

Rio Grande (one mile below Percha Dam to Caballo Reservoir)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2102.A_00	20.6.4.102	RIVER	3.05 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

South Fork Las Cruces Arroyo (Las Cruces Arroyo to hdwtrs)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_013	20.6.4.98	STREAM, EPHEMERAL	6.53 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU will remain under 20.6.4.98 NMAC.

Tierra Blanca Creek (Rio Grande to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13030102 El Paso-Las Cruces	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2103.A_70	20.6.4.98	STREAM, INTERMITTENT	33.72 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Fully Supporting				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 13030202 Mimbres

Allie Canyon (Mimbres River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2804_20	20.6.4.804	STREAM, PERENNIAL	8.82 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Bear Canyon (Mimbres River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2804_10	20.6.4.804	STREAM, PERENNIAL	9.96 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Bear Canyon Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2504_30	20.6.4.806	RESERVOIR	8.75 ACRES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2004	2021 (est.)	5/5A
		Temperature	2012	2021 (est.)	5/5A
		Mercury - Fish Consumption Advisory	2004		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Cold Springs Creek (Hot Springs Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2803_11	20.6.4.803	STREAM, PERENNIAL	7.56 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Lead, Dissolved	2012	9/11/2014	4A
		Cadmium, Dissolved	2012	9/11/2014	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 5/26/09) indicate this assessment unit is perennial (Hydrology Protocol score of 20.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Gallinas Creek (Mimbres River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2803_20	20.6.4.803	STREAM, INTERMITTENT	20.19 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2012		5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Sonde data and/or chlorophyll collection recommended prior to TMDL development. Application of the SWQB Hydrology Protocol (5/26/09 survey date) indicate this assessment unit is perennial (Hydrology Protocol score of 18.5 to 22.5 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Hanover Creek (Whitewater Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2803_31	20.6.4.98	STREAM, EPHEMERAL	7.09 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Hot Springs Ck (Perennial prt of Mimbres R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2803_10	20.6.4.803	STREAM, PERENNIAL	10.51 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: The perennial portion is privately owned -- SWQB was denied access during during both watershed surveys (2002 and 2009).

McKnight Canyon (Mimbres River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2804_30	20.6.4.804	STREAM, PERENNIAL	14.91 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Gila Trout restoration in 1972 by NMG&F.

Mimbres R (Perennial reaches Allie Canyon to Cooney Cny)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2804_00	20.6.4.804	STREAM, PERENNIAL	10.87 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Mimbres R (Perennial reaches Cooney Cyn to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2804_40	20.6.4.807	STREAM, PERENNIAL	12.13 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Mimbres R (Perennial reaches downstream of Allie Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2803_00	20.6.4.803	STREAM, PERENNIAL	29.64 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/11/2014	4A
WH	Fully Supporting				

AU Comment: This AU near the ecoregion boundary and is more closely associated with ecoregion 24b (Chihuahuan Desert).

San Vicente Arroyo (Mimbres R to Maudes Cny)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_026	20.6.4.97	STREAM, EPHEMERAL	29.85 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Hydrology Protocol-based UAA concluded this reach was ephemeral. UAA was approved by EPA in Oct 2013. Perennial reaches of San Vicente above Maudes Canyon remain classified in 20.6.4.803.

San Vicente Creek (Perennial prt Maudes Cny to Silva Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_025	20.6.4.803	STREAM, PERENNIAL	1.87 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2012		5/5A
IRR	Not Assessed				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: San Vicente below Maudes Canyon was approved by EPA as ephemeral 97 in Dec 2013. Perennial reaches of San Vicente above Maudes Canyon remain classified in 20.6.4.803.

Whitewater Creek (Mimbres River to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13030202 Mimbres	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2803_30	20.6.4.803	STREAM, PERENNIAL	17.08 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 13050001 Western Estancia

Estancia Park Lake			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13050001 Western Estancia	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_042	20.6.4.99	RESERVOIR	1.32 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.

Laguna del Pero			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13050001 Western Estancia	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_054	20.6.4.98	LAKE, PLAYA	4497.56 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Water is too saline for cattle, so livestock watering may not be an existing or attainable use.

Manzano Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050001 Western Estancia	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_114	20.6.4.99	RESERVOIR	3.19 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Marginal Coldwater is an existing uses.					

Mike's Playa			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050001 Western Estancia	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_085	20.6.4.98	LAKE, PLAYA	21.31 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Water is too saline for cattle, so livestock watering may not be an existing or attainable use.					

HUC: 13050003 Tularosa Valley

Carrizozo Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_027	20.6.4.99	RESERVOIR	2.92 ACRES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Davies Tank			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_034	20.6.4.99	LAKE, PLAYA	2.12 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: This playa was only sampled once in 1995, so Not Assessed.

Dog Canyon Creek (perennial portions)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_20	20.6.4.810	STREAM, PERENNIAL	5.84 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Temperature	2006		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: A UAA to create 20.6.4.810 NMAC for this water body with coolwater aquatic life use was approved by the WQCC (effective 2/28/18 for state purposes).

NMED EXHIBIT 27

Fresnal Canyon (La Luz Creek to Salado Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_41	20.6.4.801	STREAM, PERENNIAL	2.61 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Flow Regime Modification	2014		4C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014		5/5C
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: This reach is often dry below Salado Canyon where the Alamogordo diversion is installed,

Fresnal Canyon (Salado Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_44	20.6.4.801	STREAM, PERENNIAL	10.29 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Karr Canyon (Fresnal Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_42	20.6.4.801	STREAM, PERENNIAL	6.57 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Sedimentation/Siltation	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

La Luz Creek (perennial portions)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_40	20.6.4.801	STREAM, PERENNIAL	13.58 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Lake Holloman			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_113	20.6.4.99	LAKE, PLAYA	150.85 ACRES	2010	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Arsenic, Dissolved	2010	2021 (est.)	5/5A
WH	Fully Supporting				

AU Comment: Lake is actually an impounded playa. Although the reservoir is associated with Holloman Air Force Base, the public does have access and the AFB is considering adding a park. This lake has very high salinity, and is thus not suitable for livestock watering or supporting a viable fishery. Limited aquatic life might be a more realistic use based on salinity.

Lake Lucero (North)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_068	20.6.4.98	LAKE, PLAYA	3419.53 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Water is generally too saline for cattle, so livestock watering may not be an existing or attainable use. This playa was only sampled once in 1993, so Not Assessed.

Lake Lucero (South)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_069	20.6.4.98	LAKE, PLAYA	1987.55 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Water is generally too saline for cattle, so livestock watering may not be an existing or attainable use. This playa was only sampled once in 1993, so Not Assessed.

Lake Stinky			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_070	20.6.4.99	LAKE, PLAYA	75.24 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: This playa was only sampled once in 1993, so Not Assessed.

Malpais Springs			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_079	20.6.4.99	LAKE, PLAYA	2.2 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Habitat for White Sands pup fish. This playa was only sampled once in 1995, so Not Assessed.

Mound Springs			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_086	20.6.4.99	LAKE, PLAYA	0.59 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Habitat for White Sands pup fish. This playa was only sampled once in 1995, so Not Assessed.

Nogal Creek (Tularosa Creek to Mescalero Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_10	20.6.4.801	STREAM, PERENNIAL	4.08 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	2014	2019 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/21/2015	4A
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Salado Canyon (Fresnal Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_43	20.6.4.801	STREAM, PERENNIAL	2.03 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Salt Creek (Tularosa Valley)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_50	20.6.4.99	STREAM, PERENNIAL	47.13 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

NMED EXHIBIT 27

San Andres Canyon (S San Andres Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_31	20.6.4.801	STREAM, PERENNIAL	4.04 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				

AU Comment: None.

San Andres Canyon (Taylor Ranch Rd to S San Andres Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_30	20.6.4.97	STREAM, EPHEMERAL	3.75 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Hydrology Protocol-based UAA concluded this reach was ephemeral. UAA was approved by EPA in Oct 2013.

Three Rivers (Perennial prt HWY 54 to USFS exc Mescalero)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2802_00	20.6.4.802	STREAM, INTERMITTENT	14.69 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Flow Regime Modification			4C
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: There is extensive irrigation in the reach from surface water diversion as well as ground water pumping in the lower portion of the assessment unit. Therefore, this AU is listed under Category 4C with an impairment of Low Flow Alteration diversion (flow modification) "pollution" is de-watering this reach.

Three Rivers (USFS bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2802_01	20.6.4.802	STREAM, PERENNIAL	4.13 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Per USFS personnel (2/4/09), livestock grazing is not allowed along this stream reach. It is a popular horseback riding trail with several crossings.

Tularosa Ck (perennial prt downstream of old HWY 70 xing)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_00	20.6.4.99	STREAM, PERENNIAL	18.96 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Tularosa Creek (Old HWY 70 xing to Mescalero Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13050003 Tularosa Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2801_01	20.6.4.801	STREAM, PERENNIAL	4.85 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

HUC: 13050004 Salt Basin

Sacramento R (Arkansas Canyon to Scott Able Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050004 Salt Basin	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2805_00	20.6.4.98	STREAM, INTERMITTENT	8.43 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: 2013 application of the hydro protocol indicate this AU is intermittent.

Sacramento R (Perennial prt Scott Able Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13050004 Salt Basin	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2805_02	20.6.4.805	STREAM, PERENNIAL	7.17 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Sedimentation/Siltation	2014	2019 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Scott Able Canyon (Sacramento R to road NF-64 abv canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13050004 Salt Basin	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2805_01	20.6.4.98	STREAM, INTERMITTENT	2.76 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 13060001 Pecos Headwaters

Alamitos Canyon (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_022	20.6.4.98	STREAM, INTERMITTENT	8.86 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU likely needs to be split. The lower portion includes the reconstructed portion through Terrero Mine reclamation.

Beaver Creek (El Porvenir Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_04	20.6.4.215	STREAM, PERENNIAL	5.87 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Blue Creek (Tecolote Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_15	20.6.4.215	STREAM, PERENNIAL	4.22 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Blue Hole			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_10	20.6.4.212	SINK HOLE	0.23 ACRES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Coldwater Aquatic Life and Primary Contact are existing uses. Dissolved oxygen is naturally low due to groundwater influx. This unique water warrants its own WQ standard segment.

Brown's Marsh			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_022	20.6.4.99	LAKE, PLAYA	8.36 ACRES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Bull Creek (Cow Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_091	20.6.4.217	STREAM, PERENNIAL	15.22 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: A TMDL was written for temperature.

Burro Canyon (Gallinas River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_06	20.6.4.215	STREAM, PERENNIAL	4.48 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Cow Creek (Bull Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_102	20.6.4.217	STREAM, PERENNIAL	22.25 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	9/13/2005	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs for temperature and turbidity.

NMED EXHIBIT 27

Cow Creek (Pecos River to Bull Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_090	20.6.4.217	STREAM, PERENNIAL	15.57 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	9/13/2005	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs for temperature and turbidity. HQCWAL may not be attainable.

Dalton Canyon Creek (Perennial prt Pecos R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_070	20.6.4.217	STREAM, PERENNIAL	8.02 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Specific Conductance	2012	9/25/2013	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Portions went dry during both the 2001 and 2010 surveys. HQCWAL may not be attainable -- WQS review needed.

Doctor Creek (Holy Ghost Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_021	20.6.4.217	STREAM, PERENNIAL	3.43 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

El Porvenir Creek (Gallinas River to SFNF bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_01	20.6.4.215	STREAM, PERENNIAL	2.63 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2010	2022 (est.)	5/5A
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

El Porvenir Creek (SFNF bnd to Hollinger Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_05	20.6.4.215	STREAM, PERENNIAL	4.67 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: There were 2 of 3 exceedences of the 2007 NMAC dissolved aluminum chronic criterion (87 ug/L).					

El Rito (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_050	20.6.4.212	STREAM, PERENNIAL	2.75 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Ammonia, Total	2012	2022 (est.)	5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/25/2013	4A
WH	Fully Supporting				
AU Comment: Additional ammonia sampling and full Level 2 nutrient assessment recommended prior to TMDL development. WWTP upgraded in 2010.					

NMED EXHIBIT 27

Falls Creek (Tecolote Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_12	20.6.4.215	STREAM, PERENNIAL	6.18 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Specific Conductance	2012	9/25/2013	4A
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Gallinas River (Las Vegas Diversion to USFS bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_00	20.6.4.215	STREAM, PERENNIAL	7.91 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	1998	9/13/2005	4A
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: A TMDL was prepared for temperature.					

Gallinas River (Pecos Arroyo to Las Vegas Diversion)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_23	20.6.4.220	STREAM, PERENNIAL	10.63 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Gallinas River (Pecos River to Aguilar Creek)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_20	20.6.4.98	STREAM, PERENNIAL	20.32 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Dissolved oxygen	2012		5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: USGS 08382500 gage data from 1/1/1951 to 9/7/2011 documents 8848 days (40%) with zero daily flow. Sonde was in isolated pool - redeployment recommended.

Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_21	20.6.4.220	STREAM, PERENNIAL	41.63 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Turbidity Nutrients Temperature	2012 2006 2012	2018 (est.) 2018 (est.) 2018 (est.)	5/5A 5/5A 5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Gallinas River (USFS bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_02	20.6.4.215	STREAM, PERENNIAL	8.51 MILES	2010	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Glorieta Ck (Perennial prt Glorieta CC WWTP to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_082	20.6.4.217	STREAM, PERENNIAL	5.95 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Flow Regime Modification	2014		4C
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Very limited data. Low flow alterations affecting stream condition (impoundments on Glorieta CC property).

Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_081	20.6.4.217	STREAM, PERENNIAL	8.39 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Specific Conductance Nutrients	2004 2012		5/5B 5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Flow in this AU is effluent dominated. HQCW use and associated criteria may not be attainable. WQS under review.

Hollinger Creek (El Porvenir Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_03	20.6.4.215	STREAM, PERENNIAL	5.67 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Holy Ghost Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_020	20.6.4.217	STREAM, PERENNIAL	6.91 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Indian Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_072	20.6.4.217	STREAM, PERENNIAL	6.45 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Jack's Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_045	20.6.4.217	STREAM, PERENNIAL	6.59 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Rio Grande Cutthroat Trout restoration in 1992-1996 by NMG&F.

Johnson Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_10	20.6.4.222	LAKE, FRESHWATER	2.51 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Lake Bentley			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_067	20.6.4.99	LAKE, PLAYA	45.66 ACRES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Lake Katherine			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_20	20.6.4.222	LAKE, FRESHWATER	11.78 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Access is difficult -- high elevation lake.

Lost Bear Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_30	20.6.4.222	LAKE, FRESHWATER	0.5 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Macho Canyon Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_071	20.6.4.217	STREAM, PERENNIAL	7.82 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Specific Conductance	2012	9/25/2013	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

McAllister Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.3_00	20.6.4.213	LAKE, PLAYA	183.62 ACRES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Arsenic, Dissolved	2006	2021 (est.)	5/5A
LW	Fully Supporting				
SC	Fully Supporting				
WH	Fully Supporting				

AU Comment: This is a nutrient rich fishing lake. The human health criterion for arsenic (9.0 ug/L) was exceeded during 4 of 6 sampling events in 2001. NMED has collected fish tissue to be analyzed for arsenic to determine if a fish consumption advisory is warranted.

Monastery Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_40	20.6.4.224	RESERVOIR	5.79 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2001. An n=1 is insufficient to determine use support.

NMED EXHIBIT 27

North Fork Blue Creek (Blue Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_17	20.6.4.215	STREAM, PERENNIAL	2.11 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Panchuela Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_060	20.6.4.217	STREAM, PERENNIAL	6.9 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Park Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_20	20.6.4.99	RESERVOIR	4.21 ACRES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Pecos Arroyo (Gallinas River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_22	20.6.4.221	STREAM, PERENNIAL	13.54 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Supporting	E. coli	2010	9/25/2013	4A
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL for E. coli.

Pecos Baldy Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_50	20.6.4.222	LAKE, FRESHWATER	5.6 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Pecos River (Alamitos Canyon to Jack's Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_002	20.6.4.217	STREAM, PERENNIAL	21.21 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: A TMDL was prepared for turbidity.

Pecos River (Canon de Manzanita to Alamitos Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_003	20.6.4.217	STREAM, PERENNIAL	5.69 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2004	9/13/2005	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs were written for temperature and turbidity. De-list for turbidity.

NMED EXHIBIT 27

Pecos River (Cow Creek to Canon de Manzanita)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_02	20.6.4.216	STREAM, PERENNIAL	19.7 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Pecos River (Jack's Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_000	20.6.4.217	STREAM, PERENNIAL	13.91 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: Rio Grande Cutthroat Trout restoration in 1992-1996 by NMG&F above Pecos Falls.					

Pecos River (Santa Rosa Reservoir to Tecolote Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.A_10	20.6.4.211	STREAM, PERENNIAL	51.1 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/25/2013	4A
WH	Fully Supporting				

AU Comment: USGS 08382600 gage data from 1/1/1976 to 9/7/2011 documents 3596 days (28%) with zero daily flow.

Pecos River (Sumner Reservoir to Santa Rosa Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.A_00	20.6.4.211	STREAM, PERENNIAL	46.72 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	2012	2022 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The nutrient listing is marginal.

Pecos River (Tecolote Creek to Villanueva State Park)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_00	20.6.4.216	STREAM, PERENNIAL	18.83 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Temperature	2012	2022 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The AU boundary is the downstream end of the state park.

Pecos River (Villanueva State Park to Cow Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2213_01	20.6.4.216	STREAM, PERENNIAL	19.83 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The AU boundary is the downstream end of the state park.

Perch Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_40	20.6.4.226	SINK HOLE	3.63 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Power Dam Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.B_10	20.6.4.212	RESERVOIR	13.17 ACRES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Rio Mora (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_040	20.6.4.217	STREAM, PERENNIAL	17.93 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Rito del Oso (Rio Mora to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_044	20.6.4.217	STREAM, PERENNIAL	2.04 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Santa Rosa Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_00	20.6.4.225	RESERVOIR	4820.42 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Spirit Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_80	20.6.4.222	LAKE, FRESHWATER	2.9 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Stewart Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_70	20.6.4.222	LAKE, FRESHWATER	4.24 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Access is difficult -- high elevation lake.					

Storrie Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.5_00	20.6.4.214	RESERVOIR	1080.22 ACRES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Mercury - Fish Consumption Advisory	2006		5/5C
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
PWS	Not Assessed				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2006		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Sumner Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2210_00	20.6.4.210	RESERVOIR	4274.73 ACRES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Tecolote Creek (Blue Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_09	20.6.4.215	STREAM, PERENNIAL	5.77 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Tecolote Creek (I-25 to Blue Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_10	20.6.4.230	STREAM, PERENNIAL	22.05 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Temperature Nutrients	1998 2012		5/5A 5/5C
DWS	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: A UAA to create 20.6.4.230 NMAC for this water body with coolwater aquatic life use was approved by the WQCC (effective 2/28/18 for state purposes).

Tecolote Creek (Pecos River to I-25)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_08	20.6.4.98	STREAM, EPHEMERAL	26.37 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral.The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU will remain under 20.6.4.98 NMAC.

Tres Lagunas (Northeast)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_30	20.6.4.212	RESERVOIR	34.45 ACRES	2010	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	pH	2010	2021 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Tres Lagunas NE is one of three small on-line impoundments on a perennial tributary to the Pecos River origionally constructed by the railroad for flood control and eventual irrigation storage. In the years since the construction, the lake has filled with sediment, now averaging one meter in depth. As a result, WQS segment 20.6.4.212 is likely not appropriate for this waterbody.

Tres Lagunas (Southeast)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_31	20.6.4.212	RESERVOIR	12.44 ACRES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Tres Lagunas (West)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2211.B_32	20.6.4.212	RESERVOIR	10.89 ACRES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Truchas Lake (North)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_60	20.6.4.222	LAKE, FRESHWATER	0.68 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Truchas Lake (South)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.B_61	20.6.4.222	LAKE, FRESHWATER	2.57 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment:					

Wallace Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_107	20.6.4.99	LAKE, PLAYA	17.46 ACRES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

NMED EXHIBIT 27

Willow Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_030	20.6.4.217	STREAM, PERENNIAL	5.8 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Specific Conductance	2004	9/25/2013	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Continuing monitoring data following Terrero Mine reclaimation indicate improved water quality with respect to metals (previous listed for cadmium and zinc).

Winsor Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2214.A_061	20.6.4.217	STREAM, PERENNIAL	5.95 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Wright Canyon Creek (Tecolote Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060001 Pecos Headwaters	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2212_18	20.6.4.215	STREAM, PERENNIAL	2.05 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

HUC: 13060003 Upper Pecos

Bosque Redondo Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060003 Upper Pecos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_021	20.6.4.99	RESERVOIR	32.63 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses. This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. An n=1 is insufficient to assess for impairments. The applicable criterion for temperature was exceeded.

NMED EXHIBIT 27

Pecos River (Crockett Draw to Yeso Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060003 Upper Pecos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2207_01	20.6.4.207	RIVER	46.57 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
SC	Fully Supporting				
WH	Fully Supporting				

AU Comment: If the October 2015 proposed revisions to 20.6.4.206 NMAC are approved by the EPA, E. coli will become Non Support.

Pecos River (Salt Creek to Crockett Draw)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060003 Upper Pecos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2207_00	20.6.4.207	RIVER	22.15 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2016	2019 (est.)	5/5A
SC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Pecos River (Truchas Creek to Sumner Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060003 Upper Pecos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2207_03	20.6.4.207	RIVER	20.36 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
SC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

NMED EXHIBIT 27

Pecos River (Yeso Creek to Truchas Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060003 Upper Pecos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2207_02	20.6.4.207	RIVER	26.36 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Fully Supporting				
SC	Fully Supporting				
WH	Fully Supporting				

AU Comment: If the October 2015 proposed revisions to 20.6.4.206 NMAC are approved by the EPA, E. coli will become Non Support.

Yeso Creek (Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060003 Upper Pecos	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_011	20.6.4.98	STREAM, INTERMITTENT	46.11 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 13060007 Upper Pecos-Long Arroyo

Bitter Lake (Bitter Lake NWR)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_014	20.6.4.99	LAKE, PLAYA	149.3 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. Although there were no exceedences, an n=1 is insufficient to assess for impairments.

Bitter Lake NWR - Unit 15			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_019	20.6.4.99	RESERVOIR	68.45 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Bitter Lake NWR - Unit 16			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_017	20.6.4.99	RESERVOIR	54.99 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Bitter Lake NWR - Unit 3			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_016	20.6.4.99	RESERVOIR	52.25 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Bitter Lake NWR - Unit 5			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_015	20.6.4.99	RESERVOIR	54.16 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Bitter Lake NWR - Unit 6			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_020	20.6.4.99	RESERVOIR	82.87 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Bitter Lake NWR - Unit 7			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_018	20.6.4.99	RESERVOIR	97.39 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Bitter Lake Sink Hole 19			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_112	20.6.4.99	SINK HOLE	0.13 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2007 as part of a data gathering effort related to nutrients. An n=1 is insufficient to assess for impairments. The applicable criterion for E. coli was exceeded.

Cottonwood Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_004	20.6.4.228	SINK HOLE	0.27 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Water is naturally too saline for livestock watering.

Eagle Creek (Pecos River nr Artesia to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_008	20.6.4.98	STREAM, EPHEMERAL	68.5 MILES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 10/28/08) indicate this assessment unit is ephemeral (Hydrology Protocol score of 5.0 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to a waterbody under 20.6.4.97 NMAC. Until such time, this waterbody will remain under 20.6.4.98 NMAC.

Figure Eight Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_044	20.6.4.99	SINK HOLE	2.76 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2016		5/5B
WH	Fully Supporting				
AU Comment: Livestock use is not allowed at this lake. A segment-specific DO criterion may be warranted in this small sinkhole lake.					

Inkwell Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_002	20.6.4.228	SINK HOLE	0.4 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Water is naturally too saline for livestock consumption.					

Lake Van			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_071	20.6.4.99	RESERVOIR	37.67 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Temperature	2016	2021 (est.)	5/5A
WH	Fully Supporting				
AU Comment: None.					

Lea Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_001	20.6.4.227	SINK HOLE	17.46 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: Water is naturally too saline for livestock consumption.					

Mirror Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_003	20.6.4.229	SINK HOLE	1.98 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: Water is naturally too saline for livestock watering.					

Pasture Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_094	20.6.4.99	SINK HOLE	0.96 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: Livestock use is not allowed at this lake.					

Pecos River (Eagle Creek to Rio Felix)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_03	20.6.4.206	RIVER	34.8 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	Temperature	2016	2019 (est.)	5/5A
		DDT - Fish Consumption Advisory	2010		5/5C
		PCBS - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The DDT and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Pecos River (Rio Felix to Rio Hondo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_00	20.6.4.206	RIVER	26.77 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		Temperature	2016	2019 (est.)	5/5A
		DDT - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The DDT and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Pecos River (Rio Hondo to Salt Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_20	20.6.4.206	RIVER	21 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		DDT - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The DDT and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern. If the October 2015 proposed revisions to 20.6.4.206 NMAC are approved by the EPA, E. coli will become Non Support.

Pecos River (Rio Penasco to Eagle Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_02	20.6.4.206	RIVER	13.62 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		DDT - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The DDT and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Unnamed tributary (Hart Canyon to South Union Rd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060007 Upper Pecos-Long Arroyo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_020	20.6.4.97	STREAM, EPHEMERAL	0.92 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
SW Public Services, permit NM0029131

HUC: 13060008 Rio Hondo

Alto Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.B_30	20.6.4.98	RESERVOIR	11.15 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Water in this reservoir is used by the city of Ruidoso when available -- it is often dry. Copper sulfate has been used as an algalcide in the past to protect this drinking water supply.

Bonito Lake			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.B_10	20.6.4.223	RESERVOIR	39.05 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: This lake was several impacted by the Little Bear Fire.

Carrizo Creek (Rio Ruidoso to Mescalero Apache bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			4A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_22	20.6.4.209	STREAM, PERENNIAL	2.03 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/21/2015	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: A TMDL for E. coli (2015).

Eagle Creek (Alto Lake to S. Fork Eagle Creek)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_017	20.6.4.98	STREAM, INTERMITTENT	2.85 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Impacted by 2012 Little Bear Fire.

Eagle Creek (Rio Ruidoso to Alto Lake)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_007	20.6.4.98	STREAM, INTERMITTENT	16.27 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Not Assessed				

AU Comment: Impacted by 2012 Little Bear Fire.

Grindstone Canyon (Carrizo Creek to Grindstone Rsvr)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_008	20.6.4.98	STREAM, INTERMITTENT	0.77 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Grindstone Canyon (Grindstone Rsvr to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_009	20.6.4.97	STREAM, EPHEMERAL	1.01 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Hydrology Protocol-based UAA concluded this reach was ephemeral. UAA was approved by EPA in Oct 2013.

Grindstone Canyon Reservoir			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5B	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.B_20	20.6.4.209	RESERVOIR	56.88 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2014		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: WQS is under review.

Little Creek (Eagle Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_019	20.6.4.98	STREAM, EPHEMERAL	17.95 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

North Spring River (Rio Hondo to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_40	20.6.4.206	STREAM, PERENNIAL	6.3 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Not Assessed				
AU Comment: If the October 2015 proposed revisions to 20.6.4.206 NMAC are approved by the EPA, E. coli will become Non Support.					

Rio Bonito (Perenial prt Rio Ruidoso to NM 48 near Angus)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_10	20.6.4.208	STREAM, PERENNIAL	31.99 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Flow Regime Modification			4C
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: Stream reach has very low flow during certain times of the year due to dam forming Bonito Lake for drinking water uses. This AU was impacted by the 2012 Little Bear Fire.					

NMED EXHIBIT 27

Rio Bonito (Perennial prt NM 48 near Angus to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_10	20.6.4.209	STREAM, PERENNIAL	12.99 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Flow Regime Modification	2014		4C
		Temperature	2006	2019 (est.)	5/5A
		Benthic Macroinvertebrates			5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/21/2015	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: A small portion of this AU is dewatered due to dam. A TMDL was developed for E. Coli (2015). This AU was impacted by the 2012 Little Bear Fire.

Rio Hondo (Perennial prt North Spring R to Bonney Cyn)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_25	20.6.4.206	STREAM, PERENNIAL	47.3 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Rio Hondo (Perennial prt Pecos R to North Spring R)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_26	20.6.4.206	STREAM, PERENNIAL	7.57 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Hondo (Perennial reaches Bonney Canyon to Rio Ruidoso)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_30	20.6.4.208	STREAM, PERENNIAL	23.44 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Flow Regime Modification	2014		4C
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: A TMDL was developed for fecal coliform. This reach was impacted by 2012 fire and subsequent flooding.					

Rio Ruidoso (Carrizo Ck to Mescalero Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_20	20.6.4.209	STREAM, PERENNIAL	4.73 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Turbidity	1998	2/10/2006	4A
		Temperature	1998	2/10/2006	4A
		Phosphorus, Total	2014	12/13/2016	4A
		Nutrients	2018	12/13/2016	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: TMDLs for temperature and turbidity (prior to split at Carrizo Ck). TMDL for nutrients (2016).					

Rio Ruidoso (Eagle Ck to US Hwy 70 Bridge)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_20	20.6.4.208	STREAM, PERENNIAL	8.23 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	1998	12/13/2016	4A
		Turbidity	2014	9/21/2015	4A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/21/2015	4A
WH	Fully Supporting				
AU Comment: TMDL for nutrients.					

NMED EXHIBIT 27

Rio Ruidoso (North Fork abv Mescalero Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_24	20.6.4.209	STREAM, PERENNIAL	2.21 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Rio Ruidoso (Perennial prt Rio Bonito to Eagle Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_21	20.6.4.208	STREAM, PERENNIAL	11.68 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
FC	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

NMED EXHIBIT 27

Rio Ruidoso (US Hwy 70 Bridge to Carrizo Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_21	20.6.4.209	STREAM, PERENNIAL	7.58 MILES	2018	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2014	2/10/2006	4A
		Nutrients	2014	12/13/2016	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/21/2015	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDLs for temperature and turbidity (prior to split at Carrizo Ck), E. coli, and nutrients.

S. Fork Eagle Creek (Eagle Creek to Mescalero Apache bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_00	20.6.4.209	STREAM, PERENNIAL	0.72 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Flow Regime Modification			4C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: This reach often dries up from April on. Wells in the vicinity contribute to the drying of the stream according to USFS personnel (2/4/09).

South Fork Rio Bonito (Rio Bonito to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060008 Rio Hondo	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2209.A_11	20.6.4.209	STREAM, PERENNIAL	5.3 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

HUC: 13060009 Rio Felix

Rio Felix (Perennial reaches Pecos River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060009 Rio Felix	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_30	20.6.4.206	STREAM, PERENNIAL	22.44 MILES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: This reach is usually dry. Some fish observed in pools spring of 2003.					

NMED EXHIBIT 27

HUC: 13060010 Rio Penasco

Agua Chiquita (Rio Penasco to McEwan Cny)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060010 Rio Penasco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_02	20.6.4.97	STREAM, EPHEMERAL	14.86 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Fully Supporting				
LW	Not Assessed				
SC	Not Assessed				
WH	Fully Supporting				

AU Comment: Hydrology Protocol-based UAA concluded this reach was ephemeral. UAA was approved by EPA in Oct 2013.

Agua Chiquita (perennial portions McEwan Cny to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060010 Rio Penasco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_01	20.6.4.208	STREAM, PERENNIAL	20.81 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Turbidity	2014	9/21/2015	4A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	2018 (est.)	5/5A
WH	Fully Supporting				

AU Comment: None.

Bear Canyon Reservoir (Otero)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060010 Rio Penasco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_010	20.6.4.99	RESERVOIR	2.4 ACRES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater Aquatic Life is an existing use.

Rio Penasco (HWY 24 to Cox Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 13060010 Rio Penasco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_00	20.6.4.208	STREAM, PERENNIAL	34.66 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Turbidity	2014	9/21/2015	4A
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: Coolwater may be a more appropriate ALU designation. WQS is under review.					

Rio Penasco (Perennial prt Cox Canyon to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060010 Rio Penasco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2208_03	20.6.4.208	STREAM, PERENNIAL	14.7 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Fully Supporting				
FC	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Penasco (Perennial prt Pecos River to HWY 24)			AU IR CATEGORY	LOCATION DESCRIPTION	
			1	HUC: 13060010 Rio Penasco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_10	20.6.4.206	STREAM, PERENNIAL	64.29 MILES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

HUC: 13060011 Upper Pecos-Black

Avalon Reservoir			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2204.B_00	20.6.4.219	RESERVOIR	848.53 ACRES	2014	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR Storage	Fully Supporting				
LW	Not Assessed				
SC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Black River (Perennial reaches of Blue Spring to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_13	20.6.4.202	STREAM, PERENNIAL	37.45 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: split original AU at Blue Spring trib post 2013 survey

Black River (Perennial reaches of Pecos R to Blue Spring)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_10	20.6.4.202	STREAM, PERENNIAL	17.49 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: split original AU at Blue Spring trib post 2013 survey

Blue Spring (Black River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_11	20.6.4.202	STREAM, PERENNIAL	3.59 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Brantley Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2205_00	20.6.4.205	RESERVOIR	2273.05 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	DDT - Fish Consumption Advisory	2006		5/5C
WH	Fully Supporting				

AU Comment: The "DDT in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Harroun Dam (Ten Mile) Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_048	20.6.4.98	RESERVOIR	116.22 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Laguna Gatuna			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_055	20.6.4.98	LAKE, PLAYA	294.64 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Naturally saline lake, so livestock watering not attainable or existing.					

Laguna Quatro			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_059	20.6.4.98	LAKE, PLAYA	258.53 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Hypersaline due to potash mining activities, so livestock watering likely not attainable or existing.					

Laguna Tres			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_061	20.6.4.98	LAKE, PLAYA	334.71 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Laguna Uno			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_066	20.6.4.98	LAKE, PLAYA	142.56 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Laguna Walden			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_062	20.6.4.98	LAKE, PLAYA	19.15 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Lower Tansil Lake/Lake Carlsbad (Carlsbad Municipal Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2203.B_00	20.6.4.218	RESERVOIR	150.39 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory DDT - Fish Consumption Advisory	2010 2016		5/5C 5/5C
WH	Fully Supporting				

AU Comment: The PCB and DDT in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Pecos River (Avalon Reservoir to Brantley Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2204.A_00	20.6.4.204	RIVER	6.94 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Not Assessed				
WWAL	Not Supporting	DDT - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The "DDT in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Pecos River (Black River to Six Mile Dam Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_00	20.6.4.202	RIVER	15.13 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The PCBs in fish tissue listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Pecos River (Brantley Reservoir to Rio Penasco)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2206.A_01	20.6.4.206	RIVER	11.36 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
SC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
		DDT - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The DDT and PCBs in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Pecos River (Lake Carlsbad to Avalon Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4C	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2203.A_00	20.6.4.203	RIVER	3.9 MILES	2006	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
LW	Fully Supporting				
PC	Not Assessed				
WWAL	Not Supporting	Flow Regime Modification			4C
WH	Fully Supporting				

AU Comment: Usually dry - water diverted to Carlsbad main canal.

NMED EXHIBIT 27

Pecos River (Six Mile Dam Lake to Lower Tansil Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_01	20.6.4.202	RIVER	3.46 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The PCBs in fish tissue listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Pecos River (TX border to Black River)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2201_00	20.6.4.201	RIVER	35.06 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2016	9/23/2016	4A
WWAL	Not Supporting	Dissolved oxygen	2006		5/5C
		PCBS - Fish Consumption Advisory	2010		5/5C
WH	Fully Supporting				

AU Comment: The PCBs in fish tissue listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

NMED EXHIBIT 27

Rattlesnake Spring			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_12	20.6.4.99	SPRING	0 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Not Assessed				
AU Comment: This is the drinking water source for Carlsbad Caverns.					

Sitting Bull Creek (Last Chance Canyon to Sitting Bull Spr)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_007	20.6.4.99	STREAM, PERENNIAL	1.78 MILES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Not Assessed				
AU Comment: None.					

Six Mile Dam Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.B_20	20.6.4.202	RESERVOIR	82.11 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2016	2021 (est.)	5/5A
WH	Fully Supporting				
AU Comment: None.					

Williams Sink (Eddy)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13060011 Upper Pecos-Black	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_109	20.6.4.98	LAKE, PLAYA	210.11 ACRES	1998	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Potash activities have lead to hypersaline conditions which likely make livestock watering not attainable or existing.					

HUC: 13070002 Delaware

Delaware River (Pecos River to TX border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 13070002 Delaware	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2202.A_20	20.6.4.202	STREAM, PERENNIAL	8.43 MILES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: No flow documented at US285 bridge.					

NMED EXHIBIT 27

HUC: 13070007 Landreth-Monument Draws

Eunice Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13070007 Landreth-Monument Draws	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_043	20.6.4.99	RESERVOIR	5.21 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.

Jal Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 13070007 Landreth-Monument Draws	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_052	20.6.4.99	RESERVOIR	9.87 ACRES	2016	2021
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MCWAL	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: Marginal Coldwater and Warmwater Aquatic Life are existing uses.

HUC: 14080101 Upper San Juan

Gallegos Canyon (San Juan River to Navajo bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_060	20.6.4.99	STREAM, PERENNIAL	0.46 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Assessed				
WWAL	Not Supporting	Selenium, Total Recoverable	2004	8/26/2005	4A
WH	Not Supporting	Selenium, Total Recoverable	2004	8/26/2005	4A

AU Comment: TMDL was prepared for selenium (2005).

Los Pinos River (Navajo Reservoir to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2407.A_10	20.6.4.407	STREAM, PERENNIAL	1.35 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
PWS	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Navajo Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2406_00	20.6.4.406	RESERVOIR	12778.92 ACRES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature Mercury - Fish Consumption Advisory	2012 2004	2021 (est.)	5/5A 5/5C
IW Supply	Not Assessed				
IRR Storage	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Navajo River (Jicarilla Apache Nation to CO border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2407.A_00	20.6.4.407	STREAM, PERENNIAL	6.06 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	2012		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: Fisheries data indicate coolwater may be a more appropriate ALU -- WQS review needed.					

San Juan River (Animas River to Canon Largo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2401_00	20.6.4.408	RIVER	25.2 MILES	2016	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Sedimentation/Siltation	2004	8/26/2005	4A
PC	Not Supporting	E. coli	2006	2/26/2010	4A
PWS	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDLs were prepared for sedimentation, fecal coliform and E. coli.					

San Juan River (Canon Largo to Navajo Reservoir)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2405_10	20.6.4.405	RIVER	19.34 MILES	2010	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
HQColdWAL	Fully Supporting				
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

San Juan River (NM reach upstream of Navajo Reservoir)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 14080101 Upper San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2405_11	20.6.4.99	RIVER	0.57 MILES	2012	2018
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

NMED EXHIBIT 27

HUC: 14080104 Animas

Animas River (Estes Arroyo to So. Ute Indian Tribe bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 14080104 Animas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2404_00	20.6.4.404	RIVER	18.8 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Phosphorus, Total	2012	9/30/2013	4A
		Turbidity	2012	2019 (est.)	5/5A
		Temperature	1998	2019 (est.)	5/5A
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/30/2013	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for E. coli and total phosphorus.

Animas River (San Juan River to Estes Arroyo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 14080104 Animas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2403.A_00	20.6.4.403	RIVER	16.82 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Temperature	2012	9/30/2013	4A
		Nutrients	2004	1/17/2006	4A
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2012	9/30/2013	4A
PWS	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for nutrients, temperature, and E. coli.

Lake Farmington (Beeline Reservoir)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 14080104 Animas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_006	20.6.4.409	RESERVOIR	213.21 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	PCBS - Fish Consumption Advisory	2016		5/5C
		Mercury - Fish Consumption Advisory	2004		5/5C
LW	Fully Supporting				
PC	Fully Supporting				
PWS	Not Assessed				
WWAL	Not Supporting	Mercury - Fish Consumption Advisory	2004		5/5C
		PCBS - Fish Consumption Advisory	2016		5/5C
WH	Fully Supporting				

AU Comment: This is the City of Farmingtons drinking water supply reservoir. The PCBs and mercury in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

HUC: 14080105 Middle San Juan

Jackson Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 14080105 Middle San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_005	20.6.4.410	RESERVOIR	66.68 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This water body was sampled once in 2002. Although there were no exceedences, an n=1 is insufficient to determine use support.

La Plata R (McDermott Arroyo to So. Ute Indian Tribe bnd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 14080105 Middle San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2402.A_01	20.6.4.402	STREAM, PERENNIAL	8.03 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Nutrients	2012	2019 (est.)	5/5A
MWWAL	Not Supporting	Nutrients	2012	2019 (est.)	5/5A
PC	Not Supporting	E. coli	2006	8/26/2005	4A
WH	Fully Supporting				

AU Comment: TMDLs for DO and e. coli. The response variable DO was replaced with causal variable of nutrients based on 2010 survey data.

La Plata River (San Juan River to McDermott Arroyo)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 14080105 Middle San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2402.A_00	20.6.4.402	STREAM, PERENNIAL	16.74 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Dissolved oxygen Sedimentation/Siltation	1998 2004	2019 (est.) 8/26/2005	5/5A 4A
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2012	2/26/2010	4A
WH	Fully Supporting				

AU Comment: There were conflicting results between the 2002 dissolved oxygen sonde data (using percentage) and grab data. 2010 sonde equipment failure. Re-deployment attempted fall of 2012, but channel was completely dry. Coolwater aquatic life use may be a more appropriate ALU based on available fisheries data. Application of the SWQB Hydrology Protocol (survey date 6/17/09) indicate this assessment unit should be perennial (Hydrology Protocol score of 28.3 but 14.2% no flow days at USGS gage 09367500 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

San Juan River (Navajo bnd at Hogback to Animas River)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 14080105 Middle San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2401_10	20.6.4.401	RIVER	22.51 MILES	2016	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Turbidity Sedimentation/Siltation	2012 2012	2019 (est.) 2019 (est.)	5/5A 5/5A
PC	Not Supporting	E. coli	2006	8/26/2005	4A
PWS	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs were prepared for fecal coliform and E. coli.

Shumway Arroyo (San Juan River to Ute Mtn Ute bnd)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 14080105 Middle San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_021	20.6.4.98	STREAM, INTERMITTENT	13.2 MILES	2004	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Application of the SWQB Hydrology Protocol (survey date 6/17/09) indicate this assessment unit is intermittent (Hydrology Protocol score of 18.8 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Stevens Arroyo (Perennial prts San Juan R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 14080105 Middle San Juan	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2401_11	20.6.4.99	STREAM, PERENNIAL	9.59 MILES	2012	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Fully Supporting				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: The arroyo generally starts flowing near the Farmers Mutual Ditch. E. coli was the only parameter sampled during the 2010 survey.

HUC: 14080106 Chaco

Unnamed tributary (Kim-me-ni-oli Wash to hdwtrs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 14080106 Chaco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_025	20.6.4.97	STREAM, EPHEMERAL	8.69 MILES	2012	2018
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Lee Ranch Coal Co, El Segundo Mine, permit NM0030996

HUC: 15020003 Carrizo Wash

Crater Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_033	20.6.4.98	LAKE, PLAYA	3.29 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

El Caso Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_038	20.6.4.98	LAKE, PLAYA	19.77 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Gabaldon Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_045	20.6.4.98	LAKE, PLAYA	9.4 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Part of playa lake study. Data are old.

Largo Creek (Carrizo Wash to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_906	20.6.4.98	STREAM, EPHEMERAL	77.05 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Little El Caso Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_075	20.6.4.98	LAKE, PLAYA	3.14 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Pine Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_095	20.6.4.98	LAKE, PLAYA	16.9 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Quemado Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15020003 Carrizo Wash	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_096	20.6.4.453	RESERVOIR	111.39 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Nutrients	2014	2021 (est.)	5/5A
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

HUC: 15020004 Zuni

Cebolla Creek (Ramah Rsvr to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_032	20.6.4.98	STREAM, EPHEMERAL	10.22 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol on 5/19/2009 indicate this assessment unit is intermittent (Hydrology Protocol score of 10.5), while survey data from 10/12/11 indicate ephemeral at the station above the falls (score of 0.0). The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Cebolla Creek (Zuni Pueblo bnd to Ramah Rsvr)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_031	20.6.4.98	STREAM, EPHEMERAL	4.08 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Application of the SWQB Hydrology Protocol on 5/19/2009 indicate this assessment unit is intermittent (Hydrology Protocol score of 10.5), while survey data from 10/12/11 indicate ephemeral at the station above the falls (score of 0.0). This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

McGaffey Lake			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_083	20.6.4.98	RESERVOIR	11.47 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Supporting	Nutrients	1998	2021 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Lake often goes dry. Department of Game and Fish dredged the lake in 2003 to return it to its original design capacity. They no longer successfully stock trout (just catfish when there is adequate water).

NMED EXHIBIT 27

Ramah Reservoir			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_110	20.6.4.452	RESERVOIR	139.42 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2014	2021 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Rio Nutria (Tampico Draw to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_033	20.6.4.451	STREAM, EPHEMERAL	11.76 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Coolwater may not be attainable -- WQS under review.					

Rio Nutria (Zuni Pueblo bnd to Tampico Draw)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_029	20.6.4.451	STREAM, PERENNIAL	0.32 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

Tampico Draw (Rio Nutria to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020004 Zuni	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_080	20.6.4.451	STREAM, PERENNIAL	4.8 MILES	2006	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 15020006 Upper Puerco

Defiance Draw (CR 1 to W Defiance Road)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020006 Upper Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_026	20.6.4.97	STREAM, EPHEMERAL	4.94 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Chevron McKinley mine, permit NM0029386

Puerco River (Gallup WWTP to South Fork Puerco R)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020006 Upper Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_201	20.6.4.98	STREAM, INTERMITTENT	10.15 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Puerco River (South Fork Puerco R to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 15020006 Upper Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_202	20.6.4.98	STREAM, INTERMITTENT	43 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Puerco River (non-tribal AZ border to Gallup WWTP)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 15020006 Upper Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_200	20.6.4.99	STREAM, PERENNIAL	22.2 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	Ammonia, Total	2014	2022 (est.)	5/5A
WH	Fully Supporting				

AU Comment: This AU is effluent-dependent.

South Fork Puerco River (Puerco R to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 15020006 Upper Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.A_203	20.6.4.98	STREAM, INTERMITTENT	33.49 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Unnamed tributary to Defiance Draw (CR 1 to NM 264)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15020006 Upper Puerco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-97.A_027	20.6.4.97	STREAM, EPHEMERAL	5.17 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LAL	Not Assessed				
LW	Not Assessed				
SC	Not Assessed				
WH	Not Assessed				

AU Comment: Ephemeral AU subject to 20.6.4.97 NMAC, included in UAA for 18 Unclassified Non-Perennial Watercourses with NPDES Permitted Facilities, June 2012. EPA provided technical approval January 30, 2013.
Chevron/McKinley Mine, permit NM0029386

HUC: 15040001 Upper Gila

Beaver Creek (Perennial prt Taylor Ck to Mule Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_25	20.6.4.503	STREAM, PERENNIAL	17.45 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2014		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Temperature WQC is under review.

NMED EXHIBIT 27

Black Canyon Creek (East Fork Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_21	20.6.4.503	STREAM, PERENNIAL	25.14 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	1996	4/5/2002	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL for temperature. WQC is under review.

Canyon Creek (Middle Fork Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_43	20.6.4.503	STREAM, PERENNIAL	14.16 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Nutrients Turbidity	1998 1998	4/10/2002 4/10/2002	4A 4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL turbidity and plant nutrients

Diamond Ck (Perennial prt Bailey Ck to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_24	20.6.4.503	STREAM, PERENNIAL	12.59 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The USFS states that this reach is occupied habitat for Gila Trout.

Diamond Ck (Perennial prt East Fork Gila R to Bailey Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_22	20.6.4.503	STREAM, PERENNIAL	13 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: The USFS states that the reach is intermittent in the lower sections and contains a native warmwater fishery. The existing and attainable aquatic life use for the perennial portions in this lower AU is likely coolwater. WQS review needed.

NMED EXHIBIT 27

East Fork Gila River (Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_20	20.6.4.503	STREAM, PERENNIAL	26.14 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Benthic Macroinvertebrates	2010		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: None.					

Gila River (Mogollon Ck to East and West Forks of Gila R)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.A_30	20.6.4.502	STREAM, PERENNIAL	41.51 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Temperature	2010		5/5B
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				
AU Comment: Marginal CWAL may not be attainable. WQS under review.					

NMED EXHIBIT 27

Gilita Creek (Middle Fork Gila R to Willow Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_45	20.6.4.503	STREAM, PERENNIAL	6.27 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2002	2022 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Gilita Creek (Perennial reaches abv Willow Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_48	20.6.4.503	STREAM, PERENNIAL	6.57 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Hoyt Creek (Wall Lake to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_26	20.6.4.98	STREAM, INTERMITTENT	19.95 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Iron Creek (Middle Fork Gila R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_44	20.6.4.503	STREAM, PERENNIAL	12.96 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2014		5/5B
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: Temperature WQS is under review.

Lake Roberts			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2504_20	20.6.4.504	RESERVOIR	68.46 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients	2014	2021 (est.)	5/5A
		Mercury - Fish Consumption Advisory	2016		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The "mercury in fish tissue" listing is based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable." Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Little Creek (West Fork Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_31	20.6.4.503	STREAM, PERENNIAL	16.46 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Middle Fork Gila River (Canyon Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_41	20.6.4.503	STREAM, PERENNIAL	12.47 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2002		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Temperature WQC is under review. The 2012 Whitewater Baldy Complex Fire severely burned portions of the watershed.

Middle Fork Gila River (West Fork Gila R to Canyon Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_40	20.6.4.503	STREAM, PERENNIAL	24.32 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2002		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Temperature WQC is under review. The 2012 Whitewater Baldy Complex Fire severely burned portions of the watershed.

Mogollon Creek (Gila River to USGS Gage 09430600)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_05	20.6.4.98	STREAM, PERENNIAL	12.72 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Mogollon Creek (Perennial prt USGS Gage 09430600 to hwtrs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_02	20.6.4.503	STREAM, PERENNIAL	16.71 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: TMDL Al chronic; de-list letter for SBD (sedimentation/siltation), chronic lead. Gila Trout restoration in 1986 and 1996 by NMG&F.

Sapillo Creek (Gila River to Lake Roberts)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			1	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_04	20.6.4.503	STREAM, PERENNIAL	11.84 MILES	2018	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDL turbidity and TOC; de-list letter for biological impairment. De-listed for turbidity (2010 cycle).

Snow Canyon Ck (Perennial prt Gilita Ck to Snow Lake)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_46	20.6.4.99	STREAM, PERENNIAL	0.38 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Assessed				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: This reach exists due to dam leakage only, so an existing aquatic life use of coldwater was added to match the source of this flow.

Snow Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2504_40	20.6.4.504	RESERVOIR	91.68 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Nutrients pH	2014 2016	2021 (est.) 2021 (est.)	5/5A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Taylor Creek (Perennial reaches Beaver Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_23	20.6.4.503	STREAM, PERENNIAL	22.55 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Nutrients	1998 2014	8/5/2002 2022 (est.)	4A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: Temperature WQC is under review.					

Turkey Creek (Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_03	20.6.4.503	STREAM, PERENNIAL	16.94 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2002		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: The temperature WQC is under review.					

West Fork Gila R (East Fork to Middle Fork)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_10	20.6.4.503	STREAM, PERENNIAL	4.85 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2002		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Assessed				
WH	Fully Supporting				
AU Comment: The temperature WQC is under review. Wildfire impacts.					

West Fork Gila R (Middle Fork to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_30	20.6.4.503	STREAM, PERENNIAL	31.49 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature	2010		5/5B
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: Temperature WQC is under review.					

White Creek (West Fork Gila River to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			3/3A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_32	20.6.4.503	STREAM, PERENNIAL	8.94 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Willow Creek (Gilita Creek to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5A	HUC: 15040001 Upper Gila	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_47	20.6.4.503	STREAM, PERENNIAL	7.21 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
HQColdWAL	Not Supporting	Temperature Aluminum, Total Recoverable	2014 2014	2022 (est.) 9/11/2014	5/5A 4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Native fish re-introduction with fish barrier (2016).

HUC: 15040002 Upper Gila-Mangas

Bear Creek (Gila River nr Cliff to headwaters)			AU IR CATEGORY	LOCATION DESCRIPTION	
			2	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_01	20.6.4.502	STREAM, PERENNIAL	33.26 MILES	2008	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: According to SWQB Silver City staff, the Cypress Mine contributed to this stream reach previously going dry. This mine is now closed. SWQB intensively studied Bear Creek in 2006. No impairments were determined.

Bill Evans Lake			AU IR CATEGORY	LOCATION DESCRIPTION	
			5/5C	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.B_00	20.6.4.505	RESERVOIR	69.93 ACRES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
CoolWAL	Not Supporting	Mercury - Fish Consumption Advisory	2012		5/5C
		PCBS - Fish Consumption Advisory	2016		5/5C
LW	Fully Supporting				
PC	Fully Supporting				
WWAL	Not Supporting	PCBS - Fish Consumption Advisory	2016		5/5C
		Mercury - Fish Consumption Advisory	2012		5/5C
WH	Fully Supporting				

AU Comment: Land management agencies have posted contact recreation warnings due to toxic blue green algae in the past. SWQB does not have water quality standards or assessment procedures related to blue green algae at this time. The PCBs and mercury in fish tissue listings are based on NMs current fish consumption advisories for this water body. Per USEPA guidance, these advisories demonstrate non-attainment of CWA goals stating that all waters should be "fishable". Therefore, the impaired designated use is the associated aquatic life even though human consumption of the fish is the actual concern.

Bitter Creek (AZ border to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2503_49	20.6.4.98	STREAM, INTERMITTENT	6.27 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Blue Creek (Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2501_10	20.6.4.502	STREAM, PERENNIAL	28.92 MILES	2010	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Fully Supporting				
PC	Not Assessed				
WWAL	Fully Supporting				
WH	Not Assessed				

AU Comment: None.

Carlisle Creek (Gila River to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.A_02	20.6.4.98	STREAM, EPHEMERAL	16.9 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Fully Supporting				

AU Comment: This AU may be ephemeral. The process detailed in 20.6.4.15 NMAC Subsection C must be completed in order to classify a waterbody under 20.6.4.97 NMAC. Until such time, this AU remains classified under Intermittent Waters - 20.6.4.98 NMAC.

Gila River (AZ border to Red Rock)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2501_00	20.6.4.501	RIVER	26.34 MILES	2010	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MWWAL	Not Supporting	Temperature	2010	2022 (est.)	5/5A
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

Gila River (Mangas Creek to Mogollon Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.A_10	20.6.4.502	RIVER	15.91 MILES	2010	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Temperature	2010		5/5B
PC	Fully Supporting				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: Marginal CWAL may not be attainable. WQS under review.

Gila River (Red Rock to Mangas Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.A_00	20.6.4.502	RIVER	19.57 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Nutrients Temperature	2010 2010	2022 (est.) 2022 (est.)	5/5A 5/5A
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2010	2022 (est.)	5/5A
WH	Fully Supporting				

AU Comment: None.

Mangas Creek (Gila River to Mangas Springs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.A_21	20.6.4.502	STREAM, PERENNIAL	6.39 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Nutrients Temperature	2004 2010	4/16/2002 2022 (est.)	4A 5/5A
PC	Fully Supporting				
WWAL	Not Supporting	Nutrients	2004	4/16/2002	4A
WH	Fully Supporting				

AU Comment: TMDL for nutrients. The source spring for Mangas Creek produces unusually high concentrations of nitrates, the source(s) of which are unknown.

Mangas Creek (Mangas Springs to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040002 Upper Gila-Mangas	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2502.A_22	20.6.4.502	STREAM, PERENNIAL	18.06 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IW Supply	Not Assessed				
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
PC	Not Assessed				
WWAL	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

HUC: 15040003 Animas Valley

Burro Cienaga (Lordsburg Playa to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040003 Animas Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-98.A_010	20.6.4.98	STREAM, INTERMITTENT	52.02 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

North Lordsburg Playa			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040003 Animas Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_091	20.6.4.98	LAKE, PLAYA	3024.86 ACRES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Sacaton (No Name) Playa			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040003 Animas Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_097	20.6.4.98	LAKE, PLAYA	1180.99 ACRES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

South Lordsburg Playa			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040003 Animas Valley	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_099	20.6.4.98	LAKE, PLAYA	7456.25 ACRES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

HUC: 15040004 San Francisco

Apache Creek (Tularosa River to Hardcastle Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_44	20.6.4.98	STREAM, INTERMITTENT	8.74 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: De-list letter for conductivity. Application of the SWQB Hydrology Protocol (survey date 10/9/2008) indicate this assessment unit is intermittent (Hydrology Protocol score of 11.8 - see http://www.nmenv.state.nm.us/swqb/Hydrology/ for additional details on the protocol).

Centerfire Creek (San Francisco R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_50	20.6.4.603	STREAM, PERENNIAL	16.1 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Turbidity	2014	9/11/2014	4A
		Nutrients	1998	4/16/2002	4A
		Sedimentation/Siltation	2014	2022 (est.)	5/5A
		Specific Conductance	1998	4/16/2002	4A
		Temperature	1998	2022 (est.)	5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/11/2014	4A
WH	Fully Supporting				

AU Comment: TMDL for plant nutrients and conductivity. Temperature WQC under review.

Dry Blue Creek (AZ bnd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_70	20.6.4.603	STREAM, PERENNIAL	9.52 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

Leyba Lake			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-9000.B_074	20.6.4.98	LAKE, PLAYA	12.64 ACRES	1998	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: Part of playa lake study. Data are old.

Mineral Creek (San Francisco R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_20	20.6.4.98	STREAM, INTERMITTENT	19.64 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

Mule Creek (San Francisco R to Mule Springs)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2601_01	20.6.4.601	STREAM, PERENNIAL	10.5 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Dissolved oxygen	2014	2022 (est.)	5/5A
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: Sonde data needed to confirm DO listing based on grab data. Access is limited.

Negrito Creek (Tularosa River to confl of N and S forks)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_42	20.6.4.603	STREAM, PERENNIAL	12.42 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2002		5/5B
IRR	Not Assessed				
LW	Not Assessed				
PC	Fully Supporting				
WH	Not Assessed				

AU Comment: Reach went dry during 2011 Gila survey upstream of sampling station. Limited WQ data available. WQS under review.

North Fork Negrito Creek (Negrito Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_45	20.6.4.603	STREAM, PERENNIAL	8.31 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

S A Creek (Perennial prt of Centerfire Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-99.A_002	20.6.4.99	STREAM, PERENNIAL	13.65 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Not Assessed				
PC	Not Assessed				
WWAL	Not Assessed				
WH	Not Assessed				

AU Comment: None.

San Francisco River (AZ border to Box Canyon)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2601_00	20.6.4.601	STREAM, PERENNIAL	17.61 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				

AU Comment: None.

San Francisco River (Box Canyon to Whitewater Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2601_10	20.6.4.601	STREAM, PERENNIAL	6.41 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Benthic Macroinvertebrates	2010		5/5C
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: None.

San Francisco River (Centerfire Creek to AZ border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5C	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2602_20	20.6.4.602	STREAM, PERENNIAL	14.73 MILES	2008	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	1998	8/5/2002	4A
		Benthic Macroinvertebrates	2012		5/5C
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: TMDL for temperature and plant nutrients; de-list for turbidity. Delisted for nutrients during 2010 listing cycle. Temperature WQC is under review.					

San Francisco River (NM 12 at Reserve to Centerfire Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2602_10	20.6.4.602	STREAM, PERENNIAL	16.02 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
ColdWAL	Not Supporting	Temperature	2014	2022 (est.)	5/5A
		Turbidity	2014	9/11/2014	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/11/2014	4A
WH	Fully Supporting				
AU Comment: Wildlife impacts.					

San Francisco River (Pueblo Ck to Willow Springs Cyn)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2601_21	20.6.4.601	STREAM, PERENNIAL	22.46 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Not Assessed				
LW	Not Assessed				
MCWAL	Not Assessed				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

San Francisco River (Whitewater Ck to Pueblo Ck)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2601_20	20.6.4.601	STREAM, PERENNIAL	14.45 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Not Supporting	Sedimentation/Siltation	2014	2022 (est.)	5/5A
MWWAL	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				
AU Comment: None.					

San Francisco River (Willow Springs Cyn to NM 12 at Reserve)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2601_22	20.6.4.601	STREAM, PERENNIAL	10.42 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
IRR	Fully Supporting				
LW	Fully Supporting				
MCWAL	Fully Supporting				
MWWAL	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/11/2014	4A
WH	Fully Supporting				

AU Comment: None.

Silver Creek (Mineral Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_21	20.6.4.98	STREAM, INTERMITTENT	9.75 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
LW	Fully Supporting				
MWWAL	Not Assessed				
PC	Not Assessed				
WH	Fully Supporting				

AU Comment: None.

South Fork Negrito Creek (Negrito Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			4A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_43	20.6.4.603	STREAM, PERENNIAL	14.48 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	1998	4/5/2002	4A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/11/2014	4A
WH	Fully Supporting				
AU Comment: TMDL for temperature. The temperature WQC is under review.					

Stone Creek (San Francisco R to AZ border)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_61	20.6.4.603	STREAM, PERENNIAL	2.37 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: Temperature WQC is under review.					

Trout Creek (Perennial prt San Francisco R to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5B	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_60	20.6.4.603	STREAM, PERENNIAL	15.31 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Supporting	Temperature	2014		5/5B
IRR	Not Assessed				
LW	Not Assessed				
PC	Fully Supporting				
WH	Not Assessed				
AU Comment: Temperature WQC is under review.					

Tularosa River (Apache Creek to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			3/3A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_41	20.6.4.603	STREAM, PERENNIAL	17.75 MILES	2002	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Not Assessed				
FC	Not Assessed				
HQColdWAL	Not Assessed				
IRR	Not Assessed				
LW	Not Assessed				
PC	Not Assessed				
WH	Not Assessed				
AU Comment: None.					

Tularosa River (San Francisco R to Apache Creek)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			5/5A	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_40	20.6.4.603	STREAM, PERENNIAL	21.97 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Not Supporting	Turbidity Temperature	2014 2014	9/11/2014 2022 (est.)	4A 5/5A
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Not Supporting	E. coli	2014	9/11/2014	4A
WH	Fully Supporting				

AU Comment: TMDL for specific conductance.

Whitewater Creek (San Francisco R to Whitewater Campgrd)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_10	20.6.4.603	STREAM, PERENNIAL	5.68 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: TMDLs for turbidity and dissolved Al (2002). The 2012 Whitewater Baldy Complex Fire severely burned portions of the watershed. Dissolved Al TMDL withdrawn 2018 because no longer an applicable WQC.

Whitewater Creek (Whitewater Campgrd to headwaters)			**AU IR CATEGORY**	**LOCATION DESCRIPTION**	
			2	HUC: 15040004 San Francisco	
AU ID	**WQS REF**	**WATER TYPE**	**SIZE**	**ASSESSED**	**MONITORING SCHEDULE**
NM-2603.A_12	20.6.4.603	STREAM, PERENNIAL	13.76 MILES	2014	2019
USE	**ATTAINMENT**	**CAUSE(S)**	**FIRST LISTED**	**TMDL DATE**	**PARAMETER IR CATEGORY**
DWS	Fully Supporting				
FC	Not Assessed				
HQColdWAL	Fully Supporting				
IRR	Fully Supporting				
LW	Fully Supporting				
PC	Fully Supporting				
WH	Fully Supporting				

AU Comment: The 2012 Whitewater Baldy Complex Fire severely burned portions of the watershed.

Uses Abbreviation Key	
ColdWAL	Coldwater Aquatic Life
CoolWAL	Coolwater Aquatic Life
DWS	Domestic Water Supply
FC	Fish Culture
HQColdWAL	High Quality Coldwater Aquatic Life
IW Storage	Industrial Water Storage
IW Supply	Industrial Water Supply
IRR	Irrigation
IRR Storage	Irrigation Storage
LAL	Limited Aquatic Life
LW	Livestock Watering
MCWAL	Marginal Coldwater Aquatic Life
MWWAL	Marginal Warmwater Aquatic Life
MWS	Municipal Water Storage
PC	Primary Contact
PWS	Public Water Supply
SC	Secondary Contact
WWAL	Warmwater Aquatic Life
WH	Wildlife Habitat

NMED EXHIBIT 27

NITROGEN AND PHOSPHORUS DATA DOGGETT CREEK BELOW THE WWTP: SWQB 2015-2016 SURVEY

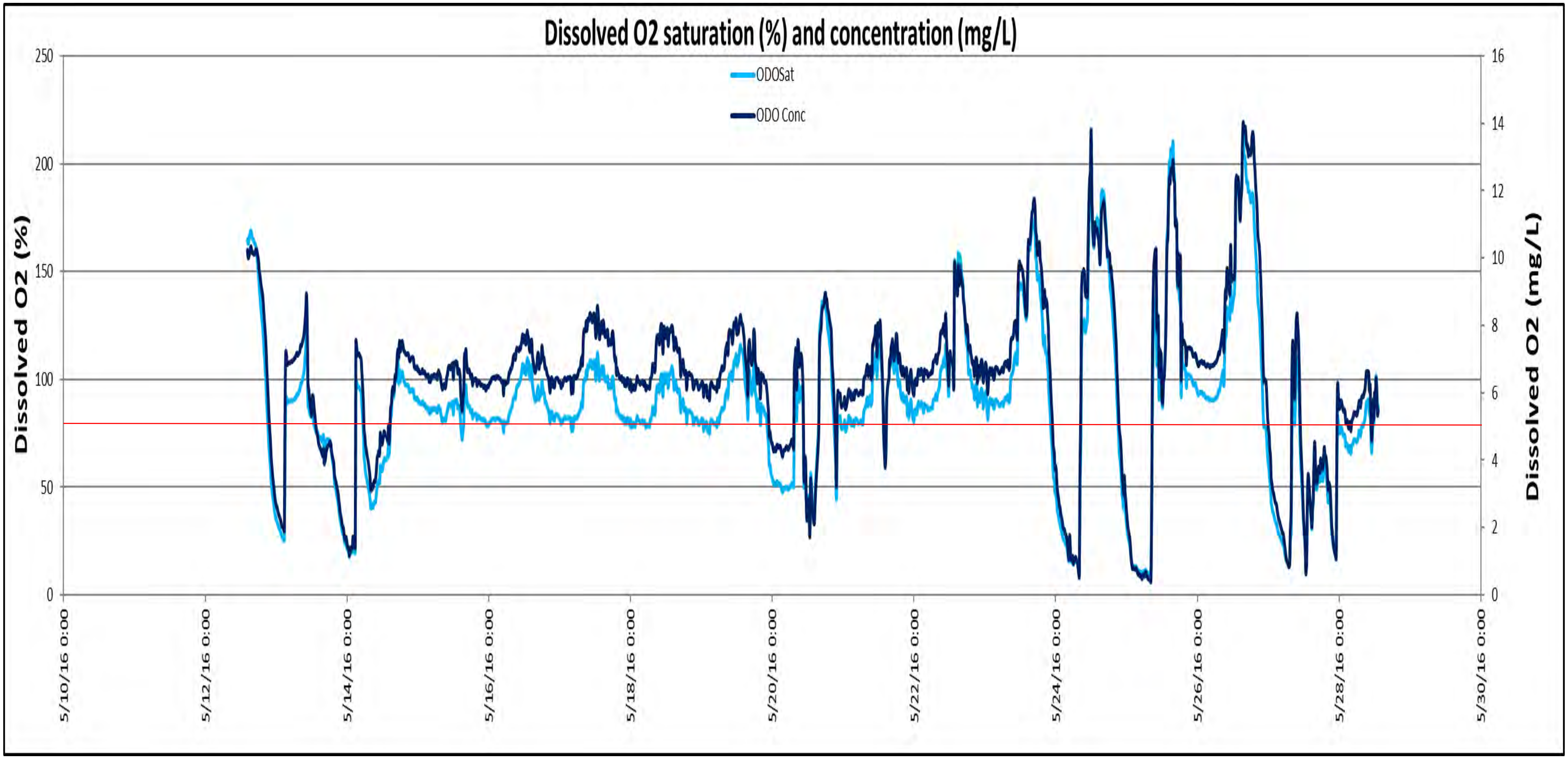
AU_NAME	*MLOC_ID*	*MLOC_NAME*	*SE_START_DATE*	*TN calculated* (mg/L)*	*TP (mg/L)*
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2015-03-23 15:05:00	0.84	not available
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2015-04-22 08:30:00	1.03	0.055
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2015-05-13 10:45:00	0.93	not available
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2015-07-15 14:40:00	1.28	0.1
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2015-08-27 08:30:00	1.09	0.06
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2015-10-20 08:35:00	0.78	not available
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2016-05-04 11:48:00	0.96	0.045
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2016-06-02 08:11:00	0.58	0.048
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2016-07-13 08:52:00	0.92	0.081
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2016-08-16 12:34:00	1.18	0.113
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2016-09-14 08:30:00	0.79	0.083
Doggett Creek (Raton Creek to headwaters)	04Dogget002.3	Doggett Creek above Raton WWTP	2016-10-26 08:26:00	0.84	0.083
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2015-03-23 15:00:00	6.03	2.18
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2015-04-22 08:20:00	5.67	2.1
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2015-05-13 10:40:00	4.56	2.68
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2015-07-15 14:50:00	5.47	2.62
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2015-08-27 08:15:00	7.32	1.63
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2015-10-20 08:45:00	5.17	not available
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2016-05-04 23:59:00	5.06	1.66
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2016-06-02 08:19:00	5.00	4.36
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2016-07-13 08:55:00	4.59	3.59
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2016-08-16 13:02:00	7.96	3.73
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2016-09-14 08:35:00	5.33	1.96
Doggett Creek (Raton Creek to headwaters)	04Dogget002.2	Doggett Creek below Raton WWTP	2016-10-26 08:33:00	5.25	1.6

* "TN calculated" is Nitrate (NO3) + Nitrite (NO2) + Total Kjeldahl Nitrogen

NMED EXHIBIT 28

DISSOLVED OXYGEN DATA DOGGETT CREEK BELOW THE RATON WWTP: May 12-28, 2016

Parameter	DO Sat %	DO Conc (mg/L)	Max 24hr ΔDO (mg/L)
Average	88.3	6.41	
Maximum	213.3	14.03	13.41
Minimum	8.8	0.39	



Streamflow Data
Doggett Creek

Assessment Unit ID	NM-2305.A_255
Name of Tributary	Doggett Creek (Raton Creek to headwaters)
Source Extracted From	Surface Water Quality Bureau

Date	Monitoring Location ID	Monitoring Location Name	Flow (cfs)
2015-03-23 15:00:00.0	04Dogget002.2	Doggett Creek below Raton WWTP	1
2015-03-23 15:05:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	0.1
2015-04-22 08:20:00.0	04Dogget002.2	Doggett Creek below Raton WWTP	1.5
2015-04-22 08:30:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	0.1
2015-05-13 10:40:00.0	04Dogget002.2	Doggett Creek below Raton WWTP	0.5
2015-05-13 10:45:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	0.1
2015-07-15 14:40:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	<1
2015-07-15 14:50:00.0	04Dogget002.2	Doggett Creek below Raton WWTP	1
2015-08-27 08:30:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	0.25
2016-05-04 11:48:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	<1
2016-05-04 23:59:00.0	04Dogget002.2	Doggett Creek below Raton WWTP	<1
2016-07-13 08:52:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	0
2016-07-13 08:55:00.0	04Dogget002.2	Doggett Creek below Raton WWTP	0.75
2016-08-16 12:34:00.0	04Dogget002.3	Doggett Creek above Raton WWTP	0.05

* Extracted from SQUID on 01.27.2020 by JTF RiverData_01-27-20_09_27_41

United States Environmental Protection Agency

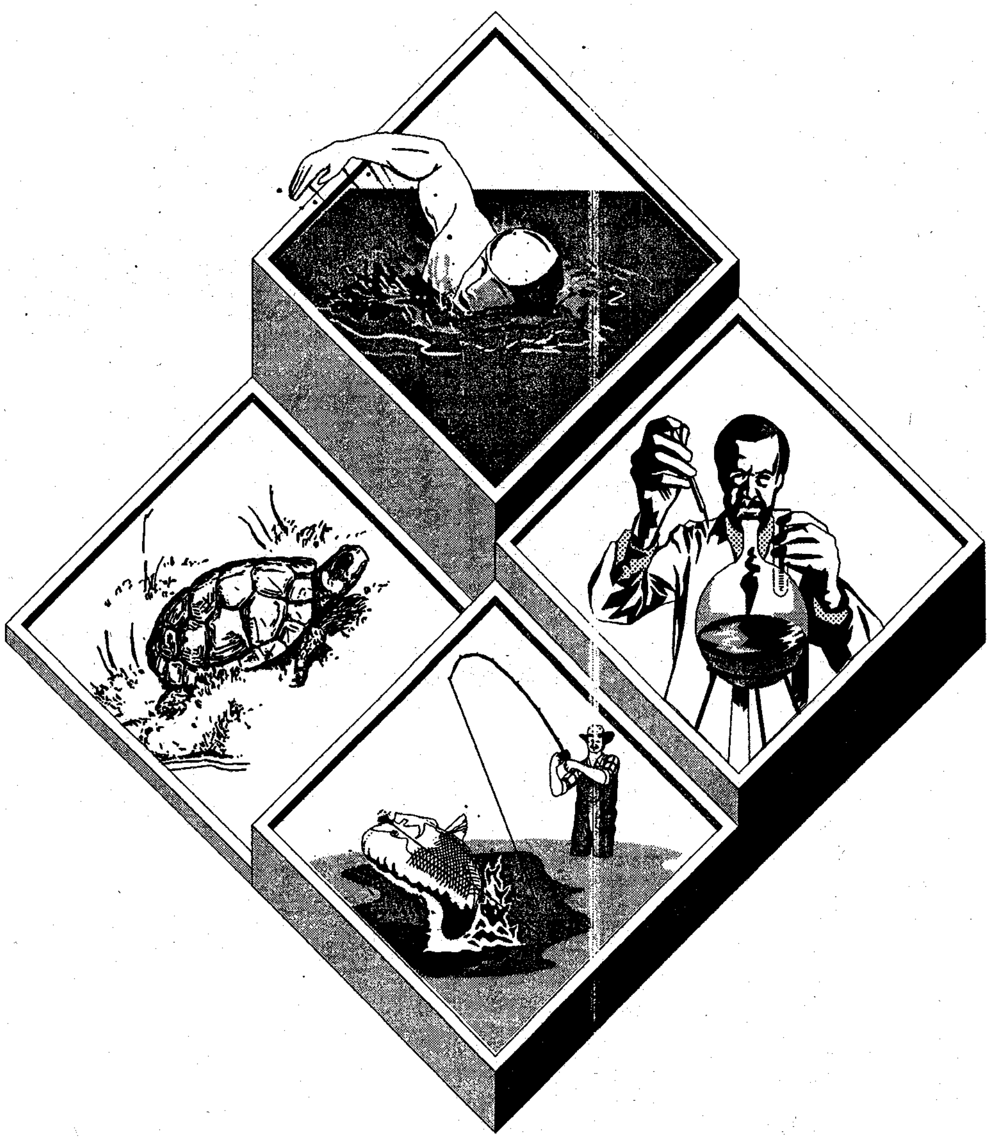
Office of Water (4303)

EPA-823-B-95-002
March 1995

EPA

Interim Economic Guidance for Water Quality Standards

Workbook



"... to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

Section 101(a) of the Clean Water Act

NMED EXHIBIT 31

Appendix M to the
Water Quality Standards Handbook - Second Edition

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 27 1995

EPA-823-B-95-002

OFFICE OF WATER

MEMORANDUM

SUBJECT: Economic Guidance for Water Quality Standards--Workbook

FROM: Tudor T. Davies, Director
Office of Science and Technology

TO: Water Management Division Directors
Regions I - X

PURPOSE

The purpose of this memorandum is to transmit the Interim Economic Guidance for Water Quality Standards Workbook for use by the States and Regions in considering economics at various points in the process of setting or revising water quality standards.

POLICY IMPLEMENTATION:

We recommend the subject guidance, including the various screening levels and measures presented, be implemented as reference points and used as guides by the States and Regions. The measures outlined in the guidance are not intended to be applied as absolute decision points. States may use other economically defensible approaches in lieu of those suggested in this interim guidance.

This guidance is designed for use in the water quality standards program and does not represent Agency guidance outside of that program.

BACKGROUND:

Economic factors may be considered at several different points in the water quality standards program. The water quality standards regulation provides for such consideration in the following areas:

Section 131.10--Designation of Uses (also applies to variances)

(g)(6) Controls more stringent than those required by Sections 301(b) and 306 of this Act would result in substantial and widespread economic and social impact.

Section 131.12--Antidegradation

(a)(2)...allowing lower water quality is necessary to accommodate important economic or social development in the areas in which the waters are located...

Since publication of the water quality standards regulation in 1983 we have produced extensive guidance on the interpretation and application of the various regulatory requirements. None of this guidance, however, dealt extensively with the economic considerations.

This guidance workbook is intended to fill that gap. It is anticipated that the guidance will be revised from time to time to reflect State and Regional experience in its application. For example we intend to add case studies as appendices to the guidance to reflect real-world experiences in its application. In addition, the Agency is considering revising the water quality regulation. If revisions to the regulation are made with respect to economic considerations, the applicable guidance will be revised accordingly. However, it is likely to be at least 3 years before any revisions to the regulation are finally promulgated and no way of anticipating whether any changes will be made in the economic provisions.

This guidance is presented to assist States and EPA Regional Offices, along with other interested parties, in understanding the economic factors that may be considered, and the types of tests that can be used to determine: (1) if a designated use cannot be attained, (2) if a variance to an individual discharger can be granted, or (3) if degradation of high-quality water is warranted.

The regulatory requirement that must be met is that attaining a designated use or obtaining a variance would result in substantial and widespread economic and social impacts. The regulatory requirement for antidegradation is that it must be shown that lower water quality is necessary to accommodate important social and economic development. This guidance provides a framework for making these determinations.

The measures and tests suggested in this guidance are standard economic analytical tools, but the States are free to provide other kinds of analysis to support their position. The guidance does provide information on the kinds and types of analysis that are appropriate and how the information can be assembled in order to make a decision. It is not an exhaustive description of all appropriate economic analysis. Additional information and tests may be necessary and/or desirable in certain circumstances.

The economic impacts to be considered are those that result from treatment beyond that required by technology-based regulations. All economic analyses of water quality standards should address only the cost of improving the water to meet water quality standards or the cost of maintaining water quality in high-quality waters.

Although EPA is responsible for approving a State's water quality standards, the State is responsible for interpreting the circumstances of each case and determining where there are substantial and widespread economic and social impacts, or where important economic and social development would be inappropriately precluded.

Various drafts of this guidance were reviewed by EPA headquarters and regional offices, States, and other organizations. State and Regional staff should feel free to contact the Economic and Statistical Analysis Branch in the Office of Science and Technology for advice and assistance regarding this guidance or related concerns. We would appreciate receiving feedback from the users of this guidance so that it can be improved as necessary. As with all guidance related to the water quality standards program, this document is considered to be part of the Water Quality Standards Handbook--Second Edition.

cc: Lee Schroer , OGC
Jim Pendergast, OWM
John Meagher, OWOW
William Painter, OPPE
Regional WQS Coordinators, Regions I - X

INTERIM ECONOMIC GUIDANCE FOR WATER QUALITY STANDARDS

WORKBOOK

Economics and Statistical Analysis Branch

Office of Science and Technology

Office of Water

U.S. Environmental Protection Agency

March 1995

NMED EXHIBIT 31

ECONOMIC GUIDANCE FOR WATER QUALITY STANDARDS WORKBOOK
TABLE OF CONTENTS

NMED EXHIBIT 31

ECONOMIC GUIDANCE FOR WATER QUALITY STANDARDS

WORKBOOK

1. INTRODUCTION

As presented in the Water Quality Standards Regulation, economic factors are taken into consideration at various points in the process of setting, enforcing, or changing Water Quality Standards This guidance is presented to assist States and applicants in understanding the economic factors that may be considered, and the types of tests that can be used to determine if a designated use cannot be attained, if a variance can be granted, or if degradation of high-quality water is warranted. In order to remove a designated use or obtain a variance, the State or discharger must demonstrate that attaining the designated use would result in substantial and widespread economic and social impacts. Likewise, if a degradation in high-quality water is proposed, it must be shown that lower water quality is necessary to accommodate important social and economic development.

This workbook provides guidance for those seeking to remove a designated use (such as might occur under a Use Attainability), or obtain a variance based on economic considerations, or to lower water quality in a high-quality water. In addition, it provides guidance to States and EPA regions responsible for reviewing requests for variances and modifications to designated uses, and for approval of antidegradation analyses. The guidance describes the types of information and analyses that should be considered by applicants and reviewers. The guidance, however, is not an exhaustive description of appropriate economic impact analyses. Additional information and tests may be necessary and/or desirable in certain circumstances.

The economic impacts considered are those that result from treatment beyond that required by technology-based regulations. Since water quality cannot be lower than that resulting from technology-based limits applied to direct and indirect point source discharges and reasonable Best Management Practices (BMP) applied to nonpoint sources, these are considered to be the baseline. All economic impact analyses of water quality standards should, therefore, address only the cost of improving the water to meet water quality standards or the cost of maintaining water quality in high-quality waters.

Although EPA is responsible for approving a State's water quality standards, the State is responsible for interpreting the circumstances of each case and determining where there are substantial and widespread economic and social impacts, or where important social and economic development would be inappropriately precluded. Each analysis of economic impacts must demonstrate:

- that the polluting entity, whether privately or publicly owned, would face substantial financial impacts due to the costs of the necessary pollution controls (substantial impacts or would interfere with development), and

- that the affected community will bear significant adverse impacts if the entity is required to meet existing or proposed water quality standards (widespread impacts or important development).

This Workbook supplements the description contained in the *Water Quality Standards Handbook*, which should be read first as it contains many important definitions and descriptions of the regulations. Specific attention should be paid to Chapters 2 (Designation of Use) and 4 (Antidegradation), which describe the context in which this guidance is to be used. This Workbook is designed as a series of worksheets and accompanying guidance to be used when actually calculating the impacts of pollution control.

The intent of this workbook is to point States and dischargers in the right direction. It does not give definitive answers as to whether or not an entity has demonstrated substantial, widespread, or important economic and social impacts. If a State or discharger has difficulty with any part of the analysis presented in this workbook, they should consider seeking the assistance of a financial expert. In addition, State and regional EPA water quality staff should feel free to contact EPA headquarters' Economic and Statistical Analysis Branch in the Office of Water for advice and assistance.

The remaining sections of Chapter 1 provide an overview of the analysis and describe various factors and concepts that generally apply to analyzing the economic impacts of compliance with water quality standards. The following four chapters provide detailed guidance.

Throughout this Workbook, the term "financial impacts" refers to impacts on the entity or party that will pay for the pollution control, whereas the term "socioeconomic impacts" refers to changes in the social and/or economic conditions of the affected community. For public-sector entities, such as a publicly owned treatment works (POTW), substantial impacts include financial impacts on the community, taking into consideration current socioeconomic conditions. Widespread, on the other hand, refers to changes in the community's socioeconomic conditions. By contrast, for private-sector entities, substantial impacts refer to financial impacts and widespread impacts refer to socioeconomic impacts on the surrounding community. In addition, the term "applicant" refers to whomever will actually complete the economic impact analysis, whether it be the State, an individual discharger, a consultant, or some other organization.

1.1 Designated Uses, Variances, and Antidegradation

Pursuant to the Water Quality Standards Regulation (40 CFR 131), States must define statewide water quality goals by: 1) designating water uses and 2) adopting water quality criteria that protect the designated uses. When designating uses, States must consider the use and value of the waterbody for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. The designated use may or may not coincide with the existing use, but it cannot reflect lower water quality than the existing use. As described in the *Water Quality Standards Handbook*, if the designated use of a water body is also an existing use, the designated use cannot be downgraded to one that requires less stringent water quality criteria. If, however, the designated use is not an existing use the States may, under certain circumstances, remove the designated use, create new subcategories of the use, or grant a water quality standard.

Before a designated use is removed a State or a discharger must conduct and submit a use attainability analysis to EPA. Briefly, a use attainability analysis is an assessment of the physical, chemical, biological and, if necessary, economic factors affecting the attainment of a use. If the analysis shows that, based on any one of these factors, conditions exist which make the use unsuitable or impossible to achieve, then the State may remove the designated use.

In many cases, a designated but unattained use for a stream segment need not be removed. Instead, individual dischargers may be granted variances from the water quality standards for a limited time with the expectation that they will be able to comply with water quality standards by the time their variance expires. A variance is preferable to a removal of a designated use since other dischargers, who are capable of meeting the standards, must comply with the standards through their permits. In cases where a discharger can meet water quality based permit limits for some parameters, a variance would not be granted for those parameters. The variance procedure is designed to encourage compliance with the Clean Water Act within a reasonable timeframe.

States are also required to adopt an antidegradation policy to protect existing uses, high-quality waters, and water quality in waters that are considered to be outstanding national resources. The antidegradation policy allows States to lower water quality in higher-quality waters only if it is necessary to accommodate important economic or social development. The use of the term "important" communicates a general sense of the level of economic and social development. This provision is intended to permit degradation of high-quality water bodies in only a few extraordinary cases where the benefits of the economic or social development unquestionably outweigh the costs of lowering water quality. Under no circumstances, however, may water quality fall below that required to protect existing or designated uses.

For each of the circumstances described above, the Water Quality Standards Regulation allows the applicant to take economic considerations into account. When applying for a change in a designated use or for a variance, the applicant must demonstrate that meeting water quality standards will cause substantial and widespread economic and social impacts. The antidegradation provision requires that the applicant demonstrate that important economic or social development would be prevented unless lower water quality is allowed. In all three cases, the same general tests of impacts are used.

1.2 Pollution Sources

The choice of methods used to evaluate the economic impacts of meeting water quality standards depend, in part, on whether pollution control is the responsibility of a privately or a publicly owned entity. Since the polluting entity or party may not be the one to pay for reductions, the analyses focus on the party that pays for pollution control. Some of the more common privately owned entities include, but are not limited to: manufacturing facilities, agricultural operations, shopping centers and other commercial development, residential developments, and recreational developments. Publicly owned entities include: publicly owned sewage treatment works, roads, and other municipal infrastructure.

In an economic impact analysis, the distinction between private-sector and public-sector entities is important as it determines not only who will pay for the necessary pollution control, but also the types of funding mechanisms available. For example, in the case of a privately-owned entity, the facility can raise the money through loans and equity funds but may try to pass some or all of the cost on to the consumer in the form of higher prices. In the case of a publicly-owned entity, the community can float bonds to pay for the capital costs, with the cost of the bonds and operating expenses covered by user fees and/or tax revenues. The different impact measures are addressed in two separate chapters. Chapter Two provides guidance on public-sector entities and Chapter Three provides guidance on private-sector entities.

Whether publicly or privately owned, polluting entities can be point (direct discharge) or nonpoint (runoff and erosion) sources of pollution. Attainment of water quality standards is not limited to controls placed on point sources. Water quality standards are applicable to nonpoint sources of pollution despite the fact that there may be no direct implementation mechanisms for nonpoint sources. Although pollution control approaches used by nonpoint sources may differ substantially from approaches typically employed by point sources, analysis of the ensuing economic impacts still depends upon whether the entity providing the pollution control is privately or publicly owned.

1.3 Substantial Impacts

A financial analysis of the discharger should be conducted to determine if the capital and the operating and maintenance costs of pollution control will have a substantial impact. This analysis is typically performed by the discharger and reviewed by the State, although there may be cases where the State or some other group completes the analysis on behalf of the discharger. The first step is to estimate the capital and the operation and maintenance costs of the necessary pollution control (see Figure 1-1). The second step is to determine how the entity will finance the necessary reductions. If the entity is publicly-owned (e.g. a municipal sewage treatment plant), the households in the community will bear the cost either through an increase in user fees, an increase in taxes or a combination of both. The burden to households resulting from total annual pollution control costs must be estimated. In addition, the financial impact analysis must consider the community's ability to obtain financing and the general economic health of the community.

If the entity is privately-owned (e.g. a manufacturing facility), the analysis should consider factors such as the entity's ability to secure financing and the degree to which it will be able to pass the cost of pollution control on to its customers in the form of higher prices. The financial impact analysis of private-sector entities employs a variety of financial ratios and tests. Some of these ratios and tests include benchmark values to help in the analysis.

Demonstration of substantial financial impacts is not sufficient reason to modify a use or grant a variance from water quality standards. Rather, the applicant must also demonstrate that compliance would create widespread socioeconomic impacts on the affected community.

1.4 Widespread Impacts

States and dischargers will need to consider the possibility that financial impacts could cause far reaching and serious impacts to the community. An important factor in determining the magnitude of these impacts is defining the geographical area affected. The affected area might be a town, city, region, county or some combination of these geographical units.

Equally important are the *types* of impacts that might occur. There are no economic ratios or tests per se to evaluate socioeconomic impacts. Instead, the relative magnitude of a group of indicators should be taken into account. For public-sector entities, the applicant will need to estimate the change in socioeconomic conditions that would occur as a result of compliance. Of particular importance are changes in factors such as median household income, unemployment, and overall net debt as a percent of full market value of taxable property. For private-sector entities, the assessment of widespread impacts should consider many of the same socioeconomic conditions. The analysis should also consider the effect of decreased tax revenues if the private-sector entity were to go out of business, income losses to the community if workers lose their jobs, and indirect effects on other businesses.

In some instances, several entities potentially may suffer substantial impacts. For example, this situation can arise where several facilities are discharging to a stream segment that is being considered for a change in designated use. While a separate financial analysis should be performed for each facility, the impacts on all the facilities should be considered jointly in the analysis of widespread impacts.

1.5 Antidegradation

As with removing a use or granting a variance, eco-nomic impacts are considered as part of an antidegradation review. While the terminology is different, the tests are basically the same. In the first case (discussed in Chapters 2, 3, and 4), a finding of substantial and widespread economic impacts can be the basis for granting a variance or changing a designated use. In the case of antidegradation, the analysis must show that maintaining "high-quality waters" will preclude important economic and social development. As such, the two cases can be thought of as two sides of the same coin. Variances and downgrades refer to situations where additional treatment to meet standards may result in declining economic and social conditions, while antidegradation refers to situations where lowering water quality may result in improved social and economic conditions.

When performing an antidegradation analysis, the first question is whether the costs of the pollution controls needed to maintain the high-quality water will interfere with the development. If not, then lower water quality is not "necessary" for the development to take place. If, on the other hand, the costs will interfere with the development and lower water quality is "necessary" for the development to take place, then the analysis must show that the development would be an important economic and social development. These two steps rely on the same test as the determination of substantial and widespread economic and social impacts.

1.6 Organization of the Rest of the Workbook

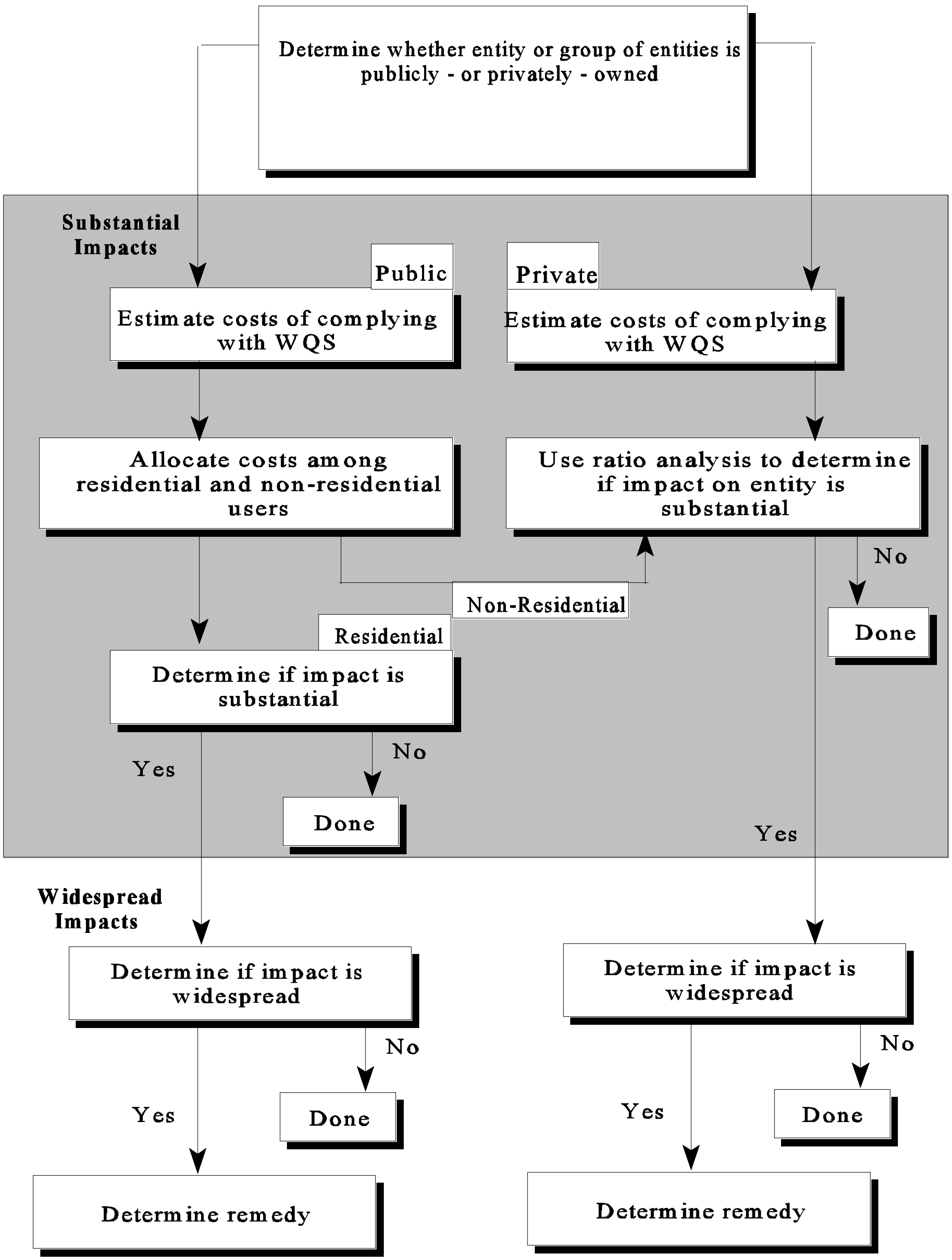
The remainder of this Workbook addresses the measurement of economic impacts. In Chapter 2, guidance is presented to assist applicants in evaluating financial impacts on public-sector entities. Chapter 3 presents guidance on evaluating financial impacts on private-sector entities. Chapter 4 provides a discussion of how to assess whether impacts are widespread as well as substantial. This discussion includes both public-sector and private-sector entities. Chapter 5 applies the concepts developed in Chapters 2, 3, and 4 to antidegradation.

Worksheets are included in each chapter that will assist the reader in calculating potential impacts. Chapters 2 and 3 include worksheets for: 1) estimation of annualized costs of pollution control, and 2) evaluation of the financial burden of pollution control. Chapter 4 includes worksheets that can be used in the evaluation of whether the impacts on the entity(ies) will result in widespread economic and social impacts. Chapter 5 includes worksheets for determining if important social and economic development might be lost.

In addition to presenting step by step guidance on how to estimate impacts, several of the worksheets provide benchmark comparisons that allow an assessment of the magnitude and relative importance of potential impacts. These worksheets, however, should not be used in isolation. Discussion of key sources of information, important entity and community attributes, and interpretation of results are found only in the accompanying text. Applicants, and State Water Quality staff charged with reviewing the application, should be sure to read all text accompanying the worksheets. While Chapter 2 addresses public-sector treatment requirements, if a substantial portion of the costs of a public facility is borne by a private entity (such as a manufacturing facility that pays substantial user charge fees to a POTW), both Chapters 2 and 3 should be referred to.

In all cases, the determination of economic and social impacts must be made on a case by case basis. This determination, therefore, requires the application of good judgement as well as use of the guidance provided in this workbook. Additional information and tests may be required in order to measure the size and extent of the impacts. Applicants should be aware that they will be required to supply documentation to substantiate their claim of substantial and widespread economic and social impacts. In addition to background data, however, this documentation should include a brief written description of why the applicant believes economic and social impacts will occur.

Figure 1-1:
Steps in the Economic Impact Analysis
Determining Whether Impacts Will be Substantial and Widespread



2. EVALUATING SUBSTANTIAL IMPACTS: PUBLIC SECTOR ENTITIES

Public entities seeking relief from meeting water quality standard requirements must demonstrate that the cost of required water pollution control will result in substantial impacts and that there will be "widespread" adverse social and economic impacts if they are required to meet these standards. For the purposes of this workbook, a public entity refers to any governmental unit that must comply with pollution control requirements in order to meet water quality standards. The most common example is a municipality or sewage authority operating a publicly owned treatment works (POTW) that must be upgraded or expanded. Municipalities, however, may also be required to control other point sources or nonpoint sources of pollution within their jurisdiction. The procedures outlined in this chapter apply to all types of publicly financed projects that may be required to meet water quality standards. Throughout this chapter, the term "State/discharger" refers to whoever will actually conduct the financial and socioeconomic impact analysis for the public entity, whether it be the State, the municipality, a consultant or some other organization.

The remainder of this chapter details methodologies and sources of information for determining the financial viability of publicly financed projects. Several worksheets are presented that will assist in demonstrating substantial impacts. States/dischargers are referred to Chapter 4 for guidance on demonstrating widespread impacts. Readers should keep in mind that the guidance in this chapter is not meant to be exhaustive. The State and/or EPA may require additional information or tests in order to evaluate whether substantial and widespread impacts will occur. In addition, the State/discharger should feel free to include any additional information they think is relevant.

As mentioned in Chapter 1, the evaluation of substantial impacts resulting from public entity compliance with water quality standards includes two elements, 1) financial impacts to the public entity and 2) current socioeconomic conditions of the community. Governments have the authority to levy taxes and distribute pollution control costs among households and businesses according to the tax base. Similarly, sewage authorities charge for services, and thus can recover pollution control costs through users fees. In both cases, a substantial impact will usually affect the wider community. Whether or not the community faces substantial impacts depends on both the cost of the pollution control and the general financial and economic health of the community.

If the public entity passes a significant portion of the pollution control costs along to private facilities or firms, then the review procedures outlined in Chapter 3 of this workbook should also be consulted to determine the impact on the private entities. Both public and private entities should consult Chapter 4 for guidance on how to estimate potential widespread impacts on the community.

This chapter focuses on ways to determine if the costs of the proposed project will likely result in substantial impacts. To make this determination the State/discharger will need to complete a five step analysis. As shown in Figure 2-1 the first step in the process is to estimate the cost of the pollution control project and calculate the annual cost of the proposed pollution control project. The second step is to calculate the total annual pollution control cost per household, which includes the cost of the project and existing pollution control costs. In the third step, the Municipal Preliminary Screener is calculated, which quickly identifies entities that clearly will not experience substantial impacts due to the cost of the necessary pollution control. If it is not clear whether there will be substantial impacts, entities should proceed to the fourth step, which is the calculation of the Secondary Test. In this step public entities will need to provide financial and socioeconomic information. For example, the ability of the community to finance the project may depend on existing financial conditions in the community such as debt per capita and the community's bond rating. The socioeconomic health of the community prior to the project's construction will also be an important indicator of whether the pollution control would impose a substantial impact on the community. The fifth and final step of determining whether impacts are "substantial" is evaluating where the community falls in the impacts matrix. This matrix takes into consideration the Municipal Preliminary Screener and the Secondary Test score. Later, in Chapter 4, estimated changes in socioeconomic health indicators will be reviewed to evaluate the extent to which the impacts can be considered widespread.

The remainder of this chapter is divided into five sections that detail the essential steps of an evaluation of substantial impacts for publicly financed projects. Figure 2-1 illustrates the steps and decision points in this process. The five steps are:

- **Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project** - This section discusses factors that should be considered when selecting a pollution control project. It also describes the type of general information about the proposed project that should be provided. In addition, it discusses how to annualize capital costs of the project and calculate total annual costs of the pollution control project.

- **Calculate Total Annualized Pollution Control Costs Per Household** - This section outlines the calculation of total annual pollution control costs per household. The costs of the proposed project and existing pollution control are included.

- **Calculate and Evaluate the Municipal Preliminary Screener Score** - This section explains the "screener" which identifies only those communities that clearly will not face any substantial impacts.

- **Apply the Secondary Test** - This measurement incorporates a characterization of the community's current financial and socioeconomic well-being.

- **Assess where the community falls in The Substantial Impacts Matrix** - This matrix evaluates whether or not communities are expected to incur substantial economic impacts due to the implementation of the pollution control costs. If the applicant cannot demonstrate substantial impacts, then they will be required to meet existing water quality standards. If impacts are expected to be substantial, then the applicant goes on to demonstrate whether they are also expected to be widespread.

2.1 Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project.

Before the impact analysis can be performed, the project costs should be verified and then annual costs calculated.

2.1.a Verify Project Costs

The first step of an economic analysis of a publicly financed project is an evaluation of the proposed project. Public entities should consider a broad range of discharge management options including pollution prevention, end-of-pipe treatment, and upgrades or additions to existing treatment. Specific types of pollution prevention activities that should be considered are:

- Public Education;
- Change in Raw Materials;
- Substitution of Process Chemicals;
- Change in Process;
- Water Recycling and Reuse; and
- Pretreatment Requirements.

Many of these approaches are particularly relevant to industrial indirect discharges to the public system. Whatever the approach, the applicant must demonstrate that the proposed project is the most appropriate means of meeting water quality standards and must document project cost estimates. If at least one of the treatment alternatives that meets water quality standards will not have a substantial financial impact, then the community should not proceed with the analysis presented in the rest of this workbook. General information regarding the proposed pollution control project and other projects considered should be supplied in **Worksheet A**.

The most cost-effective approach to meeting water quality standards should be considered. Submissions should include assumptions about excess capacity, population growth, and consideration of alternative technologies where appropriate. The most accurate estimate of project costs may be available from the discharger's design engineers. If site-specific engineering cost estimates are not available, preliminary project cost estimates can be derived from a comparable project in the State or from the judgement of experienced water pollution control engineers. (See Appendix A for sources of engineering cost information.) Capital, operation and maintenance (O&M), and other project costs can be summarized using **Worksheet B**. For comparative purposes, cost estimates (e.g. capital, O&M, other project costs) for each alternative being considered should be presented in the same units (typically annualized costs, $/yr) and for the same year. The next section explains how to annualize project costs.

For illustrative purposes, the example of a local government upgrading their existing wastewater treatment facility in order to meet water quality standards is used throughout this chapter. Details of this example may differ significantly from other projects undertaken to meet water quality objectives. Other types of public-sector water pollution control, however, would be analyzed in a similar fashion using the worksheets included in this chapter.

2.1.b Calculate the Annual Costs of the Pollution Control Project

Since capital costs typically will be paid over several years, annualized costs are used in the evaluation of economic burden to the community. The capital portion of project costs is typically financed over approximately 20 years, by issuing a municipal debt instrument such as a general obligation bond or a revenue bond. Local governments may also finance capital costs using bank loans, state infrastructure loans (revolving funds), or federally subsidized loans (such as those offered by the Farmers' Home Administration).

It should be noted that interest rates used to annualize costs are dependent on the type of debt instrument used as well as the recipient's credit standing. For example, revenue bonds typically are financed at a slightly higher interest rate because of their dependence on revenues from services as opposed to being guaranteed by the full faith and credit of the jurisdiction. Because interest rates affect the interest payment and thus the annualized capital cost of the project, it is important that the interest rate used on **Worksheet B** reflects the debt instrument (i.e. municipal bond, commercial bank loan, state revolving fund loan, or other instrument) likely to be used by the municipality.

The calculation of total annualized cost of the project is presented in **Worksheet B**. First, capital costs are summed and the portion of costs to be paid for with grant monies are deducted, as these costs will not need to be financed. Next, the annualization factor is calculated using the formula supplied on **Worksheet B**, or the annualization factor is found in Appendix B. Annualized capital cost is then calculated by multiplying the total capital costs to be financed by the annualization factor.

Next, annual operating and maintenance costs are summed, and the total is added to the annualized capital cost. These costs should include the costs of monitoring, inspection, permitting fees, waste disposal charges, repair, administration, replacement, and any other recurring costs. All recurring costs should be stated in terms of dollars per year. The sum of the annualized capital cost and total annual operating and maintenance costs is the total annual cost of the project. In the next section, the annualized costs paid by households in the community are calculated.

2.2 Calculate Total Annualized Pollution Control Costs Per Household

In order to assess the burden that total pollution control costs are expected to have on households, an average annualized pollution control cost per household should be calculated for all households in the community that would bear project costs. In order to evaluate substantial impacts, therefore, the analysis must establish which households will actually pay for pollution control as well as what proportion of the costs will be borne by households. These apportioned project costs are then added to existing pollution control costs paid by households.

It is important to first define the affected community. The "community" is the governmental jurisdiction responsible for paying compliance costs. In practice, pollution control projects may serve several communities or just portions of a community. In the case of a sewage agency serving several communities, once project costs are allocated to each community served, the economic analysis is conducted on a community by community basis. In the case of a community in which only a portion of the community is served, the affected community is defined as those who will pay the compliance costs. In such cases, it may be difficult to obtain socioeconomic data for just part of the community and data for the entire community may be used instead. The area that is affected may not be the same as the area that is paying, therefore it may be appropriate to evaluate widespread impacts, described in Chapter 4, over a community that is defined differently than the paying community.

If project costs were estimated for some prior year, these costs should be adjusted upward to reflect current year prices using the average annual national Consumer Price Index (CPI) inflation rate for the period. The CPI inflation rate is available from the Bureau of Labor Statistics. An additional source reporting the CPI inflation rate is the *CPI Detailed Report*, which is published monthly by the U.S. Department of Labor, Bureau of Labor Statistics.

The ratio of the current CPI to the CPI for the year of the cost estimates indicates how much costs have increased over the period. This ratio can be applied to the cost estimates to "bring them up to current year costs." Likewise, there are engineering cost indices that can be used for this purpose.

If project costs are not distributed simply according to wastewater flow or tax revenues, then consideration should be given to separately analyzing the impacts on users who pay a disproportionate share of the costs. This situation can arise, for example, where industrial dischargers to a sewer system are assessed pollutant surcharges to pay for their share of the cost of advanced treatment necessitated by the presence of their pollutants. Remaining costs would then be split among households according to wastewater flow or tax revenues, whichever is appropriate. The total amount of the pollution control project to be recouped by surcharges should, therefore, be removed from the total project cost before costs are allocated according to wastewater flow or tax revenues.

In calculating the total annual cost of pollution control per household, current costs of pollution control must be considered along with the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from the most recent municipal records. For example, it can be found in the sewer enterprise fund accounts for communities that maintain a separate enterprise fund. It is not necessary, in such cases, to sum all the cost components. Instead, use the most recent operating revenues, divided by the number of households served. In cases where the community does not maintain a separate enterprise fund for sewers, the cost elements can be summed from the consolidated statement for the community. If the portion of proposed project costs that households are expected to pay is known or is expected to remain unchanged, then use **Worksheet C** to calculate the total annual cost of pollution control per household. If the portion paid by households is based on flow, then should refer to **Worksheet C: Option A** as well.

The cost per household as a percent of median household income is used in Section 2.3 as a screener to quickly identify those communities that clearly will not face substantial impacts due to pollution control. For guidance in estimating impacts on non-household users (e.g., industrial, commercial), refer to Chapter 3.

2.3 Calculate and Evaluate The Municipal Preliminary Screener Value

Whether or not the community is expected to incur "substantial" economic impacts due to the pollution control project is determined by jointly considering the results of two tests. The first test is a "screener" to establish whether the community can clearly pay for the project without incurring any substantial impacts. The Municipal Preliminary Screener estimates the total annual pollution control costs per household (existing costs plus those attributable to the proposed project) as a percentage of median household income. The screener is written as follows:

$$\text{Municipal Preliminary Screener} = \frac{\text{Average Total Pollution Control Cost per Household}}{\text{Median Household Income}}$$

Median household income information for many municipalities is available from the 1990 Census of Population. If median household income is not available for the current year, it should be estimated for the current year by using the CPI inflation rate for the period between the year that median household income is available and the current year. To calculate the inflation rate over the relevant period, use the "percent change from the previous annual average" (annual inflation rate) presented in the *CPI Detailed Report*. For example, if the current year is 1993, 1990 is the most recent year that median household income is available, and the percentage changes for the 1990, 1991, and 1992 annual averages respectively are: 5.2, 4.1 and 2.9, the adjustment factor equals:

Adjustment Factor = 1.052 * 1.041 * 1.029 = 1.13

Adjusted Median Household Income =
Median Household Income * Adjustment Factor

Depending on the results of the screener, the community is expected to incur little, mid-range, or large economic impacts due to the proposed project (see **Worksheet D**). If the total annual cost per household (existing annual cost per household plus the incremental cost related to the proposed project) is less than 1.0 percent of median household income, it is assumed that the project is not expected to impose a substantial economic hardship on households. The screener is therefore set at 1.0 percent of median household income. Communities with screener results of less than 1.0 but still fairly close to 1.0, however, may still want to proceed to the Secondary Test.

Communities are expected to incur mid-range impacts when the ratio of total annual compliance costs to median household income is between 1.0 and 2.0 percent. If the average annual cost per household exceeds 2.0 percent of median household income, then the project may place an unreasonable financial burden on many of the households within the community. In either case, communities move on to the Secondary affordability Test to demonstrate substantial impacts. For example, assume that Community XYZ has a screener of 2.3 percent. Although it appears that the community faces large impacts, substantial impacts have not necessarily been demonstrated and the community must proceed to the next step and apply the Secondary Test. Dischargers with screener values well below 1.0 percent are assumed to be able to pay for pollution control without incurring any substantial economic impacts and are required to meet existing water quality standards. They do not need to proceed to the Secondary Test (see Figure 2-1).

2.4. Apply Secondary Test

The Secondary Test is designed to build upon the characterization of the financial burden identified in the Municipal Preliminary Screener. The Secondary Test indicates the community's ability to obtain financing and describes the socioeconomic health of the community. Indicators describe precompliance debt, socioeconomic, and financial management conditions in the community. Using these indicators and the scoring system described below, the impact of the cost of pollution control is estimated. Specifically, applicants are required to present the following six indicators for the community:

Debt Indicators

- Bond Rating (if available) - a measure of credit worthiness of the community;

- Overall Net Debt as a Percent of Full Market Value of Taxable Property - a measure of debt burden on residents within the community;

Socioeconomic Indicators

- Unemployment Rate - a measure of the general economic health of the community;

- Median Household Income - a measure of the wealth of the community;

Financial Management Indicators

- Property Tax Revenue as a Percent of Full Market Value of Taxable Property - a measure of the funding capacity available to support debt based on the wealth of the community; and

- Property Tax Collection Rate - a measure of how well the local government is administered.

A more detailed description of the six indicators, as well as alternative indicators for states with property tax limitations, are presented below. Table 2-1 summarizes the indicators and what is considered to be a strong, mid-range, or weak rating.

Debt Indicators

Bond Rating

Current ratings for the community summarize a bond rating agency's assessment of a community's credit capacity. The ratings generally reflect current financial conditions. If security enhancements like bond insurance have been used for the bond issue, however, the bond rating on a particular issue may be higher than local conditions justify. Only ratings for uninsured bonds, therefore, should be used.

Many small and medium sized communities have not used debt financing for projects and, as a result, have no bond rating. The absence of a bond rating does not indicate strong or weak financial health. When a bond rating is not available, this indicator should not be included in the analysis of substantial impacts. When available, the rating for the most recent general obligation bond should be used. If a general obligation bond has not been issued recently, the most recent rating for a sewer bond should be used. Recent bond ratings are included in municipal bond reports from rating agencies (e.g., *Moody's Bond Record, Standard and Poor's Corporation*).

Overall Net Debt as a Percent of Full Market Value of Taxable Property

Overall Net Debt is debt repaid by property taxes. It excludes debt that is repaid by special user fees (e.g. revenue debt). This indicator provides a measure of debt burden on residents within the community and measures the ability of local government jurisdictions to issue additional debt. It includes the debt issued directly by the local jurisdiction and debt of overlapping entities, such as school districts. It compares the level of debt owed by the community with the full market value of real property used to support that debt and serves as a measure of the community's wealth.

Debt information is available from the financial statement of each community. In most cases, recent financial statements are on file with the State (e.g., State Auditor's Office). Overlapping debt may or may not be provided in a community's financial statements. The property assessment data (assessment ratio) should be readily available through the community or the State Assessor's Office. The boundary of the affected community generally conforms to one or more community boundaries. Therefore, prorating community data to reflect specific service area boundaries is not normally necessary for evaluating the general financial capability of the affected community.

Socioeconomic Indicators

Unemployment Rate

The unemployment rate is defined as the percent of a community's labor force currently unemployed. If the unemployment rate in the service area is not available, the encompassing county's rate may be used as a substitute. The Bureau of Labor Statistics (BLS) maintains current unemployment rate figures for municipalities and counties. National unemployment data is also needed for comparison purposes. This information can be obtained from the BLS are available by request at (202) 606-6392. A community's unemployment rate is considered to be below the national average if it is more than 1% below the national average. Similarly, a community's unemployment rate is considered to be above the national average if it is more than 1% above the national unemployment rate. If the community's employment rate is equal to the national average unemployment rate, plus or minus 1%, then the community's unemployment rate is assessed as being equal to the national rate.

Median Household Income

Median household income (MHI) is defined as the median of the total income dollars received per household during a calendar year in a given area. It serves as an overall indicator of community spending capacity. Median household income, which was also used in the screener process, is available from the 1990 Census or through state data centers. The state value is also needed for comparison purposes. If a community's median household income is more than 10% below the state's median household income, then it is considered to be below the state's median. If a community's median household income is more than 10% above the state's median, then it is considered to be above the state median value. If, however, the community's median household income is equal to the state median, plus or minus 10%, then the community's median household income is assessed as being equal to the state's median household income.

Financial Management Indicators

Property Tax Revenues as a Percent of Full Market Value of Taxable Property

This indicator can be referred to as the "property tax burden" since it indicates the funding capacity to support new expenditures, based on the wealth of the community. Some states and local jurisdictions may have established legal limits on the amount of property taxes that can be levied as a percent of full market or assessed value of real property. Property assessment data should be readily available through the community or the State Assessor's Office. Property tax revenues are available in communities' annual financial statements.

Property Tax Revenue Collection Rate

This rate is an indicator of the efficiency of the tax collection system and a measure of how well the local government is administered. It compares the actual amount collected from property taxes to the amount levied. Property taxes levied can be computed by multiplying the assessed value of real property by the property tax rate, both of which are available from a community's financial statements or the State Assessor's Office.

Alternative Indicators for States with Property Tax Limitations

Two of the indicators may not be appropriate in states with statutory limits on property tax collections and/or rates, or where data on full-market value of taxable property are not available.

The first of these indicators -- The Overall Net Debt as Percent of Full Market Value of Taxable Property -- can be replaced with:

Overall Net Debt Per Capita

In calculating the Secondary Score, the following ratings for Overall Net Debt Per Capita should be used:

Greater than $3,000	=	weak	=	1
$1,000 - $3,000	=	mid-range	=	2
Less than $1,000	=	strong	=	3

The second of these indicators -- Property Tax Revenues as a Percent of Full-Market Value of Taxable Property -- has no appropriate substitute in cases where property taxes are at their limit or where full-market value of taxable property cannot be estimated. In such cases, this indicator should be dropped and the other five factors are assigned equal weights.

These six indicators are then used to form a composite assessment of the community's economic health and the financial impact of the required project. **Worksheet E** can be used to record each indicator. For each of the six indicators, the community is rated as weak, mid-range, or strong, based on the thresholds presented in Table 2-1. For example, if a community's median household income equals $15,000 and the state's median household income equals $17,000, the community would be considered weak on this measure. If, however, the community's median household income were $19,000, then the community would be considered strong on this measure.

Next, a Secondary Score is calculated for the community by weighting each indicator equally and assigning a value of 1 to each indicator judged to be weak, a 2 to each indicator judged to be mid-range, and a 3 to each strong indicator. A cumulative assessment score is arrived at by summing the individual scores and dividing by the number of factors used. **Worksheet F**,provided at the end of Section 2.4, guides the applicant through this calculation. The cumulative assessment score is evaluated as follows:

- less than 1.5 is considered weak

- between 1.5 and 2.5 is considered mid-range
- greater than 2.5 is considered strong

For example, consider a Community XYZ, which has:

- a weak ratio of overall net debt to full market value of taxable property = 1,
- a weak bond rating = 1,
- a mid-range unemployment rate = 2,
- a mid-range median household income = 2,
- a strong property tax collection rate = 3, and
- a strong ratio of property tax revenues to full market value of taxable property = 3.

$$[(1 + 1 + 2 + 2 + 3 + 3)/6] = 2$$

The Secondary Score for Community XYZ, equal to 2, falls into the mid-range category.

If the applicant is not able to develop one or more of the six indicators, they must provide an explanation as to why the indicator is not appropriate or not available. Since the point of the analysis is to measure the overall burden to the community, the debt and socioeconomic indicators are assumed to be better measures of burden than the financial management indicators. Consequently, if one of the debt or socioeconomic indicators is not available, the State/discharger should average the two financial management indicators and use this averaged value as a single indicator with the remaining indicators. This averaging is necessary so that undue weight is not given to the financial management indicators.

2.5 Assess Where the Community Falls in The Substantial Impacts Matrix

The results of the two tests are considered jointly in determining whether the community is expected to incur substantial impacts due to the proposed pollution control project.

In the following matrix, the cumulative assessment score for the community is combined with the estimated household burden. The combination of factors establishes whether impacts can be expected to be substantial. In the example of Community XYZ, their screener equaled 2.3 percent and their cumulative assessment score equaled 2. They are, therefore, in the middle cell in the far right column and thus have a rating of "X" in the matrix presented below (Table 2-2).

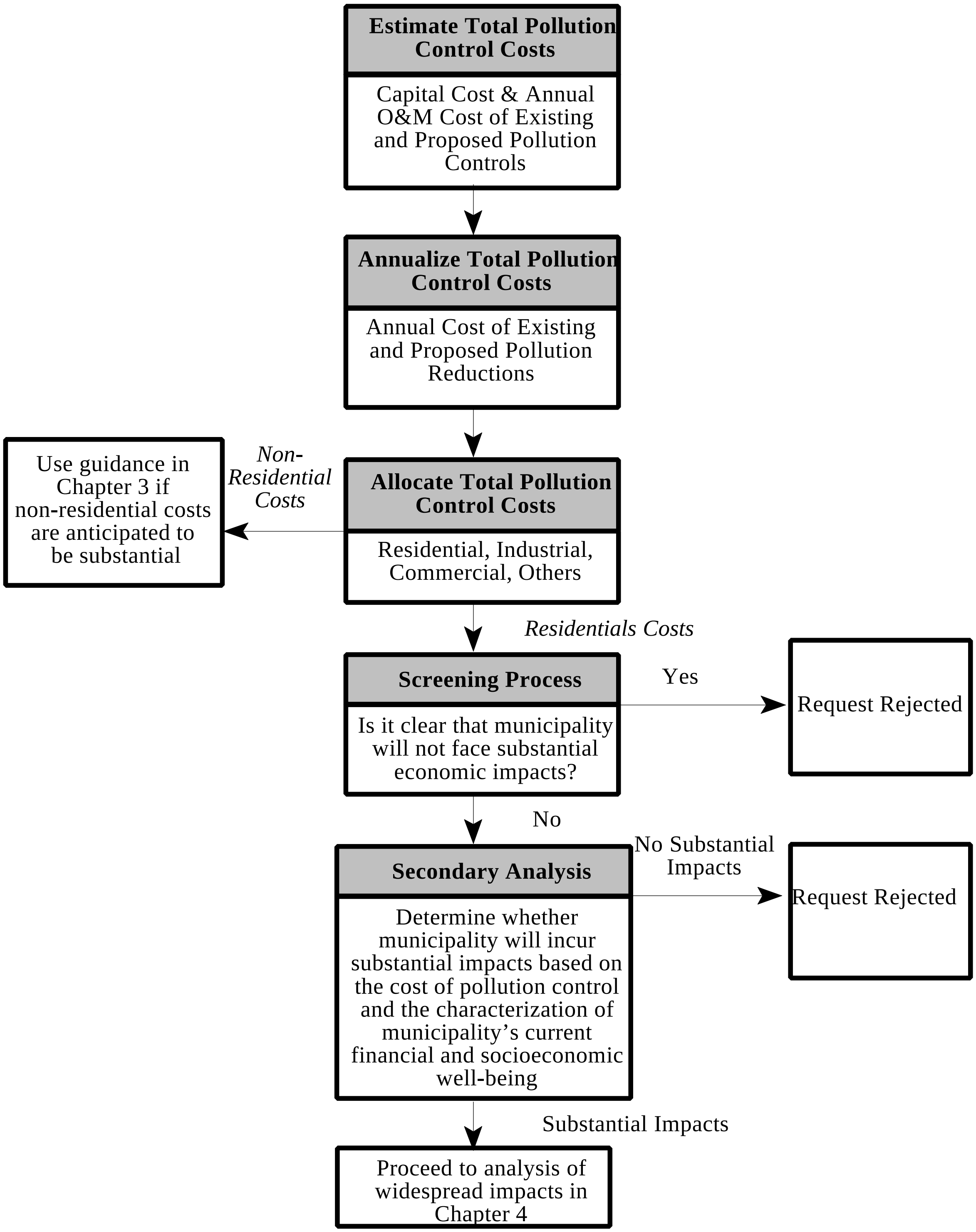
In the matrix, "X" indicates that the impact is likely to be substantial. The closer the community is to the upper right hand corner of the matrix, the greater the impact.

Similarly, "✓" indicates that the impact is not likely to be substantial. The closer to the lower left hand corner of the matrix, the smaller the impact. Finally, the "?" indicates that the impact is unclear.

For communities that fall into the "?" category, if the results of both the Secondary Test and the Municipal Preliminary Screener are borderline, then the community should move into the category closest to it. Take, for example, a community that falls into the center box, with a cumulative assessment score of between 1.5 and 2.5 and a percent of median household income (MHI) between 1.0 and 2.0. If the cumulative score was 1.6 and the percent of MHI was 1.8, then the community should be considered to fall into one of the adjacent "X" categories. If results are not borderline, other factors such as the impact on low or fixed income households, the presence of a failing local industry, and other projects the community would have to forgo in order to comply with water quality standards should be considered. Relevant additional information might include information collected from interviews with municipal financial officers, special reports on industry trends that may affect local employers, and specific financial and economic indicators. The State/discharger should provide any additional information they feel is relevant. This additional information will be critical where the matrix results are not conclusive.

EPA will interpret a "✓" rating to mean that the community is not expected to incur substantial impacts as a result of the pollution control project. Communities falling into this category will be required to meet existing water quality standards. If the applicant State/discharger disagrees with the results of the Secondary Test, they may present additional information to the Regional EPA Administrator documenting the unique circumstances of the community. Since the impacts are not substantial, there is no need to demonstrate widespread impacts. EPA will interpret a "X" rating to mean that the community will incur substantial impacts. Before a water quality standard is modified or changed, however, communities falling into this category must demonstrate that impacts are also widespread. For those communities rated "?", EPA's interpretation will rely on the additional information presented by the State/discharger. It should be noted that, in this case, there is no "correct" set of information. It will be up to the applicant to collect whatever information they feel is relevant in describing the unique circumstances affecting their community. For example, the matrix may suggest that the community's financial condition is strong. At the same time, however, a local industry may be failing. In such a case, it is important to determine the importance of that industry to the local economy (as measured by its contribution to area employment, payroll, and tax revenues) and whether the industry itself would be affected by the project. Communities falling into either the "X" or the "?" category should proceed to Chapter 4 to determine whether the impacts are also expected to be widespread.

Figure 2-1:
Measuring Substantial Impacts
(Public Entities)



NMED EXHIBIT 31

Table 2-1

Secondary Indicators

	Secondary Indicators		
Indicator	Weak	Mid-Range	Strong
Bond Rating	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) or Baa (Moody's)
Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2%-5%	Below 2%
Unemployment	More than 1% above National Average	National Average	More than 1% below National Average
Median Household Income	More than 10% below State Median	State Median	More than 10% above State Median
Property Tax Revenues as a Percent of Full Market Value of Taxable Property	Above 4%	2%-4%	Below 2%
Property Tax Collection Rate	< 94%	94% - 98%	> 98%

NMED EXHIBIT 31

Table 2-2
Assessment of Substantial Impacts Matrix

Secondary Score		**Municipal Preliminary Screener**		
		Less than 1.0 Percent	Between 1.0 and 2.0 Percent	Greater than 2.0 Percent
Less than 1.5		?	X	X
Between 1.5 and 2.5		✓	?	X
Greater than 2.5		✓	✓	?

3. EVALUATING SUBSTANTIAL IMPACTS: PRIVATE-SECTOR ENTITIES

For facilities owned by the private sector, measuring substantial impacts requires estimating the financial impacts on the entities that will pay for the pollution controls. For example, compliance with water quality standards may require that a particular facility, perhaps a factory, install additional wastewater treatment. After estimating the cost of the additional wastewater treatment, the next step is to measure the ability of the factory to pay for the additional treatment. If the analysis shows that the entity will not incur any substantial impacts due to the cost of pollution control (e.g., there will be no significant changes in the factory's level of operations nor profit), then the analysis is completed. If, on the other hand, the analysis shows that there will be substantial impacts on the entity, then the resulting impacts on the surrounding community must be considered (e.g. the impact of lost employment on the community's employment base, or the impact on the overall economy of the community). Impacts to the surrounding community, referred to as widespread impacts, are addressed in Chapter 4.

The following sections describe the steps involved in evaluating whether impacts will be substantial. These steps are outlined in Figure 3-1. This chapter explains how to adapt each of the steps to a range of data sources and provides worksheets to assist the discharger in working through each step. The analytic approach presented here can be used for a variety of private-sector entities, including commercial, industrial, residential and recreational land uses, and for point and nonpoint sources of pollution. The guidance provided in this chapter, however, is not meant to be exhaustive. The State and/or EPA may require additional information or tests in order to evaluate whether substantial and widespread impacts will occur. In addition, the applicant should feel free to include any additional information they feel is relevant. The steps described in further detail in the rest of the chapter are:

- **Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project** - This section discusses factors that should be considered when verifying that the proposed pollution control project is the most appropriate solution to the pollution problem. It also describes the type of general information that should be provided about the proposed project. In addition, it discusses how to annualize capital costs of the project and calculate total annual costs of the pollution control project.

- **Financial Impact Analysis** - This section describes the types of financial tests that should be applied to measure the impact on the applicant. The primary measure is profitability. The secondary measures include indicators of liquidity, solvency, and leverage.

Most of this chapter is written in terms of evaluating whether there will be a substantial impact on a particular discharger. This type of analysis is necessary whenever there is a request for a variance. These same tests, however, can be used to analyze the impact on a group of dischargers, as might be the case in a use attainability analysis. For example, there may be several facilities that would confront similar requirements to improve their waste water discharges in order to meet a higher water quality standard under consideration. The same primary and secondary tests would be used to measure substantial impacts in the dischargers. The difference would be, however, when the analysis moved to measuring widespread impacts. Here the impacts on the total group of dischargers (or all dischargers in the relevant reach) would be used to measure whether or not the impacts are considered widespread.

3.1 Verify Project Costs and Calculate The Annual Cost of the Pollution Control Project

Before the impact analysis can be performed, the project costs should be verified and the annual costs calculated.

3.1.a Verify Project Costs

The first step in the financial impact analysis is an evaluation of the proposed pollution control project. Private entities should consider a broad range of discharge management options including pollution prevention, end-of-pipe treatment, and upgrades or additions to existing treatment. Specific types of pollution prevention activities to be considered include:

- Change in Raw Materials;
- Substitute Process Chemicals;
- Change in Process;
- Water Recycling and Reuse; and
- Pretreatment Requirements.

Whatever the approach, the discharger must demonstrate that the proposed project is the most appropriate means of meeting water quality standards and must document project cost estimates. If at least one of the treatment alternatives that allows the applicant to meet water quality standards would not impose substantial impacts, then they are not able to demonstrate substantial impacts and should not proceed with the analysis presented in the remainder of this workbook.

Since the most cost-effective approach to meeting water quality standards should be considered, submissions should list their assumptions about excess capacity, future facility expansion, and alternative technologies. The most accurate estimate of project costs may be available from the discharger's design engineers. These estimates can be compared to estimates available from EPA.

3.1.b Calculate the Annual Costs of the Pollution Control Project

In order to perform the economic tests, the cost of the pollution control needed to comply with the Water Quality Standards must be calculated and converted to an annualized cost. Initially, pollution control costs are expressed in two parts: (1) the capital costs of purchasing and installing the equipment and (2) the yearly operating and maintenance (O&M) costs. Both the capital and O&M cost estimates should be provided by the discharger requesting relief. To assess whether the costs represent the most cost effective means of meeting the water quality standards, they should be compared to costs at comparable entities that meet the same standards. For dischargers covered by effluent guidelines, compliance costs have been calculated by the Agency and are available for comparative purposes. (See Appendix A.) Costs for nonpoint sources are less readily available.

Instead of assuming that the total capital costs will be paid in the first year of operation, these costs are usually annualized. By assuming that costs are spread out over several years, annualization calculates the amount that will be paid each year, including the financing costs. In order to allow for comparisons across cases, the analysis should assume that the applicant will borrow the capital for the pollution control equipment and repay the loan in even annual installments over a 10 year period. The assumption of ten years is based on the likely life of the equipment. The assumption of even annual installments is made for convenience. The interest rate on the loan should be equivalent to the rate the applicant pays when it borrows money. If it borrows from the parent firm, the interest charge should be equivalent to the interest charged by the parent firm. If the parent firm would lend the entity money without interest, then the interest payments should be equivalent to the interest rate the applicant would pay to borrow from a bank or on its line of credit. If it is impossible to determine the appropriate interest rate, the analysis should assume an interest rate equal to the prime rate plus one percent.

The financial tests discussed below compare the costs of compliance to other costs and revenues of the applicant. Compliance costs and other costs and revenues must, therefore, be comparable. In other words, they should be calculated for the same year. If compliance costs are estimated assuming construction several years in the future, they should be deflated back to the year of the financial data. This can be done by assuming that the inflation rate over the last five years will continue into the future. See discussion in Section 2.2, and Appendix A for references to inflation/deflation indices. Likewise, if costs were estimated for an earlier year, they should be inflated to current year costs. The Annualized Cost of Pollution Control can be calculated using **Worksheet G**.

3.2 Financial Impact Analysis

The purpose of the financial impact analysis is to assess the extent to which existing or planned activities and/or employment will be reduced as a result of meeting the water quality standards. The tests described in this Workbook are not designed to determine the exact impact of pollution control costs on an entity. They merely provide indicators of whether pollution control costs would result in a substantial impact.

Four general categories of financial tests are presented in the following sections. As indicated below, the four categories are divided into a primary measure of financial impacts and three secondary measures of financial impacts:

Primary Measure

- Profit -- how much will profits decline due to pollution control expenditures?

Secondary Measures

- Liquidity -- how easily can an entity pay its short-term bills?
- Solvency -- how easily can an entity pay its fixed and long-term bills?
- Leverage -- how much money can the entity borrow?

Profit and solvency ratios are calculated both with and without the additional compliance costs (taking into consideration the entity's ability, if any, to increase its prices to cover part or all of the costs). Comparing these ratios to each other and to industry benchmarks provides a measure of the impact on the entity.

For all of the tests, it is important to look beyond the individual test results and evaluate the total situation of the entity. While each test addresses a single aspect of financial health, the results of the four tests should be considered jointly to obtain an overall picture of the economic health of the applicant and the impact of the water quality standards requirement on the applicant's health. The results should be compared with the ratios for other entities in the same industry or activity. In addition, the ratios and tests should be calculated for several years of operations. This will allow long-term trends to be differentiated from short-term conditions.

The structure, size, and financial health of the parent firm should also be considered. An important factor, which may not be reflected in the preceding measures, is the value of an applicant's product or operations to its parent firm. For example, if a facility produces an important input used by other facilities owned by the firm, the firm may be likely to support the facility even if it appears to have only borderline profitability. The results of these tests and other relevant factors, can be used to make a judgement as to the likely actions of the applicant (e.g. shut down entirely, close one or more product/service lines, shift to other products/services, not proceed with an expansion, continue operations at current levels) faced with the pollution control investment.

Each type of test measures a different aspect of a discharger's financial health. The primary measure evaluates the extent to which an applicant's profit rate will change, and compares the profit level to typical profits in that industry. The secondary measures provide additional information about specific impacts that the discharger would bear if required to meet water quality standards. In some cases, the tests might indicate that the discharger would remain profitable (Profit) after investing in pollution control, but would have trouble borrowing the needed capital (Leverage). This situation would indicate a need to work with the discharger in choosing the technology and schedule used to meet the regulations. In other cases the tests might show that the discharger has a short-term problem with meeting the financial obligation imposed by the standards, but could handle it in the long-run (Liquidity vs. Solvency). This is important information when considering whether or not to grant a variance so as to allow more time for compliance.

Since it is the discharger that will have to pay for the wastewater treatment, the financial tests presented in this Workbook use data about the discharger's operations. This data, however, may not be readily available for the discharger itself, and if available, the discharger may consider the information to be confidential. It is EPA policy, however, that applications based on economic considerations must be accompanied by data that demonstrate the impacts.

If the information is not available at the discharger level, it can be estimated from the balance sheets or income statements of the firm that owns or controls the discharger. Estimates can be made in a variety of ways. One commonly used approach is to compare the discharger's sales or revenues to the firm's sales or revenues and apply this ratio to other financial factors. For example, if the discharger is responsible for 20 percent of its firm's revenues, than it is assigned 20 percent of the firm's current assets and current liabilities. In some cases, particularly with manufacturing facilities, the discharger may not sell its production directly, but may ship it to another facility owned by the same firm. In this case, the discharger's share of sales should be calculated by determining the market value of the goods produced by the discharger, using market prices for the year being analyzed.

The primary and secondary measures are described below, along with an example of specific tests to be used. While there are several ratios that could be used for each test, to simplify the presentation only one ratio per test is described in detail. All four primary and secondary measures, however, should be used in the analysis.

In most cases, interpreting the results requires comparisons with typical values for the industry. Among the sources that provide comparative information are: Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, Dun and Bradstreet's *Dun's Industry Norms*, and Standard & Poor's *Industry Surveys*. The *Annual Statement Studies*, *Dun's Industry Norms* , and Standard & Poor's *Industry Surveys* provide composite statistics for firms grouped into various manufacturing and service industries.

The *Moody's Industrial Manual* provides detailed financial information on individual firms that can be used for comparison purposes. Although benchmarks are available for most financial tests, EPA emphasizes that the discharger should consider these benchmarks as indicators of financial health and not as definitive measures.

3.2.a Primary Measure: Profitability

The Profit Test measures what will happen to the discharger's earnings if additional pollution control is required. If the discharger is making a profit now but would lose money with the pollution control, then the possibility of a total shutdown or the closing of a production line must be considered. Greatly reduced, but still positive, profits are also of concern. Likewise in the case of a proposed facility or proposed expansion; if estimated profits would drop considerably with pollution control, then the development might not take place.

Two pieces of information are needed for the Profit Test. The first piece is the total annual cost of the required pollution control from **Worksheet G**. The second piece is the earnings information from the entity's income statement (**Worksheet H**).

$$Profit\ Test = \frac{Earnings\ Before\ Taxes}{Revenues}$$

The Profit Test should be calculated with and without the cost of pollution control. In the former case, the annualized cost of pollution control (including O&M) is subtracted from the discharger's earnings before taxes (revenues minus costs excluding income taxes) for the most recently completed fiscal year. Profits before pollution control investments have been made should be examined to determine whether the discharger was already in trouble (either not profitable or profits far below industry norms) before pollution control investments were made. If the discharger is already not profitable, it may not claim that substantial impacts would occur due to compliance with water quality standards.

The Profit Test can be calculated using **Worksheets H, and I**. Earnings before taxes (EBT) should be calculated for at least the three previous fiscal years in order to identify any trends or atypical years. Earnings with pollution control costs should be calculated for the latest year with complete financial information. Arguably, as long as the applicant maintains positive earnings, it can afford to pay for the pollution control. Over the long run, however, the owner is likely to shift operations to more profitable facilities, if possible. The workbook, therefore, guides the applicant through a more thorough analysis, which compares the EBT, with and without pollution control, to total revenues to yield a profit rate and change in the profit rate due to pollution control. (Use **Worksheet I**.) These profit rates should be compared to those for facilities in similar lines of business. As with other tests, it may not be possible to compare the discharger's rate directly with the rates of similar facilities. In such cases the discharger's profit rate should be compared with that of firms that concentrate in similar businesses, using data in *Moody's Industrial Manual*, *Dun & Bradstreet's Industry Norms and Key Business Ratios*, *Standard & Poor's Industry Surveys*, or Robert Morris's *Annual Statement Studies*. If the discharger's ratio compares favorably with the median or upper quartile ratio for similar businesses, the discharger is considered to be financially healthy. A typical income statement, like those found in *Moody's Industrial Manual*, has been included in Exhibit 3-1. The appropriate data have been underlined.

Although complicated, the analysis should consider whether the discharger or firm would be able to raise its prices in order to cover some or all of the pollution control costs. In such a case, revenues increase and earnings fall by an amount less than the costs of pollution control. The degree to which the discharger is able to raise prices is difficult to predict, and depends on many factors. Considerations should include the level of competition in the industry, the likelihood of competitors' facilities facing similar project costs, and the willingness of consumers to pay more for the product.

3.2.b Secondary Measures

The following secondary measures provide additional important information about the financial health of the discharger. All primary and secondary measures will be included in the analysis. It is not sufficient to conclude that the discharger will be unprofitable after pollution control investments. In addition, the applicant should feel free to include any additional information about the discharger's financial health that they feel is relevant.

Liquidity

Liquidity is a measure of how easily a discharger can pay its short-term bills. One measure of liquidity is the Current Ratio, which compares current assets with current liabilities. Current assets include cash and other assets that are or could reasonably be converted into cash during the current year. The following items are considered to be current assets:

- **Inventories** -- finished products, products in the process of being manufactured, raw materials, supplies, fuels, etc.;
- **Prepaid expenses** -- expenses paid in advance of use such as prepaid rent;
- **Short-term investments** -- savings accounts, certificates of deposit;
- **Accounts receivable**;

- **Marketable securities**; and
- **Cash**.

Likewise, current liabilities are items that must be paid within the current year. The following items are considered to be current liabilities:

- **Accounts payable** -- purchases of goods for resale and services received in the normal course of business;
- **Wages payable**;
- **Short-term notes payable** -- any debt initially incurred and due in the current year;
- **Accrued expenses** -- expenses that have been incurred but have not yet been paid at the end of the accounting period;
- **Taxes**; and
- **Current portion of any long-term debt**.

A more stringent test is the Quick Ratio, also known as the Acid Test, which compares current assets without inventories to current liabilities. It does not include inventories since they may take time to convert to cash and may be valued on the discharger's books for more than they could be sold.

The Current Ratio should be calculated for each of the last three full fiscal years for which there are data. Comparing ratios for three years will identify any trends that are developing and will ensure that the most recent year is not an unusual year that might distort the results of the analysis.

The Current Ratio is calculated by dividing current assets by current liabilities.

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities}$$

The Current Ratio can be calculated using **Worksheet J**. The general rule is that if the Current Ratio is greater than 2, the entity should be able to cover its short-term obligations. Frequently, lenders require this level of liquidity as a prerequisite for lending. While a Current Ratio of greater than 2 indicates that the entity can probably cover its short-term obligations, the impact of a major capital investment such as the pollution control project must be judged in conjunction with the other three financial tests described in this guidance.

In addition, this rule (Current Ratio > 2) may not be appropriate for all types of private entities covered by Water Quality Standards. The Current Ratio of the discharger in question should be compared with ratios for other dischargers in the same line of business. It may not be possible, however, to compare the discharger's ratio directly with other similar dischargers because this information frequently is unavailable at the facility level or is considered confidential. In cases where a direct comparison cannot be made, the discharger's Current Ratio should be compared with the ratio for firms that concentrate in similar businesses. If the discharger's ratio compares favorably with the median or upper quartile ratio for similar businesses, it should be able to cover it's short term obligations. Among the sources that provide comparison information are: Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, and Dun and Bradstreet's *Dun's Industry Norms*. The *Annual Statement Studies* and *Dun's Industry Norms* provide composite statistics for firms grouped by different manufacturing and service industries. The *Moody's Industrial Manual* provides detailed financial information on individual firms. Pages from both of these sources are displayed in Exhibits 3-2 and 3-3, with the appropriate data indicated.

Solvency

Solvency is a measure of an entity's ability to meet its fixed and long-term obligations. These obligations are bills and debts that are owed on a regular basis for periods longer than one year. Solvency tests are commonly used to predict financial problems that could lead to bankruptcy within the next few years. Since any single year of data can easily be distorted by unusually high or low net income or by the timing of debt, solvency tests must be considered over at least three years of data in order to reveal long-term trends.

As with liquidity, there are several possible tests for solvency. One commonly used solvency test (called Times Interest Earned) compares income before interest and taxes to interest expenses. Another solvency test, the Beaver's Ratio, compares cash flow to total debt. This test has been shown to be a good indicator of the likelihood of bankruptcy.

$$Beaver's\ Ratio = \frac{Cash\ Flow}{Total\ Debt}$$

The Beaver's Ratio can be calculated using **Worksheet K**. Cash Flow is a measure of the cash the entity has available to it in a given year. Since depreciation is an accounting cost -- a cost that does not use any currently available revenues -- it is added back to reported net income after taxes to get cash flow. Total debt is equal to the current debt for the current year plus the long term debt, since current debt includes that part of long-term debt that is due in the current year.

If the Beaver's Ratio is greater than 0.20 the discharger is considered to be solvent (i.e., can pay its long-term debts). If the ratio is less than 0.15 the discharger may be insolvent (i.e., go bankrupt). If the ratio is between 0.15 and 0.20, then future solvency is uncertain. The discharger's Beaver's Ratio should be compared with the ratios of similar dischargers. However, as with other ratios, it may not be possible to compare the discharger's ratio directly with other similar dischargers. In cases where a direct comparison cannot be made, the discharger's Beaver's Ratio should be compared with that of firms that concentrate in similar businesses, using information from income accounts and balance sheets in *Moody's Industrial Manual*. If the discharger's ratio compares favorably with similar businesses, it should be able to meet its fixed and long term obligations. A typical balance sheet and income statement have been included in Exhibits 3-4 (for calculating total debt) and 3-5 (for calculating cash flow). The appropriate data from them has been underlined.

Leverage

Leverage tests measure the extent to which a firm already has fixed financial obligations and thus indicate how much more money a firm is capable of borrowing. Firms that rely heavily on debt may find it difficult and expensive to borrow additional funds. Most leverage tests compare equity to some measure of debt or fixed assets. The Debt to Equity Ratio is the most commonly used method of measuring leverage. Unlike the ratios discussed above, the debt to equity ratio cannot be easily calculated for a single facility; it must be calculated for the firm, since it is usually the firm, not the facility, that borrows money. The ratio measures how much the firm has borrowed (debt) relative to the amount of capital which is owned by its stockholders (equity). Since values for the Debt to Equity Ratio vary widely by the type of enterprise, the ratio should be compared with the ratio for firms in similar lines of business. The ratio also should be calculated with at least three years of data.

The Debt to Equity Ratio is equal to Long-Term Liabilities (long-term debt such as bonds, debentures, and bank debt, and all other noncurrent liabilities like deferred income taxes) divided by Owners' Equity. Owner's Equity is the difference between total assets and total liabilities, including contributed or paid in capital and retained earnings. For publicly held firms, use Net Stockholders Equity (which is the equivalent of Total Stockholder Equity minus any Treasury Stock).

$$Debt/Equity\ Ratio = \frac{Long\text{-}Term\ Liabilities}{Owners'\ Equity}$$

NMED EXHIBIT 31

The Debt to Equity Ratio can be calculated using **Worksheet L**. Since there are no generally accepted Debt/Equity Ratio values that apply to all types of economic activity, the ratio should be compared with the ratio of firms in similar businesses. If the entity's ratio compares favorably with the median or upper quartile ratio for similar businesses, it should be able to borrow additional funds. These ratios can be calculated using data in Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, and Dun & Bradstreet's *Dun's Industry Norms*. Pages from these sources have been included in Exhibits 3-6 and 3-7, with the appropriate data indicated.

For entities with special sources of funding, leverage is not an appropriate measure of their ability to raise capital. Examples are agriculture and affordable housing, where special loan programs may be available. In these cases, an analysis of the probability that the project would receive this money is appropriate.

3.3 Interpreting the Results

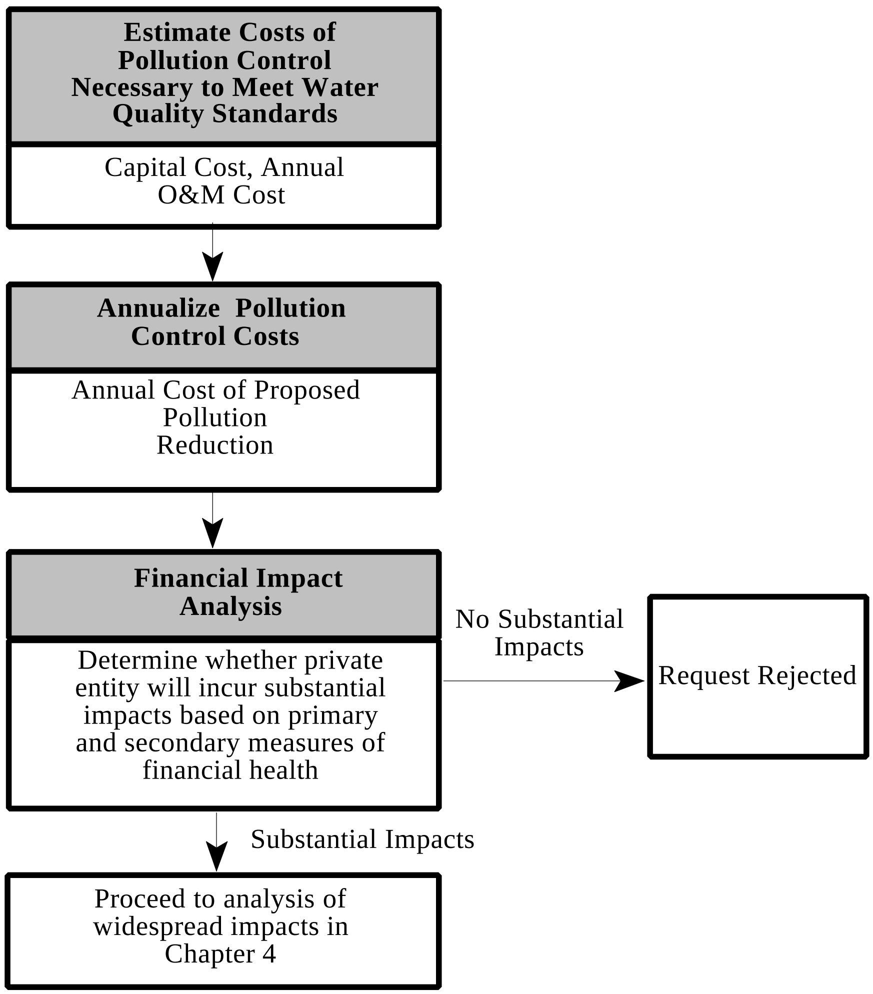
The financial analysis should be used to determine if there will be a substantial adverse impact on the applicant. As indicated above, the Profit Test should be considered first. The Profit Test measures what will happen to the discharger's earnings if additional pollution control is required. If the discharger is making a profit now but would lose money with the pollution control, then the possibility of a total shutdown or the closing of a production line must be considered. Likewise in the case of a proposed facility; if it would make money without the pollution control but would make much less or even lose money with it, then the development might not take place. In either case, there is the chance that employment will be lost and local purchases by the discharger reduced. Whether or not these impacts will be considered widespread is addressed in Chapter 4.

There are several more complicated scenarios that all involve making a judgement as to the likely impacts on the discharger, including questions of the timing of compliance. For example, the Profit Test may indicate that the applicant will continue to maintain profit levels typical for its industry after compliance, but the Debt/Equity Ratio may indicate that they will have trouble raising the required capital through debt. This problem may be solved by giving them more time to meet the regulations (a variance), so that they can restructure their debt and/or find alternative sources of funds. In another case, the applicant might argue that while they will still make money and be able to raise the needed capital, they would alternatively spend those funds on an expansion which would have resulted in increased employment and income for the community. This is a more difficult situation to analyze, and will depend on judgments about the relative importance of water pollution control versus economic growth. These issues are discussed in more detail in Chapter 4.

Another possible scenario is that the discharger may shift to an alternative economic activity (e.g., manufacture another product or produce a different crop). While the applicant will not have gone out of business, this shift may result in reduced profits, employment, and purchases in the local community that must be considered. In each case, it is important to take the entire picture presented by the four ratios into account in judging whether or not the discharger will incur substantial impacts due to the cost of the necessary pollution reductions.

Using the guidance presented in this chapter, applicants that feel they have demonstrated substantial impacts should proceed to Chapter 4: Determination of Widespread Impacts. If dischargers are not able to demonstrate substantial impacts, the entity must meet existing standards. If a group of dischargers within the community will experience the substantial impacts resulting from compliance with water quality standards, these impacts should be considered jointly when assessing whether or not the impacts will be widespread.

Figure 3-1:
Measuring Substantial Impacts
(Private Entities)



NMED EXHIBIT 31

Exhibit 3-1

XYZ, INC.
CONSOLIDATED STATEMENTS OF INCOME AND RETAINED EARNINGS (DEFICIT)
FOR THE YEARS ENDED SEPTEMBER 30, 1988, 1987, 1986

	1988	1987	1986
Net sales	**$42,389,957**	$33,294,962	$30,730,768
Cost of sales	**35,981,363**	26,405,930	24,972,185
Gross profit	**6,408,594**	6,889,032	5,758,583
Selling, general and administrative expenses	**3,957,771**	3,876,206	3,824,226
Income from operations	**2,450,823**	3,012,826	1,934,357
Other income (deductions)			
Interest income	**441,891**	347,613	362,295
Interest expense	**(10,985)**	(22,513)	(46,467)
Other investment income - net			134,690
Miscellaneous	**55,066**	48,660	93,654
Total other income (deductions) - net	**485,972**	373,760	544,172
Income before income taxes	**2,936,795**	3,386,586	2,478,529
Provision for income taxes	**1,139,118**	1,620,012	1,150,949
Net income	**1,797,677**	1,766,574	1,327,580
Retained earnings, beginning of year	**1,157,528**	1,726,292	1,983,007
Stock dividend	**(2,610,888)**	(1,952,645)	(1,365,590)
Cash dividend ($.11 per share, 1988; $.08 per share, 1987; $.06 per share, 1986)	**(391,960)**	(300,693)	(218,705)
Common stock acquired and retired	**(2,591)**	(82,000)	
Retained earnings (deficit), end of year	**$ (50,234)**	$ 1,157,528	$ 1,726,292
Weighted average number of shares outstanding	**3,593,048**	3,630,652	3,637,798
Earnings per common share	**$.50**	$.49	$.36

See accompanying Notes to Financial Statements

INDEPENDENT AUDITORS' REPORT

To the Shareholders of XYZ, Inc.:

We have audited the consolidated balance sheets of XYZ, Inc. at September 30, 1988 and 1987, and the related consolidated statements of income and retained earnings (deficit), and cash flows for each of the three years in the period ended September 30, 1988. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of the companies at September 30, 1988 and 1987, and the results of their operations and their cash flows for each of the three years in the period ended September 30, 1988 in conformity with generally accepted accounting principles.

DELOITTE HASKINS & SELLS
Minneapolis, Minnesota
December 5, 1988

Exhibit 3-2

MANUFACTURERS • GAMES, TOYS & CHILDREN'S VEHICLES; EXCEPT DOLLS & BICYCLES. SIC # 3944

Comparative Historical Data				Current Data Sorted by Sales					
		1	**# Postretirement Benefits**						1
17	19	19	**Type of Statement**				4	4	11
11	21	24	Unqualified	1	3	7	10	2	1
2	7	14	Reviewed	3	5		3	1	2
	1		Compiled						
17	20	18	Tax Returns	2	5	2		1	8
			Other						
4/1/90-3/31/91	**4/1/91-3/31/92**	**4/1/92-3/31/93**			**17(4/1/-9/30/92)**		**58 (10/1/92-3/31/93)**		
ALL	**ALL**	**ALL**		**0-1MM**	**1-3mm**	**3-5MM**	**5-10MM**	**10-25MM**	**25MM & OVER**
47	**68**	**75**	**NUMBER OF STATEMENTS**	**6**	**13**	**9**	**17**	**8**	**22**
%	**%**	**%**	**ASSETS**	**%**	**%**	**%**	**%**	**%**	**%**
7.1	8.9	7.2	Cash & Equivalents		7.4		13.3		5.8
27.0	30.9	31.8	Trade Receivables - (net)		24.5		32.0		36.0
31.9	30.4	35.3	Inventory		47.4		31.0		28.3
2.1	1.9	1.7	All Other Current		.6		2.2		2.7
68.1	72.1	76.1	Total Current		79.8		78.5		72.7
19.2	17.5	16.7	Fixed Assets (net)		16.1		14.4		17.2
4.2	3.7	3.1	Intangibles (net)		1.8		2.2		5.4
8.5	6.7	4.1	All Other Non-Current		2.3		4.9		4.7
100.0	100.0	100.0	Total		100.0		100.0		100.0
			LIABILITIES						
16.4	12.6	14.0	Notes Payable Short-Term		13.9		12.3		11.8
3.4	2.3	3.0	Cur. Mat.-L/T/D		4.5		3.6		.7
11.7	13.1	14.6	Trade Payables		14.5		12.0		16.5
.7	.9	.6	Income Taxes Payable		.5		.5		.7
8.1	9.0	11.1	All Other Current		5.6		10.8		11.9
40.3	38.0	43.2	Total Current		38.8		39.2		41.7
13.2	13.4	12.2	Long Term Debt		15.5		9.4		11.8
1.2	.5	.4	Deferred Taxes		.1		.5		.6
2.8	5.3	3.5	All Other Non-Current		2.2		2.1		1.7
42.4	42.9	40.6	Net Worth		43.4		48.8		44.3
100.0	100.0	100.0	Total Liabilities and Net Worth		100.0		100.0		100.0
			INCOME DATA						
100.0	100.0	100.0	Net Sales		100.0		100.0		100.0
35.5	37.2	36.0	Gross Profit		35.5		33.5		35.8
28.5	29.3	30.2	Operating Expenses		29.9		28.2		28.6
6.9	7.9	5.8	Operating Profit		5.7		5.3		7.2
3.3	1.8	1.2	All Other Expenses (net)		1.1		.4		1.8
3.7	6.1	4.6	Profits Before Taxes		4.6		4.9		5.3
			RATIOS						
2.5	2.8	2.9			4.5		2.8		2.8
1.7	1.9	1.8	Current		2.3		1.9		1.9
1.2	1.3	1.3			1.5		1.3		1.2
1.4	1.7	1.4			1.7		2.0		1.8
.8	1.1	.8	Quick		.6		.8		1.0
.6	.7	.6			.5		.6		.7
34 10.6	**31** 11.6	**34** 10.8			**14** 25.2		**31** 11.9		**56** 6.5
55 6.6	**49** 7.4	**56** 6.5	Sales Receivables		**37** 10.0		**56** 6.5		**72** 5.1
85 4.3	**85** 4.3	**85** 4.3			**78** 4.7		**89** 4.1		**99** 3.7
62 5.9	**55** 6.6	**63** 5.8			**79** 4.6		**43** 8.5		**68** 5.4
104 3.5	**85** 4.3	**94** 3.9	Cost of Sales/Inventory		**126** 2.9		**78** 4.7		**85** 4.3
146 2.5	**152** 2.4	**146** 2.5			**166** 2.2		**140** 2.6		**118** 3.1
21 17.0	**21** 17.7	**18** 20.1			**10** 38.1		**12** 30.2		**29** 12.5
29 12.4	**27** 13.3	**30** 12.3	Cost of Sales/Payables		**27** 13.3		**22** 16.4		**39** 9.4
50 7.3	**47** 7.8	**61** 6.0			**40** 9.1		**33** 11.0		**66** 5.5
3.9	3.4	3.3			2.6		3.0		3.3
7.6	6.2	6.3	Sales/Working Capital		4.4		6.5		5.1
17.5	10.8	13.8			14.0		11.5		15.0
7.1	10.1	9.0			6.8		9.2		14.5
(44) 2.4	(66) 3.4	(69) 3.6	EBIT/Interest		(12) 1.9		(14) 4.6		(21) 4.3
1.0	1.5	1.5			.8		1.3		2.9
8.9	(34) 13.3	(24) 13.1	Net Profit + Depr., Dep.,						
(23) 2.8	3.3	2.8	Amort./Cur. Mat.L/T/D						
.5	1.8	1.2							
.2	.2	.1			.1		.1		.2
.6	.4	.5	Fixed/Worth		.4		.3		.5
.8	.8	1.0			1.2		.7		1.0
.9	.8	1.0			.7		.5		.7
2.0	1.6	1.8	Debt/Worth		1.5		1.1		1.7
3.0	3.3	3.3			3.0		5.5		2.6
34.5	52.8	39.9	% Profit Before Taxes/Tangible		51.2		42.8		37.9
(45) 16.2	(65) 26.1	(70) 22.8	Net Worth		9.2		(16) 27.4		(21) 27.9
−1.1	7.0	4.6			−2.8		3.2		17.2
11.7	20.5	17.0	% Profit Before Taxes/Total		21.1		18.6		14.2
5.5	10.8	7.6	Assets		3.3		9.6		8.2
−.4	1.9	1.5			−.8		1.5		3.9
20.1	44.3	35.8			64.6		42.7		21.4
9.8	15.6	17.1	Sales/Net Fixed Assets		35.8		15.1		11.2
6.5	7.3	7.5			9.5		7.3		7.2
2.1	2.5	2.6			2.9		2.6		2.1
1.6	2.0	2.0	Sales/Total Assets		2.0		1.8		1.9
1.3	1.5	1.6			1.7		1.5		1.4
1.1	.8	.7			.4		.8		1.4
(36) 2.1	(61) 1.7	(61) 1.6	% Depr., Dep., Amort./Sales		(11) .8		2.3		2.6
2.9	3.3	2.8			2.5		2.9		3.2
1.8	2.4	2.7	% Officers', Directors',						
(12) 4.3	(23) 4.1	(30) 4.5	Owners' Comp/Sales						
6.7	9.5	7.8							
1537661M	**1883457M**	**1840680M**	Net Sales ($)	**3293M**	**27202M**	**36782M**	**116678M**	**115773M**	**1540952M**
1092333M	**1169085M**	**1136958M**	Total Assets ($)	**1948M**	**13736M**	**20946M**	**72757M**	**52973M**	**974598M**

M = $thousand MM = $million

See Pages 1 through 15 for Explanation of Ratios and Data

NMED EXHIBIT 31

Exhibit 3-3

XYZ, INC.
CONSOLIDATED
BALANCE
SHEETS
SEPTEMBER 30, 1988 AND 1987

		1988	1987
ASSETS	**Current Assets:**		
	Cash and cash equivalents	**$ 2,944,964**	$ 1,459,475
	Cash investments	**2,244,061**	3,369,289
	Trade receivables - less allowance for doubtful accounts: 1988, $85,352; 1987, $135,353	**5,025,964**	4,171,421
	Inventories	**4,109,264**	3,335,251
	prepaid expenses and other	**725,964**	122,370
	Total current assets	**15,050,217**	12,457,806
	Property, Plant and Equipment:		
	Land	**356,217**	296,217
	Buildings and Improvements	**5,476,155**	4,837,392
	Machinery and equipment	**2,160,671**	1,546,476
	Transportation equipment	**1,866,005**	1,705,107
	Office furniture and equipment	**463,750**	483,769
	Total	**10,322,798**	8,868,961
	Less accumulated depreciation	**4,705,580**	4,207,598
	Property - net	**5,617,218**	4,661,363
	Other Assets:		
	Intangible assets - less accumulated amortization: 1988, $197,437; 1987, $239,281	**226,728**	252,884
	Insurance trust	**1,122,796**	1,066,964
	Other	**89,287**	77,778
	Total other assets	**1,438,811**	1,397,626
	Total	**$22,106,246**	$18,516,795
LIABILITIES AND SHAREHOLDERS' EQUITY	**Current Liabilities:**		
	Current portion of long-term debt	**$ 17,902**	$ 32,405
	Accounts payable - trade	**5,049,234**	2,686,669
	Accrued income taxes		21,400
	Accrued payroll and employee benefits	**681,369**	678,752
	Container deposits	**1,054,373**	1,199,263
	Other accruals	**198,477**	178,736
	Total current liabilities	**7,001,355**	4,797,225
	Long-term debt	**53,706**	71,608
	Deferred income taxes	**249,900**	242,200
	Shareholders' Equity:		
	Common stock - authorized 4,000,000 shares of $.05 par value, issued: 1988, 3,592,673; 1987, 3,268,337		
	Additional paid-in capital	**179,634**	163,417
	Retained earnings (deficit)	**14,671,885**	12,084,817
	Total shareholders' equity	**(50,234)**	1,157,528
		14,801,285	13,405,762
	Total	**$22,106,246**	$18,516,795

See accompanying Notes to Financial Statements

NMED EXHIBIT 31

Exhibit 3-4

XYZ, INC.
CONSOLIDATED BALANCE SHEETS
SEPTEMBER 30, 1988 AND 1987

		1988	1987
ASSETS	**Current Assets:**		
	Cash and cash equivalents	**$ 2,944,964**	$ 1,459,475
	Cash investments	**2,244,061**	3,369,289
	Trade receivables - less allowance for doubtful accounts: 1988, $85,352; 1987, $135,353	**5,025,964**	4,171,421
	Inventories	**4,109,264**	3,335,251
	prepaid expenses and other	**725,964**	122,370
	Total current assets	**15,050,217**	12,457,806
	Property, Plant and Equipment:		
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	Less accumulated depreciation	**4,705,580**	4,207,598
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	Total current liabilities	**7,001,355**	4,797,225
	Long-term debt	**53,706**	71,608
	Deferred income taxes	**249,900**	242,200
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	Common stock - authorized 4,000,000 shares of $.05 par value, issued: 1988, 3,592,673; 1987, 3,268,337		
	Additional paid-in capital	**179,634**	163,417
	Retained earnings (deficit)	**14,671,885**	12,084,817
	Total shareholders' equity	**(50,234)**	1,157,528
		14,801,285	13,405,762
	Total	**$22,106,246**	$18,516,795

See accompanying Notes to Financial Statements

Exhibit 3-5

XYZ, INC.
CONSOLIDATED STATEMENTS OF INCOME AND RETAINED EARNINGS (DEFICIT)
FOR THE YEARS ENDED SEPTEMBER 30, 1988, 1987, 1986

	1988	1987	1986
Net sales	**$42,389,957**	$33,294,962	$30,730,768
Cost of sales	**35,981,363**	26,405,930	24,972,185
Gross profit	**6,408,594**	6,889,032	5,758,583
Selling, general and administrative expenses	**3,957,771**	3,876,206	3,824,226
Income from operations	**2,450,823**	3,012,826	1,934,357
Other income (deductions)			
Interest income	**441,891**	347,613	362,295
Interest expense	**(10,985)**	(22,513)	(46,467)
Other investment income - net			134,690
Miscellaneous	**55,066**	48,660	93,654
Total other income (deductions) - net	**485,972**	373,760	544,172
Income before income taxes	**2,936,795**	3,386,586	2,478,529
Provision for income taxes	**1,139,118**	1,620,012	1,150,949
Net income	**1,797,677**	1,766,574	1,327,580
Retained earnings, beginning of year	**1,157,528**	1,726,292	1,983,007
Stock dividend	**(2,610,888)**	(1,952,645)	(1,365,590)
Cash dividend ($.11 per share, 1988; $.08 per share, 1987; $.06 per share, 1986)	**(391,960)**	(300,693)	(218,705)
Common stock acquired and retired	**(2,591)**	(82,000)	
Retained earnings (deficit), end of year	**$ (50,234)**	$ 1,157,528	$ 1,726,292
Weighted average number of shares outstanding	**3,593,048**	3,630,652	3,637,798
Earnings per common share	**$.50**	$.49	$.36

See accompanying Notes to Financial Statements

INDEPENDENT AUDITORS' REPORT

To the Shareholders of XYZ, Inc.:

We have audited the consolidated balance sheets of XYZ, Inc. at September 30, 1988 and 1987, and the related consolidated statements of income and retained earnings (deficit), and cash flows for each of the three years in the period ended September 30, 1988. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of the companies at September 30, 1988 and 1987, and the results of their operations and their cash flows for each of the three years in the period ended September 30, 1988 in conformity with generally accepted accounting principles.
DELOITTE HASKINS & SELLS
Minneapolis, Minnesota
December 5, 1988

Exhibit 3-6

MANUFACTURERS • GAMES, TOYS & CHILDREN'S VEHICLES; EXCEPT DOLLS & BICYCLES. SIC # 3944

Comparative Historical Data | **Current Data Sorted by Sales**

	4/1/90-3/31/91		4/1/91-3/31/92		4/1/92-3/31/93			17(4/1-9/30/92)		58 (10/1/92-3/31/93)		
					1	**# Postretirement Benefits**						1
						Type of Statement						
	17		19		19	Unqualified				4	4	11
	11		21		24	Reviewed	1	3	7	10	2	1
	2		7		14	Compiled	3	5		3	1	2
			1			Tax Returns						
	17		20		18	Other	2	5	2		1	8
	ALL		**ALL**		**ALL**		**0-1MM**	**1-3mm**	**3-5MM**	**5-10MM**	**10-25MM**	**25MM & OVER**
	47		**68**		**75**	**NUMBER OF STATEMENTS**	**6**	**13**	**9**	**17**	**8**	**22**
	%		**%**		**%**	**ASSETS**	**%**	**%**	**%**	**%**	**%**	**%**
	7.1		8.9		7.2	Cash & Equivalents		7.4		13.3		5.8
	27.0		30.9		31.8	Trade Receivables - (net)		24.5		32.0		36.0
	31.9		30.4		35.3	Inventory		47.4		31.0		28.3
	2.1		1.9		1.7	All Other Current		.6		2.2		2.7
	68.1		72.1		76.1	Total Current		79.8		78.5		72.7
	19.2		17.5		16.7	Fixed Assets (net)		16.1		14.4		17.2
	4.2		3.7		3.1	Intangibles (net)		1.8		2.2		5.4
	8.5		6.7		4.1	All Other Non-Current		2.3		4.9		4.7
	100.0		100.0		100.0	Total		100.0		100.0		100.0
						LIABILITIES						
	16.4		12.6		14.0	Notes Payable Short-Term		13.9		12.3		11.8
	3.4		2.3		3.0	Cur. Mat.-L/T/D		4.5		3.6		.7
	11.7		13.1		14.6	Trade Payables		14.5		12.0		16.5
	.7		.9		.6	Income Taxes Payable		.5		.5		.7
	8.1		9.0		11.1	All Other Current		5.6		10.8		11.9
	40.3		38.0		43.2	Total Current		38.8		39.2		41.7
	13.2		13.4		12.2	Long Term Debt		15.5		9.4		11.8
	1.2		.5		.4	Deferred Taxes		.1		.5		.6
	2.8		5.3		3.5	All Other Non-Current		2.2		2.1		1.7
	42.4		42.9		40.6	Net Worth		43.4		48.8		44.3
	100.0		100.0		100.0	Total Liabilities and Net Worth		100.0		100.0		100.0
						INCOME DATA						
	100.0		100.0		100.0	Net Sales		100.0		100.0		100.0
	35.5		37.2		36.0	Gross Profit		35.5		33.5		35.8
	28.5		29.3		30.2	Operating Expenses		29.9		28.2		28.6
	6.9		7.9		5.8	Operating Profit		5.7		5.3		7.2
	3.3		1.8		1.2	All Other Expenses (net)		1.1		.4		1.8
	3.7		6.1		4.6	Profits Before Taxes		4.6		4.9		5.3
						RATIOS						
	2.5		2.8		2.9			4.5		2.8		2.8
	1.7		1.9		1.8	Current		2.3		1.9		1.9
	1.2		1.3		1.3			1.5		1.3		1.2
	1.4		1.7		1.4			1.7		2.0		1.8
	.8		1.1		.8	Quick		.6		.8		1.0
	.6		.7		.6			.5		.6		.7
34	10.6	**31**	11.6	**34**	10.8		**14**	25.2	**31**	11.9	**56**	6.5
55	6.6	**49**	7.4	**56**	6.5	Sales Receivables	**37**	10.0	**56**	6.5	**72**	5.1
85	4.3	**85**	4.3	**85**	4.3		**78**	4.7	**89**	4.1	**99**	3.7
62	5.9	**55**	6.6	**63**	5.8		**79**	4.6	**43**	8.5	**68**	5.4
104	3.5	**85**	4.3	**94**	3.9	Cost of Sales/Inventory	**126**	2.9	**78**	4.7	**85**	4.3
146	2.5	**152**	2.4	**146**	2.5		**166**	2.2	**140**	2.6	**118**	3.1
21	17.0	**21**	17.7	**18**	20.1		**10**	38.1	**12**	30.2	**29**	12.5
29	12.4	**27**	13.3	**30**	12.3	Cost of Sales/Payables	**27**	13.3	**22**	16.4	**39**	9.4
50	7.3	**47**	7.8	**61**	6.0		**40**	9.1	**33**	11.0	**66**	5.5
	3.9		3.4		3.3			2.6		3.0		3.3
	7.6		6.2		6.3	Sales/Working Capital		4.4		6.5		5.1
	17.5		10.8		13.8			14.0		11.5		15.0
	7.1		10.1		9.0			6.8		9.2		14.5
(44)	2.4	(66)	3.4	(69)	3.6	EBIT/Interest	(12)	1.9	(14)	4.6	(21)	4.3
	1.0		1.5		1.5			.8		1.3		2.9
	8.9	(34)	13.3	(24)	13.1	Net Profit + Depr., Dep.,						
(23)	2.8		3.3		2.8	Amort./Cur. Mat.L/T/D						
	.5		1.8		1.2							
	.2		.2		.1			.1		.1		.2
	.6		.4		.5	Fixed/Worth		.4		.3		.5
	.8		.8		1.0			1.2		.7		1.0
	.9		.8		1.0			.7		.5		.7
	2.0		1.6		1.8	Debt/Worth		1.5		1.1		1.7
	3.0		3.3		3.3			3.0		5.5		2.6
	34.5		52.8		39.9	% Profit Before Taxes/Tangible		51.2		42.8		37.9
(45)	16.2	(65)	26.1	(70)	22.8	Net Worth		9.2	(16)	27.4	(21)	27.9
	−1.1		7.0		4.6			−2.8		3.2		17.2
	11.7		20.5		17.0	% Profit Before Taxes/Total		21.1		18.6		14.2
	5.5		10.8		7.6	Assets		3.3		9.6		8.2
	−.4		1.9		1.5			−.8		1.5		3.9
	20.1		44.3		35.8			64.6		42.7		21.4
	9.8		15.6		17.1	Sales/Net Fixed Assets		35.8		15.1		11.2
	6.5		7.3		7.5			9.5		7.3		7.2
	2.1		2.5		2.6			2.9		2.6		2.1
	1.6		2.0		2.0	Sales/Total Assets		2.0		1.8		1.9
	1.3		1.5		1.6			1.7		1.5		1.4
	1.1		.8		.7			.4		.8		1.4
(36)	2.1	(61)	1.7	(61)	1.6	% Depr., Dep., Amort./Sales	(11)	.8		2.3		2.6
	2.9		3.3		2.8			2.5		2.9		3.2
	1.8		2.4		2.7	% Officers', Directors',						
(12)	4.3	(23)	4.1	(30)	4.5	Owners' Comp/Sales						
	6.7		9.5		7.8							
	1537661M		**1883457M**		**1840680M**	Net Sales ($)	**3293M**	**27202M**	**36782M**	**116678M**	**115773M**	**1540952M**
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See Pages 1 through 15 for Explanation of Ratios and Data

NMED EXHIBIT 31

Exhibit 3-7

XYZ, INC.
CONSOLIDATED BALANCE SHEETS
SEPTEMBER 30, 1988 AND 1987

		1988	1987
ASSETS	**Current Assets:**		
	Cash and cash equivalents	**$ 2,944,964**	$ 1,459,475
	Cash investments	**2,244,061**	3,369,289
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	prepaid expenses and other	**725,964**	122,370
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	Total	**10,322,798**	8,868,961
	Less accumulated depreciation	**4,705,580**	4,207,598
	Property - net	**5,617,218**	4,661,363
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	Total	**$22,106,246**	$18,516,795
LIABILITIES AND SHAREHOLDERS' EQUITY	**Current Liabilities:**		
	Current portion of long-term debt	**$ 17,902**	$ 32,405
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	Total shareholders' equity	**(50,234)**	1,157,528
		14,801,285	13,405,762
	Total	**$22,106,246**	$18,516,795

See accompanying Notes to Financial Statements

NMED EXHIBIT 31

4. DETERMINATION OF WIDESPREAD IMPACTS

The financial impacts of undertaking pollution controls could potentially cause far-reaching and serious socioeconomic impacts. If the financial tests outlined in Chapter 2 and 3 suggest that a discharger (public or private) or group of dischargers will have difficulty paying for pollution controls, then an additional analysis must be performed to demonstrate that there will be widespread adverse impacts on the community or surrounding area. There are no economic ratios per se that evaluate socioeconomic impacts. Instead, the relative magnitudes of indicators such as increases in unemployment, losses to the local economy, changes in household income, decreases in tax revenues, indirect effects on other businesses, and increases in sewer fees for remaining private entities should be taken into account when deciding whether impacts could be considered widespread. Since EPA does not have standardized tests and benchmarks with which to measure these impacts, the following guidance is provided as an example of the types of information that should be considered when reviewing impacts on the surrounding community.

In certain circumstances, the information presented here may not adequately address all potential impacts. At a minimum, however, the analysis must define the affected community (the geographic area where project costs pass through to the local economy), consider the baseline economic health of the community, and finally evaluate how the proposed project will affect the socioeconomic well-being of the community. Applicants should feel free to consider additional measures not mentioned here if they judge them to be relevant. Likewise, applicants should not view this guidance as a check list. In all cases, socioeconomic impacts should not be evaluated incrementally, rather, their cumulative effect on the community should be assessed. More detailed guidance on the factors that should be considered when evaluating the socioeconomic impacts to communities of meeting water quality standards is given below.

4.1 Define Relevant Geographical Area

One important factor in determining the magnitude of these impacts is defining the geographical area in which they occur. In some cases, one community's loss may be another community's gain, as in the case of a plant moving to another community. In the case of municipal pollution control projects, the affected community is most often the immediate municipality. There are, however, exceptions where the affected community includes individuals and areas outside the immediate community. For example, if business activity in the region is concentrated in a nearby community and not in the immediate community, then the nearby community may also be affected by loss of income in the immediate community and should be included in the analysis. If business activity of the region is concentrated in the immediate community, then outlying communities dependent upon the immediate municipality for employment, goods, and services should also be included in the analysis. Similarly, if a large number of workers commute to an industrial facility that is significantly affected by the costs, then the affected community should include the home communities of commuters as well as the immediate community.

The relevant geographic area for evaluating the socioeconomic effects of compliance by private entities varies with each situation. For impacts from actions by a private entity, the area will typically be determined by the area in which the majority of its workers live and where most of the businesses that depend on it are located. There are no simple rules for defining the relevant area or community; the decision is based on the judgement of the discharger and state, subject to EPA review.

4.2 Determine Whether Impacts are Widespread: Public-Sector Entities

In demonstrating that impacts will be substantial, the applicant will have shown that compliance with water quality standards would be burdensome to the community. To demonstrate that impacts will also be widespread, the applicant must examine the estimated <u>change</u> in socioeconomic conditions that occur as a result of compliance.

There are no explicit criteria by which to evaluate widespread impacts. It is recommended, however, that changes in the socioeconomic indicators listed below be considered. For each indicator listed, the applicant should estimate the potential change from precompliance conditions if the community were to adopt pollution controls.

- Median Household Income;
- Community Unemployment Rate;
- Overall Net Debt as a Percent of Full Market Value of Taxable Property;
- Percent of Households Below Poverty Line;
- Impact on Community Development Potential; and
- Impact on Property Values.

Precompliance estimates of the first three indicators were considered in Chapter 2 in the Secondary Test. Estimated changes should be described qualitatively in **Worksheet M**. Depending on the size and type of impacts on industrial and commercial discharges, these estimated changes may be relatively large or small. In addition to changes in income, unemployment, and debt, affected communities may be faced with impaired development opportunities if pretreatment requirements or significantly higher user fees are imposed by the POTW. The municipality should therefore assess the potential for the loss of future jobs and personal income to the community if businesses would chose not to locate in the affected community. The potential for impaired development opportunities can be judged, in part, by comparing post-compliance costs to costs in neighboring communities. The cost of pollution control may also have an adverse effect on property values. Where property taxes are used to finance the project, property values may fall in response to higher taxes. Similarly, if the project will be financed through user fees, demand for property in the community may fall, thus decreasing the value of property in the community.

The extent to which estimated changes can be interpreted as significant, however, will depend on the health of the community before compliance. It is therefore not possible to identify acceptable or unacceptable estimated changes for each indicator. For example, if Community XYZ were determined to be in a weak condition before compliance. As defined in Chapter 2, but the evaluation of widespread impacts suggests that all of the indicators listed above will remain virtually unchanged, then widespread impacts have not been demonstrated. Alternatively, if Community XYZ were very healthy, the estimated change in the indicators listed above would have to be very large in order for widespread impacts to occur.

In addition, there may be secondary impacts (not captured by the primary and secondary tests) to the community. Secondary impacts might include depressed economic activity in a community resulting from loss of purchasing power by persons losing their jobs due to increased user fees. The next section describes secondary impacts in greater detail.

4.3 Determine Whether Impacts are Widespread: Private-Sector Entities

If the financial tests suggest that a private entity or group of entities will have difficulty paying for pollution controls, then an additional analysis must be performed to demonstrate that there will be widespread adverse impacts on the community or surrounding area. The current economic condition of the affected community and the role of the affected entities within the community should first be considered when determining whether the affected community will be able to absorb the impacts of reduced business activity or closures. Through property taxes and employment, the entity(ies) may be a key contributor to the economic base of the affected community. In this situation, reductions in employment caused by compliance with the water quality standards could be widespread if workers have no other employment opportunities nearby. Impacts may also be significant where the entity(ies) is a primary producer of a particular product or service upon which other nearby businesses or the affected community depend. The impacts of reduced business activities or closure will be far greater in this case than if the products are sold elsewhere. These two examples illustrate how the interdependence between the affected entity(ies) and the affected community is a major factor in demonstrating that the impacts are not only substantial, but also widespread.

As important as the extent of socioeconomic impacts is the type of impacts that might occur. A worksheet has been provided to assist applicants in their evaluation of socioeconomic impacts. **Worksheet N** is designed as a list of the factors applicants should consider in determining whether impacts are not only substantial but also widespread. The worksheet is organized to follow the text below. To make the most efficient use of this worksheet, applicants should read the remainder of Section 4.3 and then collect the data suggested in the worksheet. Applicants should feel free, however, to use anecdotal information to describe any current community characteristics or anticipated impacts that are not listed in the worksheet.

Potentially, one of the most serious impacts on the affected community's economy is the loss of employment caused by a reduction in business activity or closure. The size of this impact is dependent on the number of jobs lost relative to the total number of jobs in the community, and to the job opportunities available in the community. Typically, a decline in employment leads to a decline in personal income in the affected community. The total amount of income lost by the affected community will depend, in part, on the future job prospects of those losing their jobs. If employees leave the area in search of opportunities, all of their income will be lost to the affected community. Workers who are unable to market the full range of their skills to a new employer will receive lower wages in subsequent jobs. If employees stay in the area and find lower paying jobs or receive unemployment benefits, the loss of income to the affected community would be equal to the difference between existing and future income; the cost of unemployment benefits is calculated as a government expense or an expense borne someplace else, whichever is appropriate to the situation.

To assess the net impact on employment in the affected community, the existing rate of unemployment should be considered as an indicator of worker mobility between jobs. When the unemployment rate is very high in an affected community, workers will have a difficult time finding other jobs in that community. Where possible, comparisons should be made between industry employment levels in the community and the nation as a whole. If employment levels in the industry as a whole are falling, the industry may be in decline regardless of the burden placed on them by water quality standards regulations. If it is clear that a private-sector entity will go out of business regardless of water quality standards, the impact of the pollution controls should not be viewed as substantial. If the entity is in a marginal position, however, the effect that meeting water quality standards will have on the entity and the community should be considered. Applicants should also consider whether the lack of alternative employment opportunities may lead to an increased need for social services in the affected community. If the costs of increased social services will be borne by the affected community, they should be included in the assessment of widespread and substantial impacts.

Socioeconomic impacts may also include effects on the local government(s) such as loss of property tax revenues. If the financial tests in Chapter 3 suggest that an entity or group of entities will close, then the assessed value of property and tax revenues will fall. If the entities are a major source of revenue for the affected community, this loss in tax revenue may be significant. One example might be water quality standards that affect farming practices in an agricultural region. Compliance with these standards might lower the profitability of many farms, even to the point of forcing them to cease operations. To assess the impact, the loss in property tax revenues should be compared to total property tax revenues in the affected community to determine the relative size of the loss. In general, a drop of 1 percent in property tax revenues would be considered significant.

If compliance is evaluated in the context of a public investment for which the private entity is paying a share (e.g., a factory's share of the cost to upgrade a municipal treatment plant), then the analysis of widespread impacts is more complicated. If the financial analysis shows that the entity or group of entities cannot pay their share of the cost, then the socioeconomic and public entity analysis should include this additional burden on other users. Likewise, if the entity or group of entities are significant users of the local utilities, then a reduction in business activity or closure may lead to a lowered demand and possible decreased efficiency for local utilities. For example, a water supply system may be designed with a large industrial user in mind. If much of the demand is eliminated, the system may become excessively expensive for the remaining users.

Affected communities may also be faced with impaired development opportunities if the need to comply with water quality standards discourages other businesses from locating in the area. In situations where the affected facility has not been built, additional expenditures on water pollution controls may delay or cancel the construction. The applicant should, therefore, consider not only the loss of potential jobs and personal income to the community if the entity is not built, but the future losses in jobs, personal income and tax revenues from other businesses that would choose not to locate in the affected community.

There may be some cases in which the socioeconomic impacts of implementing pollution controls are large enough that they are felt at the state level. For example, the State may lose tax revenues from lost production and lost income if a business closes. This will be of particular importance if the business is a major employer in the State and/or the State is experiencing a period of high unemployment and fiscal distress. At the same time, the State may encounter increased expenditures for unemployment compensation and social services. In reviewing state level impacts, the applicant should consider the degree to which decreases in employment and personal income in one area of the State are offset by increases in employment and personal income in other parts of the State. In most cases, impacts at the state level will be relatively minor. If not, then impacts are widespread.

4.4 Estimate Multiplier Effect

The effects of increased unemployment, decreased personal income, and reductions in local expenditures by the entity or group of entities (public and private) will be compounded as money moves through the local economy. Some portion of the lost income would have been spent in the local economy for the purchase of other goods and services and thus for the salaries of other local employees. These local employees, in turn, would have spent some portion of their income in the local economy. This multiplier effect means that each dollar lost to an employee results in the loss of more than one dollar to the local economy.

The U.S. Department of Commerce, Bureau of Economic Analysis (BEA) has developed several multipliers to estimate the effect of reduced economic activity on output (sales), earnings, and employment. These multipliers are available by industry sector for 39 or 531 different industry classifications, depending on the level of detail required. Applicants that are interested in using these multipliers are advised to consult a copy of *RIMS II Regional Multipliers: A User Handbook of the Regional Input-Output Modeling System*, available from the National Technical Information Service (NTIS). The NTIS document number is #PB-86-230-216 and orders can be placed by calling NTIS at (703) 487-4650. Additional information on using multipliers is available from the BEA at (202) 606-5343.

4.5 Economic Benefits of Clean Water

Benefit-cost analysis is not required to demonstrate substantial and widespread effects under the Federal Water Quality Standards regulation.

In many cases, there may be economic benefits that accrue to the affected community from cleaner water. For example, in a rural community where the primary source of employment is agriculture, the reduction of fertilizer and pesticide runoff from farms would reduce the cost of treating irrigation water to downstream users. Another example might be an industrial facility discharging its wastewater into a stream that otherwise could be used for recreational cold-water fishing. Treatment or elimination of the industrial wastewater would provide a benefit to recreational fishermen by increasing the variety of fish in the stream. In both cases, the economic benefit is the dollar value associated with the increase in beneficial use or potential use of the waterbody. The types of economic benefits that might be realized will depend on both the characteristics of the polluting entity and characteristics of the affected community, and should be considered on a case by case basis.

Since the assessment of benefits requires site-specific information, it will be up to States to determine the extent to which benefits can be considered in the economic impact analysis. This determination should be coordinated with the EPA Regional Office. A more detailed description of the types of benefits that might be considered is given in Appendix C. This appendix is not intended to provide in-depth guidance on how to estimate economic benefits; rather, it is intended to give States an idea of the types of benefits that might be relevant in a given situation.

4.6 Summary of Financial Capability and Determination of Whether Impacts are Substantial and Widespread

Using the guidance described in this document, the applicant must demonstrate that the pollution control measures needed to meet water quality standards are not affordable. In addition, the applicant will have to show that there will be widespread adverse impacts to the community if it is required to meet standards. A summary checklist of the steps required in this process is presented in Table 4-1. This checklist also presents the type of data the applicant will need to collect to support each step. Whether or not the applicant has successfully demonstrated that substantial and widespread economic and social impacts would occur, however, will depend upon the EPA Regional Administrator's review of the application.

If the EPA Regional Administrator determines that substantial and widespread economic and social impacts have not been demonstrated, then the discharger must meet the water quality standards. Alternatively, if substantial and widespread economic and social impacts have been demonstrated, then the discharger will not have to meet the water quality standards. The discharger will, however, be expected to undertake some additional pollution control. The criteria outlined in Chapters 2 and 3 should be used to determine the most protective pollution control technique that would not impose a substantial impact on the entity. In addition, the discharger should check with EPA and the State regularly to determine what else will be required of them. It is then up to the State to revise the standards in the water body to reflect the uses that would be achieved if the discharger adopts the next most protective pollution control technique. The State will also have to revise its water quality criteria to protect the newly attainable uses. The discharger's NPDES permit will then be revised to reflect the new limits associated with revised criteria. Finally, federal regulations require that water quality standards be reviewed every three years to determine if there is any new information or technology that allows attainment of the full designated use without causing substantial and widespread social and economic impacts.

Table 4-1
Demonstration of Substantial and Widespread
Economic and Social Impacts of Attainment of Designated Uses

CHECKLIST

STEPS	**INFORMATION THAT WILL BE REQUIRED FROM APPLICANT**
1. Demonstrate that designated use is a potential use and not an existing use.	Data from State Water Quality Assessment Documents and water quality standards regulations.
2. Demonstrate that entity will incur substantial economic impacts.	
a. Identify all reasonable pollution reduction options,	Information on end-of-pipe treatment, possible treatment upgrades, additions to existing treatment, and pollution prevention activities including the following: • change in raw materials, • substitution of process chemicals, • change in process, • water recycling, reuse and efficiency, • pretreatment requirements, and • public education.
b. Evaluate costs of all reasonable pollution reduction options,	Assumptions about water demand, treatment capacity, expansion plans, population growth, and effectiveness of control in reducing pollution for each option. Estimate of project costs from design engineers, costs of comparable projects in the State, or judgement of experienced water pollution control engineers.
c. Identify lowest cost pollution reduction option that allows entity to meet water quality standards.	Information on treatment efficiencies for alternative pollution reduction techniques. Cost estimates for all alternatives.

NMED EXHIBIT 31

Table 4-1 CHECKLIST (Cont'd.)

STEPS	INFORMATION THAT WILL BE REQUIRED FROM APPLICANT
3. Evaluate entity's financial health (**Public Entities Only**):	
a. determine method of financing,	Information on user fee financing mechanisms such as Revenue Bonds. Information on tax based financing mechanisms such as General Obligation Bonds.
b. annualize pollution reduction project costs,	Information on appropriate interest rates and period of financing.
c. allocate project costs,	Information on user groups, wastewater flow by user group, and surcharges on industrial users.
d. apply Municipal Preliminary Screener test,	Information on average total annual pollution control cost per household and median household income.
e. Depending on the results of the Municipal Preliminary Screener test, apply Secondary Test.	Information on results of Municipal Preliminary Screener test, overall net debt as a percent of full market value of taxable property, median household income, bond rating, community unemployment rate, property tax collection rate, and property tax revenues as a percent of full market value of taxable property.
4. Evaluate entity's financial health (**Private Entities Only**):	
a. annualize pollution reduction project costs,	Information on appropriate interest rates and period of financing.
b. Primary Measure:	
profitability,	Information that will allow evaluation of whether an entity will remain profitable after incurring the cost of pollution reduction including: • revenues, • cost of goods sold,

Table 4-1 CHECKLIST (Cont'd.)

STEPS	INFORMATION THAT WILL BE REQUIRED FROM APPLICANT
	• portion of corporate overhead assigned to the entity, and • total annualized pollution reduction project costs.
c. Secondary measures:	
solvency,	Information that will allow evaluation of the entity's ability to meet its fixed and long-term obligations including: • long-term debt, • current debt, • net income after taxes, and • depreciation.
liquidity, and	Information that will allow evaluation of how easily an entity can pay its short-term bills such as: • current assets, • current liabilities, and • total annualized pollution reduction project costs.
leverage.	Information that will allow evaluation of the extent to which a firm already has fixed financial obligations and therefore how much money it will be able to borrow including, long-term liabilities and owner equity.
5. Determine whether impacts are widespread (**Public Entities Only**):	
a. Evaluate change in socioeconomic conditions that occur as a result of compliance.	Information on <u>changes</u> in median household income, community unemployment rate, overall net debt as a percent of full market value of taxable property, percent of households below the poverty line, impact on community development potential, and impact on community

Table 4-1 CHECKLIST (Cont'd.)

STEPS	INFORMATION THAT WILL BE REQUIRED FROM APPLICANT
6. Determine whether impacts are widespread (**Private Entities Only**):	property values resulting from compliance.
a. Define community,	Information on the geographical boundary of the area in which the majority of the entity's workers live and where most of businesses that depend on the entity are located.
b. Evaluate effect on employment,	Current unemployment, change in unemployment due to investment in pollution reduction.
c. Evaluate effect on tax revenues,	Information on the likely effect on assessed value of property tax revenues if the entity must adopt pollution reductions.
d. Assess impairment of development opportunities,	Information on the likelihood that the need to adopt pollution reductions in the affected community would discourage other businesses from locating in the area in the future.
e. Collect any relevant additional information that demonstrates widespread socioeconomic impacts.	Any additional information that suggests that there are unique conditions in the affected community that should also be considered.
7. Evaluate economic benefits of cleaner water.	Information on potential benefits of cleaner water including enhanced recreational opportunities, reduced treatment costs for downstream users and increased property values.
8. Public comment and debate period.	Be prepared to supply backup information on the application to modify

Table 4-1 CHECKLIST (Cont'd.)

STEPS	INFORMATION THAT WILL BE REQUIRED FROM APPLICANT
	or change a designated use to the public.
9. If substantial and widespread economic and social impacts are demonstrated, determine which pollution reduction option should be implemented.	Information on the cost and efficiency of affordable pollution reduction alternatives.
10. Redesignate uses.	Uses will be determined by the level of "affordable" pollution reduction.
11. Standards will be adopted to protect new uses.	Once uses are established, standards should be revised to protect those uses.
12. Effluent limits and permits will be modified.	Limits will be modified to reflect effluent concentrations associated with the "affordable" pollution reduction technique.
13. Re-evaluate water quality standards in three years.	Per federal regulations, water quality standards must be revised every three years to determine if there is any new information or technology that allows attainment of the full designated uses without causing a substantial and widespread economic and social impact.

5. ANTIDEGRADATION: ROLE OF ECONOMIC ANALYSIS

Under the Water Quality Standards program, each State must develop, adopt and retain a statewide antidegradation policy and establish procedures for its implementation. The antidegradation policy is intended to protect current water quality; in only a limited set of cases can economic grounds be used to allow for a lowering of water quality. In particular, if the quality of the water exceeds levels necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water (i.e. "high-quality water"), then economic considerations can be taken into account. Before any lowering of water quality in high-quality waters, however, an antidegradation review must determine that the lowering is necessary in order to accommodate important economic or social development in the area in which the waters are located.

Antidegradation is not a "no growth" rule and was never designed nor intended to be one. It is a policy that allows the public to make decisions about important environmental actions. Where the State intends to provide for development, it may decide that some lowering of water quality in "high-quality waters" is necessary to accommodate important economic or social development. Any such reduction in water quality, however, must protect existing uses fully and must satisfy the requirements for intergovernmental coordination and public participation.

While the terminology is different, the tests to determine substantial and widespread economic impacts (used when removing a use or granting a variance) are basically the same as those used to determine if there might be interference with an important social and economic development (antidegradation). As such, antidegradation analysis is the mirror image of the analyses described in Chapters 2, 3 and 4. Variances and downgrades refer to situations where additional treatment needed to meet standards may result in worsening economic conditions; while antidegradation refers to situations where lowering water quality may result in improved social and economic conditions.

When performing an antidegradation review, the first question is whether the pollution controls needed to maintain the high-quality water will interfere with the proposed development. If not, then the lowering of water quality is not warranted. If, on the other hand, the pollution controls will interfere with development, then the review must show that the development would be an important economic and social one. These two steps rely on the same tests as the determination of substantial and widespread impacts. It should be stressed at the outset that substantial economic impacts does not mean driving profits to zero, nor precluding all other municipal expenditures.

The following sections describe the steps involved in performing an economic impact analysis as part of an antidegradation review. These steps are outlined in Figure 5-1. The analytic approach presented here can be used for a variety of public-sector and private-sector entities, including POTWs, commercial, industrial, residential and recreational land uses, and for point and nonpoint sources of pollution. The guidance provided in this chapter, however, is not meant to be exhaustive. The State and/or EPA may require additional information or tests. In addition, the applicant should feel free to include any additional information they feel is relevant. The steps described in further detail in the rest of the chapter are:

- **Verify Project Costs and Calculate the Annual Cost of the Pollution Control Project** - This section describes the factors considered when verifying that the proposed pollution control project is the most appropriate solution and the type of information that should be provided about the proposed project. It discusses how to annualize capital costs of the project and calculate total annual costs of the pollution control project.

- **Determine if Requirements would Interfere with Development (i.e., lower water quality is "necessary")** - This section describes the types of financial tests that should be used to determine if maintaining the high-quality water would interfere with the development.

- **Determine if Economic and Social Development would be Important** - This section presents factors to be considered in determining whether the development would be important from an economic and social point of view.

These steps closely parallel the analytic techniques presented in Chapters 2, 3, and 4. These chapters should be read for more detail.

5.1 Verify Project Costs and Calculate The Annual Cost of the Pollution Control Project

Before the impact analysis can be performed, the project costs should be verified and the annual costs calculated. Both private-sector and public-sector entities should consider a broad range of discharge management options including pollution prevention, end-of-pipe treatment, and upgrades or additions to existing treatment.

Whatever approach, the discharger must demonstrate that the proposed project is the most appropriate means of meeting water quality standards and must document project cost estimates. If there is at least one of the treatment alternatives that allows the applicant to maintain high-quality water without incurring substantial impacts, then they have failed to show that the requirements would interfere with the development. Cost information, and the assumptions underlying the cost estimates, should be supplied on Worksheet O.

The following two sections (5.1.a and 5.1.b) discuss analyzing public-sector projects. Section 5.1.c discusses private sector projects.

5.1.a Public-Sector Developments: Calculate the Annual Costs of the Pollution Control Project

Since capital costs typically will be paid over several years, annualized costs are used in the evaluation of economic burden to the community. The capital portion of public-sector project costs is typically financed over approximately 20 years, by issuing a municipal debt instrument such as a general obligation bond or a revenue bond.

The calculation of total annualized cost of the project is presented in **Worksheet P**. First, capital costs are summed and the portion of costs to be paid for with grant monies are deducted, as these costs will not need to be financed. Next, the annualization factor is calculated using the formula supplied on **Worksheet P**, or the annualization factor is found in Appendix B. Annualized capital cost is then calculated by multiplying the total capital costs to be financed by the annualization factor.

The interest rates used to annualize costs are dependent on the type of debt instrument used as well as the issuer's credit standing. Therefore, the interest rate used on **Worksheet P** reflects the debt instrument (i.e. municipal bond, commercial bank loan, state revolving fund loan, or other instrument) likely to be used by the municipality.

Next, annual operating and maintenance costs are added to the annualized capital cost. O&M costs should include the costs of monitoring, inspection, permitting fees, waste disposal charges, repair, administration, replacement, and any other recurring costs. All recurring costs should be stated in terms of dollars per year. The sum of the annualized capital cost and total annual operating and maintenance costs is the total annual cost of the project.

5.1.b Public-Sector Developments: Calculate Total Annualized Pollution Control Costs Per Household

To assess the burden that total pollution control costs are expected to have on households, an average annualized pollution control cost per household should be calculated for all households in the community that would bear project costs. In order to evaluate substantial impacts, therefore, the analysis must establish which households will actually pay for pollution control and what proportion of the costs will be borne by households. Then, these apportioned project costs are added to existing pollution control costs paid by the households.

It is important to define the affected community. The "community" is the governmental jurisdiction or jurisdictions responsible for paying compliance costs.

If project costs were estimated for some prior year, these costs should be adjusted upward to reflect current year prices using the average annual national Consumer Price

Index (CPI) inflation rate for the period. The CPI inflation rate is available from the Bureau of Labor Statistics. An additional source reporting the CPI inflation rate is the *CPI Detailed Report*, which is published monthly by the U.S. Department of Labor, Bureau of Labor Statistics.

In calculating the total annual cost of pollution control per household, current costs of pollution control must be considered along with the projected annual costs of the proposed pollution control project. The existing cost per household usually can be obtained from the most recent municipal records. For example, use the most recent operating revenues of the sewer enterprise fund, divided by the number of households served. If the portion of proposed project costs that households are expected to pay is known or is expected to remain unchanged, then use **Worksheet Q** to calculate the total annual cost of pollution control per household. If the portion paid by households is based on flow, then should refer to **Worksheet Q: Option A** as well.

5.1.c Private-Sector Entities: Calculate the Annual Costs of the Pollution Control Project

As with public-sector investments, the total capital costs are usually spread out over several years. Annualization calculates the amount that will be paid each year, including the financing costs. In order to allow for comparisons across cases, the analysis should assume that the applicant will borrow the capital and repay the loan in even annual installments over a 10 year period. The assumption of ten years is based on the likely life of the equipment. The assumption of even annual installments is made for convenience. The interest rate on the loan should be equivalent to the rate the applicant pays when it borrows money.

The financial tests discussed below compare the costs of compliance to other costs and revenues of the applicant. Compliance costs and other costs and revenues must, therefore, be calculated for the same year. See discussion in Section 2.2, and Appendix A for references to inflation/deflation indices. The Annualized Cost of Pollution Control for a private-sector entity can be calculated using **Worksheet R**.

5.2 Financial Analysis to Determine if Lower Water Quality is "Necessary"

The purpose of the financial impact analysis is to assess the extent to which planned development will be reduced as a result of maintaining water quality. There are two sets of tests presented in this section: one set for publicly owned developments, such as POTWs, and another for privately owned developments, such as new manufacturing facilities. The tests are not designed to determine the exact impact of pollution control costs on an entity. They merely provide indicators of whether pollution control costs would result in a substantial impact.

5.2.a Public-Sector Developments: Calculate and Evaluate the Municipal Preliminary Screener Value

Whether or not maintaining high-quality water is likely to interfere with a development due to additional public-sector costs is determined by jointly considering the results of two tests. The first test is a "screener" to establish whether the community can clearly pay for the project. The Municipal Preliminary Screener estimates the total per household annual pollution control costs to be borne by households (existing costs plus those attributable to the proposed project) as a percentage of median household income. The screener is written as follows:

$$Municipal\,Preliminary\,Screener\ =$$

$$\frac{Average\,Total\,Pollution\,Control\,Cost\,per\,Household}{Median\,Household\,Income}$$

Median household income information for many municipalities is available from the 1990 Census of Population. To estimate median household income for the current year, use the CPI inflation rate for the period between the year that median household income is available and the current year.

Depending on the results of the screener, the community is expected to incur small, mid-range, or large economic impacts (see **Worksheet S**). If the total annual cost per household (existing annual cost per household plus the incremental cost related to the proposed project) is less than 1.0 percent of median household income, then the requirements are not expected to impose a substantial economic hardship on households and would not interfere with the development.

Communities are expected to incur mid-range impacts when the ratio of total annual compliance costs to median household income is between 1.0 and 2.0 percent. If the average annual cost per household exceeds 2.0 percent of median household income, then the project may place a large financial burden on many of the households within the community and the requirements may interfere with the development. In either case, communities move on to the Secondary Test to demonstrate substantial impacts.

5.2.b Public-Sector Developments: Secondary Test

The Secondary Test is designed to build upon the characterization of community identified in the Municipal Preliminary Screener. The Secondary Test indicates the community's ability to obtain financing and describes the socioeconomic health of the community. Indicators describe precompliance debt, socioeconomic, and financial management conditions in the community. Using these indicators and the scoring system described below, the impact of the cost of pollution control is estimated. Specifically, applicants are required to present the following six indicators for the community:

Debt Indicators

- Bond Rating (if available) - a measure of credit worthiness of the community;

- Overall Net Debt as a Percent of Full Market Value of Taxable Property - a measure of debt burden on residents within the community;

Socioeconomic Indicators

- Unemployment Rate - a measure of the general economic health of the community;

- Median Household Income - a measure of the wealth of the community;

Financial Management Indicators

- Property Tax Revenue as a Percent of Full Market Value of Taxable Property - a measure of the funding capacity available to support debt based on the wealth of the community; and

- Property Tax Collection Rate - a measure of how well the local government is administered.

A more detailed description of the six indicators is presented in Section 2.4, including a discussion of alternative measures to use in States with property tax caps and limitations on assessed values. **Worksheet T** can be used to estimate each of the indicators. Table 5-1 summarizes the indicators and what is considered to be a strong, mid-range, or weak rating.

The Secondary Score is calculated for the community by weighting each indicator equally and assigning a value of 1 to each indicator judged to be weak, a 2 to each indicator judged to be mid-range, and a 3 to each strong indicator. A cumulative assessment score is arrived at by summing the individual scores and dividing by the number of factors used. **Worksheet U** guides the reader through this calculation. The cumulative assessment score is evaluated as follows:

- less than 1.5 is considered weak
- between 1.5 and 2.5 is considered mid-range
- greater than 2.5 is considered strong

If the applicant is not able to develop one or more of the six indicators, they must provide an explanation as to why the indicator is not appropriate or not available. Since the point of the analysis is to measure the overall burden to the community, the debt and socioeconomic indicators are assumed to be better measures of burden than the financial management indicators. Consequently, if one of the debt or socioeconomic indicators is not available, the applicant should average the two financial management indicators and use this averaged value as a single indicator with the remaining indicators. This averaging is necessary so that undue weight is not given to the financial management indicators.

5.2.d Public-Sector Developments: Assess Whether the Requirements Would Interfere With the Development

The results of the two tests are considered jointly in determining whether the community is expected to incur substantial impacts that would interfere with the development. As shown in Table 5-2, the cumulative assessment score for the community is combined with the estimated household burden. The combination of factors establishes whether impacts can be expected to be substantial.

In the matrix, "X" indicates that the impact is likely to interfere with the development. The closer the community is to the upper right hand corner of the matrix, the greater the likelihood. Similarly, "✓" indicates that the impact is not likely to interfere with development. The closer to the lower left hand corner of the matrix, the smaller the likelihood. Finally, the "?" indicates that the impact is unclear.

5.2.e Private-Sector Developments: Financial Measures

Four general categories of financial tests are used to determine if maintaining high-quality water will interfere with privately owned development. The four categories are divided into a primary measure of financial impacts and three secondary measures of financial impacts:

Primary Measure

- Profit -- how much would profits decline due to pollution control expenditures?

Secondary Measures

- Liquidity -- how easily can an entity pay its short-term bills?
- Solvency -- how easily can an entity pay its fixed and long-term bills?
- Leverage -- how much money can the entity borrow?

Profit and solvency ratios are calculated both with and without the additional compliance costs (taking into consideration the entity's ability, if any, to increase its prices to cover part or all of the costs). Comparing these ratios to each other and to industry benchmarks provides a measure of the impact on the entity. Since antidegradation reviews involve new or expanded operations, the ratios often will be calculated using estimated values from pro-forma income statements and balance sheets prepared for the development.

For all of the tests, it is important to look beyond the individual test results and evaluate the total situation of the entity. While each test addresses a single aspect of financial health, the results of the four tests should be considered jointly to obtain an overall picture. The results should be compared with the ratios for other entities in the same industry or activity.

The primary and secondary measures are described below, along with an example of specific tests to be used. While there are several ratios that could be used for each test, to simplify the presentation only one ratio per test is described. In most cases, interpreting the results requires comparisons with typical values for the industry. Among the sources that provide comparative information are: Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, Dun and Bradstreet's *Dun's Industry Norms*, and Standard & Poor's *Industry Surveys*. The *Annual Statement Studies*, *Dun's Industry Norms* , and Standard & Poor's *Industry Surveys* provide composite statistics for firms grouped into various manufacturing and service industries. The *Moody's Industrial Manual* provides detailed financial information on individual firms that can be used for comparison purposes. Each of the tests is discussed in more detail in Chapter 3.

5.2.f Private-Sector Developments: Primary Measure

Primary measure is the Profit Test, which measures the development's earnings if it is required to provide pollution control necessary to maintain the high-quality waters and if it is not required to do so. If maintaining high-quality water would result in considerably lower profits, then the development might not take place.

Two pieces of information are needed for the Profit Test. The first piece is the total annual cost of the required pollution control from **Worksheet R**. The second piece is the earnings information from the entity's income statement (**Worksheet V**).

$$Profit\ Test = \frac{Earnings\ Before\ Taxes}{Revenues}$$

The Profit Test should be calculated with and without the cost of the pollution control. In the former case, the annualized cost of pollution control (including O&M) is subtracted from the discharger's estimated earnings before taxes (revenues minus costs excluding income taxes). The Profit Test can be calculated using **Worksheets V, and W**. These profit rates should be compared to those for facilities in similar lines of business, using data in *Moody's Industrial Manual*, *Dun & Bradstreet's Industry Norms and Key Business Ratios*, *Standard & Poor's Industry Surveys*, or Robert Morris's *Annual Statement Studies*.

The degree to which the discharger is able to raise prices is difficult to predict, and depends on many factors. Considerations should include the level of competition in the industry, the likelihood of competitors' facilities facing similar project costs, and the willingness of consumers to pay more for the product.

5.2.g Private-Sector Developments: Secondary Measures

The following secondary measures provide additional important information about the financial health of the development. All primary and secondary measures should be included in the analysis.

Liquidity

Liquidity is a measure of how easily a discharger can pay its short-term bills. One measure of liquidity is the Current Ratio, which compares current assets with current liabilities. Current assets include cash and other assets that are or could reasonably be converted into cash during the current year. Likewise, current liabilities are items that must be paid within the current year.

The Current Ratio is calculated by dividing current assets by current liabilities.

$$\textit{Current Ratio} = \frac{\textit{Current Assets}}{\textit{Current Liabilities}}$$

The Current Ratio can be calculated using **Worksheet X**. The general rule is that if the Current Ratio is greater than 2, the entity should be able to cover its short-term obligations. Frequently, lenders require this level of liquidity as a prerequisite for lending. This rule (Current Ratio > 2) may not, however, be appropriate for all types of private entities. The Current Ratio of the discharger in question should be compared with ratios for other dischargers in the same line of business.

Solvency

Solvency is a measure of an entity's ability to meet its fixed and long-term obligations. These obligations are bills and debts that are owed on a regular basis for periods longer than one year. Solvency tests are commonly used to predict financial problems that could lead to bankruptcy within the next few years.

As with liquidity, there are several possible tests for solvency. One solvency test, the Beaver's Ratio, compares cash flow to total debt. This test has been shown to be a good indicator of the likelihood of bankruptcy.

$$Beaver's\ Ratio = \frac{Cash\ Flow}{Total\ Debt}$$

The Beaver's Ratio can be calculated using **Worksheet Y**. Cash Flow is a measure of the cash the entity has available to it in a given year. Since depreciation is an accounting cost -- a cost that does not use any currently available revenues -- it is added back to reported net income after taxes to get cash flow. Total debt is equal to the current debt for the current year plus the long term debt, since current debt includes that part of long-term debt that is due in the current year.

If the Beaver's Ratio is greater than 0.20 the development is considered to be solvent (i.e., can pay its long-term debts). If the ratio is less than 0.15 the development may be insolvent (i.e., go bankrupt). If the ratio is between 0.15 and 0.20, then future solvency is uncertain.

Leverage

Leverage tests measure the extent to which a firm has fixed financial obligations and thus indicates how much more money a firm is capable of borrowing. Firms that rely heavily on debt may find it difficult and expensive to borrow additional funds. One commonly used measure of leverage is the Debt to Equity Ratio.

$$Debt/Equity\ Ratio = \frac{Long\text{-}Term\ Liabilities}{Owners'\ Equity}$$

The Debt to Equity Ratio can be calculated using **Worksheet Z**. Since there are no generally accepted Debt/Equity Ratio values that apply to all types of economic activity, the ratio should be compared with the ratio of firms in similar businesses. If the entity's ratio compares favorably with the median or upper quartile ratio for similar businesses, it should be able to borrow additional funds. These ratios can be calculated using data in Robert Morris Associates' *Annual Statement Studies*, *Moody's Industrial Manual*, and Dun & Bradstreet's *Dun's Industry Norms*.

For entities with special sources of funding, leverage is not an appropriate measure of their ability to raise capital. Examples are agriculture and affordable housing, where special loan programs may be available. In these cases, an analysis of the probability that the project would receive this money is appropriate.

5.2.g Private-Sector Developments: Assess Whether the Requirements Will Interfere With the Development: Interpreting the Results

The financial analysis should be used to determine if there will be a substantial adverse impact such as to interfere with the development. If the four tests taken together indicate that the requirements would interfere with the development, then proceed to Section 5.3 to determine if the development would be considered important in social and economic terms.

5.3 Determine If Economic and Social Development Would Be Important

There are no economic ratios per se that determine whether a development would be considered important. Instead, the relative magnitudes of indicators such as increases in unemployment, losses to the local economy, changes in household income, decreases in tax revenues, indirect effects on other businesses, and increases in sewer fees should be taken into account. The term important is intended to convey a general concept regarding the level of social and economic development used to justify a change in high-quality waters.

5.3.a Define Relevant Geographical Area

One important factor is defining the geographical area in which the impacts will occur. In the case of municipal pollution control projects, the affected community is most often the immediate municipality. The relevant geographic area for evaluating the importance of a private-sector development varies with each situation. The area will typically be determined by the area in which the majority of its workers live and where most of the businesses that depend on it are located. In either case, the geographical area considered must include "...the area in which the waters are located." (40 CFR 131.12 (a)(2)) There are no simple rules for defining the relevant area or community; the decision is based on the judgement of the applicant and state, subject to EPA review.

5.3.b Public-Sector Developments: Determine Whether Important

While there are no explicit criteria, it is recommended that changes in the socioeconomic indicators listed below be considered. For each indicator listed, the applicant should estimate the potential change that would result from the development.

- Median Household Income;
- Community Unemployment Rate;
- Overall Net Debt as a Percent of Full Market Value of Taxable Property;
- Percent of Households Below Poverty Line;
- Impact on Community Development Potential; and
- Impact on Property Values.

Estimated changes should be provided, along with supporting discussions, on **Worksheet AA**.

5.3.c Private-Sector Developments: Determine Whether Important

Determination of whether or not a private-sector development will be important to a community requires exploring more factors than is the case with public-sector developments. **Worksheet AB** has been provided to assist applicants in their evaluation of socioeconomic impacts. It is designed as a list of the factors applicants should consider in determining whether the development is important. Applicants should feel free, however, to add anecdotal information to describe any current community characteristics or anticipated impacts that are not listed in the worksheet.

Potentially, one of the most important impacts on the affected community's economy is the employment to be gained. The size of this impact is dependent on the number of new jobs relative to the total number of jobs in the community, and to the other job opportunities available in the community. Typically, an increase in employment leads to an increase in personal income in the affected community. The total amount of income gained by the affected community will depend, in part, on the other job prospects of those hired. To assess the net impact on employment in the affected community, the existing rate of unemployment should be considered as an indicator of worker mobility between jobs.

The analysis should also consider whether the increase in employment opportunities may lead to a decreased need for social services in the affected community. If the cost of savings for decreased social services will be borne by the affected community, they should be included in the assessment.

The effects of increased employment and personal income will be compounded as the money moves through the economy. This multiplier effect means that each dollar gained to an employee results in the gain of more than a dollar to the local economy. Multiplier effects are discussed in more detail in Section 4.4.

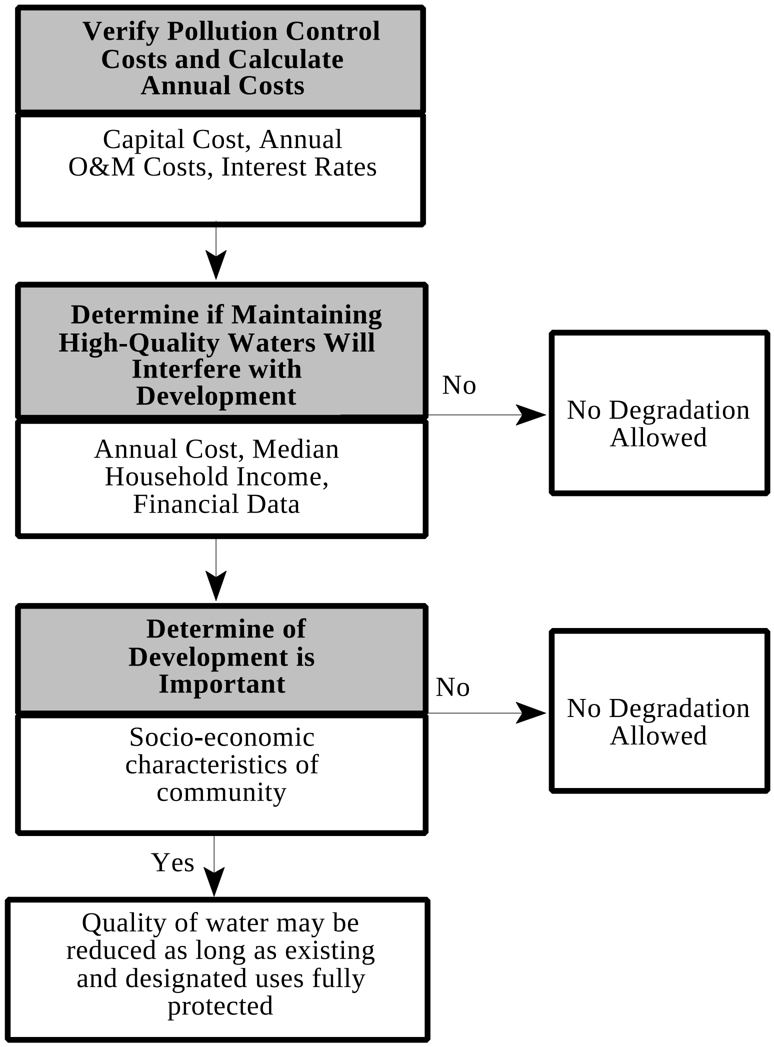
Socioeconomic impacts may also include effects on the local government(s) such as property tax revenues and the demand for other public services. For example, if the development would be paying a share of the cost to upgrade a municipal treatment plant, then the analysis of community impacts is more complicated. If the development is eliminated, the system may become excessively expensive for the remaining users.

5.4 Summary

Using the guidance described in this document, the applicant must demonstrate that the pollution control measures needed to maintain the high-quality waters will interfere with the development. In addition, the applicant will have to show that the development is important to the community.

The tests used to demonstrate interference and importance are the same as those used to demonstrate substantial and widespread. The difference is, however, that an antidegradation review considers situations that would improve the economic condition.

Figure 5-1:
Antidegradation Review



NMED EXHIBIT 31

TABLE 5-1

SECONDARY INDICATORS

	Secondary Indicators		
Indicator	**Weak**	**Mid-Range**	**Strong**
Bond Rating	Below BBB (S&P) Below Baa (Moody's)	BBB (S&P) Baa (Moody's)	Above BBB (S&P) or Baa (Moody's)
Overall Net Debt as Percent of Full Market Value of Taxable Property	Above 5%	2%-5%	Below 2%
Unemployment	More than 1% above National Average	National Average	More than 1% below National Average
Median Household Income	More than 10% below State Median	State Median	More than 10% above State Median
Property Tax Revenues as a Percent of Full Market Value of Taxable Property	Above 4%	2%-4%	Below 2%
Property Tax Collection Rate	< 94%	94% - 98%	> 98%

TABLE 5-2

ASSESSMENT OF SUBSTANTIAL IMPACTS MATRIX

Secondary Score	Municipal Preliminary Screener		
	Less than 1.0 Percent	**Between 1.0 and 2.0 Percent**	**Greater than 2.0 Percent**
Less than 1.5	?	X	X
Between 1.5 and 2.5	✓	?	X
Greater than 2.5	✓	✓	?

APPENDIX A

DATA RESOURCES AND REFERENCE MATERIALS

APPENDIX A

Cost Estimation Resources:

U.S. EPA, *Construction Costs for Municipal Wastewater Treatment Plants: 1973-1978*, EPA/430/9-80-003, April, 1980.

U.S. EPA, *Technical Report: Operation and Maintenance Costs for Municipal Wastewater Facilities*, EPA/430/9-81-004, September, 1981.

U.S. EPA, *Construction Costs for Municipal Wastewater Conveyance Systems: 1973-1979*, EPA/430/9-81-003, January, 1981.

U.S. EPA, *Quarterly Indices of Direct Costs for Operation, Maintenance and Repair: (a) Waste Pumping Stations, (b) Gravity Sewers*, Office of Municipal Pollution Control, Municipal Facilities Division, Current.

Municipal Statistics Resources:

Bureau of the Census, U.S. Department of Commerce, *County and City Data Book*, published annually.

Financial and Ratio Analysis Resources:

Leopold A. Bernstein, *The Analysis of Financial Statements*, Dow Jones-Irwin, 1978.

Dun & Bradstreet, *Dun's Industry Norms*, annual.

J. Fred Weston and Eugene F. Brigham, *Managerial Finance*, The Dryden Press, several editions.

Robert Morris Associates, *Annual Statement Studies*, annual.

Moody's Financial Services, *Moody's Industrial Manual*, annual.

U.S. Department of Labor, Bureau of Labor Statistics, *CPI Detailed Report.*

U.S. EPA, *EPA Financial Capability Guidebook*, Office of Water Programs Operations, 1984.

U.S. EPA, *The Municipal Sector Study: Impacts of Environmental Regulations on Municipalities*, EPA 230-09-038, Office of Policy, Planning and Evaluation, September 1988.

				Interest Rate					
Year	0.5%	1.0%	1.5%	2.0%	2.5%	3.0%	3.5%	4.0%	4.5%
1	1.0050	1.0100	1.0150	1.0200	1.0250	1.0300	1.0350	1.0400	1.0450
2	0.5038	0.5075	0.5113	0.5150	0.5188	0.5226	0.5264	0.5302	0.5340
3	0.3367	0.3400	0.3434	0.3468	0.3501	0.3535	0.3569	0.3603	0.3638
4	0.2531	0.2563	0.2594	0.2626	0.2658	0.2690	0.2723	0.2755	0.2787
5	0.2030	0.2060	0.2091	0.2122	0.2152	0.2184	0.2215	0.2246	0.2278
6	0.1696	0.1725	0.1755	0.1785	0.1815	0.1846	0.1877	0.1908	0.1939
7	0.1457	0.1486	0.1516	0.1545	0.1575	0.1605	0.1635	0.1666	0.1697
8	0.1278	0.1307	0.1336	0.1365	0.1395	0.1425	0.1455	0.1485	0.1516
9	0.1139	0.1167	0.1196	0.1225	0.1255	0.1284	0.1314	0.1345	0.1376
10	0.1028	0.1056	0.1084	0.1113	0.1143	0.1172	0.1202	0.1233	0.1264
11	0.0937	0.0965	0.0993	0.1022	0.1051	0.1081	0.1111	0.1141	0.1172
12	0.0861	0.0888	0.0917	0.0946	0.0975	0.1005	0.1035	0.1066	0.1097
13	0.0796	0.0824	0.0852	0.0881	0.0910	0.0940	0.0971	0.1001	0.1033
14	0.0741	0.0769	0.0797	0.0826	0.0855	0.0885	0.0916	0.0947	0.0978
15	0.0694	0.0721	0.0749	0.0778	0.0808	0.0838	0.0868	0.0899	0.0931
16	0.0652	0.0679	0.0708	0.0737	0.0766	0.0796	0.0827	0.0858	0.0890
17	0.0615	0.0643	0.0671	0.0700	0.0729	0.0760	0.0790	0.0822	0.0854
18	0.0582	0.0610	0.0638	0.0667	0.0697	0.0727	0.0758	0.0790	0.0822
19	0.0553	0.0581	0.0609	0.0638	0.0668	0.0698	0.0729	0.0761	0.0794
20	0.0527	0.0554	0.0582	0.0612	0.0641	0.0672	0.0704	0.0736	0.0769

APPENDIX C

CONCEPTUAL MEASURES OF ECONOMIC BENEFITS

APPENDIX C

CONCEPTUAL MEASURES OF ECONOMIC BENEFITS

In valuing benefits associated with an ecological resource such as clean water, a basic distinction is made between the intrinsic value of the existence of the resource and its value in use by the human population. Use values are further subdivided into direct or indirect uses. Other valuation concepts arise from the uncertainty surrounding future uses and availability of the resource. A classification of these valuation concepts, along with examples, is presented in Table C-1.

C.1 Use Benefits

Estimating the benefits of clean water will depend upon several variables that describe the attributes of the resource and its uses. A waterbody might be used for recreational activities (such as fishing, boating, swimming, hunting, bird watching), for commercial purposes (such as industrial water supply, irrigation, municipal drinking water, and fish harvesting), or for both. Where recreational activities are created or enhanced due to water quality improvements, the public will benefit in the form of increased recreational opportunities. Similarly, the cost of treating irrigation and drinking water to down stream users could be reduced if pollutant discharges were reduced or eliminated in a particular stretch of river.

Direct use includes both consumptive and non-consumptive uses. Consumptive uses can be distinguished from non-consumptive uses in that the former excludes other uses of the same resource while the latter does not. For example, water is consumed when it is diverted from a waterbody for irrigation purposes. With non-consumptive uses, however, the resource base remains in the same state before and after use (e.g., swimming). Human health benefits associated with cleaner water could be consumptive (reduced illness from eating finfish or shellfish) or non-consumptive (reduced exposure to infectious diseases while recreating).

When estimating benefits, it is important to determine whether or not the resource and its uses (in this case clean water) can be considered market or non-market resources and uses (i.e., does a market exist for the resource or its use). For example, commercial fisheries have a market value reflected by the financial value of landings of a particular species. By contrast, no market exists to describe the value individuals receive from swimming. Where market values are available, they should be used to estimate benefits. In the case of water supply, there may or may not be a market for clean water. Some water users may be required to pay for that use as in the case of a farmer paying a regional water board to divert water for irrigation purposes. This will be particularly true in the arid west. By contrast, a manufacturing facility using water for cooling or process water may not pay anything for the right to pump and use water from an adjacent river. For resources with no market value, a number of estimation techniques including the travel cost, estimation from similar markets, and contingent valuation methods have been developed.

While they are conceptually distinct attributes, consumptive use is frequently associated with markets and non-consumptive use is frequently associated with non-market situations. Some resources that are considered market resources, however, may be used non-consumptively. The converse is also true. As an example of the first, a fee may be charged (other than parking) to gain entrance to a state park, however, while a swimmer's use of a lake in the park is not consuming any part of the lake.

Commercial activities that are dependent on clean water which is not directly owned are said to benefit from indirect use. Examples would be a fishing equipment manufacturer's dependence on healthy fish stocks to induce demand for its products or the dependence of property values on the pristine condition of an adjacent water body. Indirect use is also characterized by the scenic views and water enhanced recreational opportunities (camping, picnicking, birdwatching) associated with the quality of water in a water body. Indirect use benefits such as enhanced property values can be estimated using the hedonic price technique. Care should be taken, however, to not double-count benefits. If property values reflect the proximity to and thus use of water, then the value of the use should not be included separately.

C.2 Intrinsic Benefits

Intrinsic benefits include all benefits associated with a resource that are not directly related to the current use of the resource. Intrinsic benefits are represented by the sum of existence and option values. Existence value indicates an individual's (and society's) willingness to pay to maintain an ecological resource such as clean water for its own sake, regardless of any perceived or potential opportunity for that individual to use the water body now or in the future. Contributions of money to save endangered species such as the snail darter demonstrate a willingness to pay for the existence of an environmental amenity despite the fact that the contributors may never use it or even experience it directly.

Option value is the willingness to pay for having a future opportunity to use resources such as clean water in known or as yet unknown ways. In a sense it is a combination of insurance and speculative value. Individuals routinely pay to store or transport something they are not sure they will use in the future because they recognize it would be more costly to recreate the item than to preserve it. In an ecological sense, pristine habitats and wildlife refuges are often preserved under the assumption that plant or animal species which may yield pharmaceutical, genetic, or ecosystem benefits are yet to be discovered. Option value takes on particular importance when proposed development or environmental perturbations are largely irreversible or pollutants are persistent. Intrinsic benefits are difficult to measure due to the level of uncertainty associated with these benefits. The most common approach to estimating intrinsic benefits, however, is the contingent valuation method, which cannot be described in detail within this short overview.

C.3 Summary

Total valuation of clean water benefits includes all use and existence values as well as option value. The proper framework for estimating the economic benefits associated with clean water consists of 1) determining when damage first occurs or would occur; 2) identifying and quantifying the potential physical/biological damages relative to an appropriate baseline; 3) identifying all affected individuals both due to potential loss of direct or indirect services or uses, and to potential losses attributable to existence values (may include projections for growth in participation rates); 4) estimating the value affected individuals place on clean water prior to potential degradation; and 5) determining the time horizon over which the waterbody would be degraded or restored to some maximum reduced state of service (if ever), and appropriately discounting the stream of potential lost services. If evaluating an improvement in water quality, the procedures are the same except that benefits gained are measured.

TABLE C-1

CATEGORIES OF BENEFITS

<u>Use Benefits</u>

Direct

Consumptive:*Market Benefits*

Industrial Water Supply
Agricultural Water Supply
Municipal Water Supply
Commercial Fishing

Non-Market Benefits

Recreational Fishing
Hunting
Industrial Water Supply
Agricultural Water Supply
Municipal Water Supply

Non-Consumptive:Swimming
Boating
Human Health

Indirect

Fishing Equipment Manufacturer
Property Values
Aesthetics (scenic views, water enhanced recreation)

<u>Intrinsic Benefits</u>

Option Value (access to resource in future)

Existence Value (knowledge that services of resource exist)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

RECEIVED
JUN 04 2015
SURFACE WATER QUALITY BUREAU

MAY 28 2015

REPLY TO: 6WQ-NP

CERTIFIED MAIL: RETURN RECEIPT REQUESTED (7014 0150 0000 2452 0290)

Mr. Dan Campbell
General Manager
City of Raton
Wastewater Treatment/Reclamation Facility
P.O. Box 99
Raton, NM 87740

Re: NPDES Permit Number: NM0020273 – City of Raton

Dear Mr. Campbell:

This package constitutes EPA's final permit decision for the above referenced facility. Enclosed are the responses to comments received during the public comment period and the final permit. According to EPA regulations at 40 CFR 124.19, within 30 days after a final permit decision has been issued, any person who filed comments on the draft permit or participated in the public hearing may petition the Environmental Appeals Board to review any condition of the permit decision.

Should you have any questions regarding the final permit, please feel free to contact Jim Afghani of the Permits Branch at the above address or by telephone: (214) 665-6615, by fax: (214) 665-2191, or by E-mail: afghani.jim@epa.gov. Should you have any questions regarding compliance with the conditions of this permit, please contact the Water Enforcement Branch at the above address or by telephone: (214)-665-6468.

Sincerely yours,

William K. Honker, P.E.
Director
Water Quality Protection Division

Enclosures

cc w/enclosures:

Bruce Yurdin, Point Source Regulation Section Staff Manager, NMED

NMED EXHIBIT 32

NPDES PERMIT NO. NM0020273
RESPONSE TO COMMENTS

RECEIVED ON THE SUBJECT DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT IN ACCORDANCE WITH REGULATIONS LISTED AT 40 CFR 124.17

APPLICANT: City of Raton Wastewater Treatment/Reclamation Facility
P.O. Box 99
Raton, NM 87740

ISSUING OFFICE: U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

PREPARED BY: Jim Afghani
Environmental Engineer
NPDES Permits and TMDLs Branch (6WQ-PP)
Water Quality Protection Division
VOICE: 214-665-6615
FAX: 214-665-2191
EMAIL: afghani.jim@epa.gov

PERMIT ACTION: Final permit decision and response to comments received on the proposed NPDES permit publicly noticed on January 31, 2015.

DATE PREPARED: April 3, 2015

Unless otherwise stated, citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations, revised as of April 3, 2015.

SUBSTANTIAL CHANGES FROM DRAFT PERMIT

1. Added effluent limitations and monitoring requirements for Total Nitrogen (TN) and Total Phosphorus (TP) as recommended by NMED.

2. Increased measurement frequency for pH from twice per week to five per week.

3. The changed to 7-day chronic testing from 48-hour acute whole effluent toxicity monitoring.

STATE CERTIFICATION

In a letter from James Hogan, Bureau Chief, SWQB, to William K. Honker, P.E., Director, Water Quality Protection Division (EPA) dated March 30, 2015, the NMED certified that the discharge will comply with the applicable provisions of Section 208(e), 301, 302, 303, 306 and 307 of the Clean Water Act and with appropriate requirements of State law.

The NMED stated that in order to meet the requirements of State law, including water quality standards and appropriate basin plans as may be amended by the water quality management plan, each of the conditions cited in the draft permit and the State certification shall not be made less stringent.

The State also stated that it reserves the right to amend or revoke this certification if such action is necessary to ensure compliance with the State's water quality standards and water quality management plan.

CONDITIONS OF CERTIFICATION

Condition 1. Nutrient Effluent Limitations
To protect and maintain existing and downstream water quality and to prevent further degradation of water quality in Doggett and Raton creeks in accordance with 40 CFR 131.12, Subsection A of 20.6.4.8 NMAC, and the New Mexico Continuing Planning Process – Antidegradation Policy Implementation Procedures, *NMED requires that this NPDES permit include Total Phosphorus (TP) and Total Nitrogen (TN) discharge limitations in Part I.A, Table 3 of the permit with the following requirements:*

Pollutant Characteristics	Discharge Limitations							
	lbs/day, unless noted			mg/L, unless noted			Monitoring Requirements	
Pollutant	30-Day AVG	7-Day AVG	Daily MAX	30-Day AVG	7-Day AVG	Daily MAX	Measurement Frequency	Sample Type
Total Phosphorus	14.0	N/A	Report	3.0	N/A	Report	3/month	3-Hour Composite
Total Nitrogen	46.7	N/A	Report	10.0	N/A	Report	3/month	3-Hour Composite

Response No. 1:
The discharge limitations and measurement frequencies for TN and TP have been added to the final permit.

Condition 2. Location of Discharge (Cover Page)
To insure the discharge will comply with the applicable provisions of Sections 208(e), 301, 302, 303, 306 and 307 of the Clean Water Act and with appropriate requirements of State law, the coordinates of the outfall location on the cover page of the proposed permit must be changed to the following: *Outfall 001: Latitude ~~36° 51' 35"~~36° 52' 13.91" N and Longitude ~~104° 25' 53"~~104° 25' 39.18" W*

Response No. 2:
The coordinates of the outfall have been revised.

COMMENTS THAT ARE NOT CONDITIONS OF CERTIFICATION

Raton Comment No. 1:
Raton's 0.9 MGD intermittent cycle extended aeration facility began operation in June, 2007 and has consistently met permit requirements. The population has reduced over 5% in the 2010 census and then reduced another 5% based on the current estimated census data. The discharge from the facility is at an all-time low compared to historical records with an average daily flow rate of 0.35 mg in this permit application. The flow is substantially less on summer days due to 60-70 % reuse for irrigation on municipal parks, ball fields and golf course.

Response No. 1:
Comment noted.

Raton Comment No. 2:
Any increase in facility lab or operation requirements would seem unwarranted at this time with the reduced discharge and improved effluent quality. We believe the facility can meet the new e-coli limits with minimal operational changes and the additional pH monitoring is not an issue. The facility has been on 48 hour acute whole effluent toxicity monitoring for over 15 years and is on reduced monitoring due to successful results with 100% effluent. The change to 7 day chronic testing will potentially increase lab test expense while our discharge is at its lowest historical level.

Response No. 2:
The change to 7-day chronic testing is based on the following: The receiving water body designation has changed from 20.6.4.97 NMAC to 20.6.4.99 NMAC since Doggett Creek is considered by NMED to be perennial below the discharge. The new designation requires 7-day chronic testing to protect the warm-water aquatic life designated use, consistent with NMAC 20.6.4.99 (A) and 20.6.4.900 (H). The final permit establishes a monitoring frequency of once per year consistent with the NMIP (see also NMED comment no. 3).

Raton Comment No. 3:
The facility would also request that quarterly testing be performed based on calendar quarter for simplicity and to correlate with current groundwater permit testing requirements. We can perform an additional test as necessary to achieve this.

Response No. 3:
NMED recommended TN and TP limits. They have been included as required by a condition of certification by the State of New Mexico. Also, NMED recommended the measurement frequency be 3 per month instead of report once per quarter for the TN and TP. The final permit reflects the NMED request.

NMED Comment No. 1:
Compliance schedules for NPDES permits are allowed by 20.6.4.12 NMAC and 40 CFR 122.47, and are written to require compliance at the earliest practicable time. Compliance schedules include milestone dates and provisions for submitting quarterly progress reports and a final report detailing activities conducted toward meeting compliance schedule provisions. A compliance schedule also includes required actions, on the part of permittee, to achieve the effluent limitation.

NMED recommends a compliance schedule of one (1) year after the permit issuance date to comply with the TP and TN effluent limitations. The facility will need to develop and implement additional sampling procedures and may need to develop additional internal controls to ensure consistent treatment to remove nutrients and maintain water quality. It is the policy of the Water Quality Control Commission and EPA to allow schedules of compliance in NPDES permits in order for the facility modifications necessary to meet new water quality based requirements.

Response No. 1:
A one year schedule of compliance has been added per the NMED recommendation.

NMED Comments No. 2:
NMED noticed that the paragraph under Part I.A "FINAL Effluent Limits" reads:

During the period beginning the effective date of the permit and lasting through the expiration date of the permit (unless otherwise noted), the permittee is authorized to discharge treated sanitary wastewater to Doggett Creek, according to New Mexico surface water quality standard 20.6.4.99 NMAC for Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below in Table 1 and Table 2.

NMED believes that this was an oversight and the last sentence should read:
...Such discharges shall be limited and monitored by the permittee as specified below in Table 1, Table 2 and Table 3.

Response No. 2:
The permit has been corrected as suggested.

NMED Comments No. 3:
The monitoring frequency for WET testing in the proposed permit is described as once per permit term (see Part I.A, Table 2). NMED is confused because the Fact Sheet states, "*based on the nature of the discharge... the NMIP directs the WET test to be a 7-day chronic test... with a frequency of once per annual quarter.*" However, according the NMIP, WET testing for this facility should occur at a monitoring frequency of once per year. NMED suggests double checking the NMIP recommendations and changing as applicable.

Response No. 3:
The monitoring frequency for WET has been corrected to once per year from once per permit term in table3.

NMED Comments No. 4:
A. Table 3 in Part I.A of the proposed permit is very difficult to read. NMED recommends that EPA reformat Table 3 prior to issuing the final permit.

B. The *sample type* for E. coli Bacteria is listed as "Instantaneous Grab." Table II of 40 CFR Part 136 identifies a maximum holding time for E. coli Bacteria of 8 hours. NMED believes the sample type for E. coli Bacteria in Table 3 was an oversight and should be changed to "Grab" since analysis for this pollutant is not required within 15 minutes of collection.

C. The Daily Max limit for TRC has footnote (4) associated with it. Footnote (4) pertains to bacteria reporting. NMED suggests deleting footnote (4) from the TRC daily max limit in Table 3.

D. The heading for Table 3 footnotes states, "Footnotes for Factsheet Table 1." NMED recommends changing the heading to, "Footnotes for Table 3."

Response No. 4:
Recommendations have been incorporated.

NMED Comments No. 5:
Part I.C "Monitoring and Reporting (Minor Dischargers)" is missing in the proposed permit. NMED suggests inserting Part I.C below, or some part thereof, into the final permit for clarification:

C. MONITORING AND REPORTING (MINOR DISCHARGERS)

Monitoring results must be reported to EPA on either the electronic or paper Discharge Monitoring Reports (DMRs) as specified in Part III.D. Monitoring results can be submitted electronically in lieu of the paper DMR Form. To submit electronically, access the NetDMR website at www.epa.gov/netdmr and contact the R6NetDMR@epa.gov in-box for further instructions. Until you are approved for Net DMR, you must report on EPA's paper DMR Form No. 3320-1. Monitoring results shall be submitted quarterly. Each quarterly submittal shall include separate forms for each month of the reporting period.

1. *Reporting periods shall end on the last day of the months March, June, September, and December.*

2. *The permittee is required to make regular monthly reports as described above postmarked no later than the 28th day of the month following the end of each reporting period.*

3. *If any 30-day average, 7-day average, or daily maximum value exceeds the effluent limitations specified in Part I.A, the permittee shall report the excursion in accordance with the requirements of Part III.D.*

4. *Any 30-day average, 7-day average, or daily maximum value reported in the required DMR which is in excess of the effluent limitation specified in Part I.A shall constitute evidence of violation of such effluent limitation and of this permit.*

5. *Other measurements of oxygen demand (e.g., TOC and COD) may be substituted for BOD5 or for CBOD5, as applicable, where the permittee can demonstrate long-term correlation of the method with BOD5 or CBOD5 values, as applicable. Details of the correlation procedures used must be submitted and prior approval granted by the permitting authority for this procedure to be acceptable. Data reported must also include evidence to show that the proper correlation continues to exist after approval.*

Response No. 5:
The above recommended language has been incorporated in the final permit.

NMED Comments No. 6:
In Part I.D "Overflow Reporting" the proposed permit describes how to report and submit the annual WET toxicity testing results. Since this does not pertain to overflow reporting, NMED recommends removing this content from this section.

Response No. 6:
WET reporting has been moved to Part II.D.

NMED Comments No. 7:
NMED suggests deleting Part I.F "Copy of DMR Reports" from the proposed permit because this seems repetitive. DMR reporting requirements are covered under Standard Conditions for NPDES Permits in Part III.D.

Response No. 7:
DMR reporting requirements in Part I.F has been deleted from the permit.

NMED Comments No. 8:
In Part II.A regarding "Minimum Quantification Level (MQL)," it is not entirely clear how sufficiently sensitive methods will apply to this section. NMED recommends that EPA modify the language in this section to discuss sufficiently sensitive methods and their impact, if any, on this monitoring and reporting requirement.

Response No. 8:
The following language has been added to the permit:

"The permittee shall use sufficiently sensitive EPA-approved analytical methods (under 40 CFR part 136 or required under 40 CFR chapter I, subchapters N or O) when quantifying the presence of pollutants in a discharge for analyses of pollutants or pollutant parameters under the permit. In case the approved methods are not sufficiently sensitive to the limits, the most sufficiently sensitive methods (lowest minimum levels) must be used as defined under 40 CFR 122.44(i)(1)(iv)(A).

For pollutants listed on Appendix A of Part II with MQL's, analyses may be performed to the listed MQL. If any individual analytical test result is less than the MQL listed, a value of zero (0) may be used for that pollutant result for the Discharge Monitoring Report (DMR) reporting requirements.

In addition, any additional pollutant sampling for purposes of this permit, including renewal applications or any other reporting, may be tested to the MQL, permit limit(s) or the state WQS. Results of analyses that are less than the listed MQL, permit limit(s) or the state WQS may be reported as "non-detect."

Upon written approval by the EPA Region 6 NPDES Permits Branch (6WQ-P), the effluent specific MQL may be utilized by the permittee for all future DMR reporting requirements until/or unless changes are required for adoption of a lower MQL."

REGION 6
1445 ROSS AVENUE
DALLAS, TEXAS 75202-2733

NPDES Permit No NM0020273

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

City of Raton Wastewater Treatment/Reclamation Facility
P.O. Box 99
Raton, NM 87740

is authorized to discharge from the City of Raton Wastewater Treatment/Reclamation Facility, located at the following coordinates:

Outfall 001: Latitude 36° 52' 13.91" N and Longitude 104° 25' 39.18" W

The facility discharge is to Doggett Creek, thence to Raton Creek, thence to Chicorica Creek, thence to Canadian River. The Doggett Creek is an unclassified perennial water.

Outfall 001 is within accordance with this cover page and the effluent limitations, monitoring requirements, and other conditions set forth in Part I, Part II, Part III, and Part IV as stated below.

This permit supersedes and replaces NPDES Permit No. NM0020273 with an effective date of December 1, 2008, and an expiration date of November 30 2013.

This permit shall become effective on JULY 1, 2015

This permit and the authorization to discharge shall expire at midnight, JUNE 30, 2020

Issued on MAY 28 2015

Prepared by

[signature]
William K. Honker, P.E.
Director
Water Quality Protection Division

[signature] Jim Afghani
Jim Afghani
Environmental Engineer
Permits & Technical Section (6WQ-PP)

NMED EXHIBIT 32

DOCUMENT ABBREVIATIONS

In the document that follows, various abbreviations are used. They are as follows:

Avg	Average
BOD_5	five-day biochemical oxygen demand
CFR	Code of Federal Regulations
cfu	colony forming units
COD	chemical oxygen demand
DMR	discharge monitoring report
EPA	United States Environmental Protection Agency
ft.	feet (measurement of distance)
FWS	United States Fish and Wildlife Service
lbs	pounds
Max	maximum
ug/L	micrograms per litter (one part per billion)
mg/L	milligrams per liter (one part per million)
MGD	million gallons per day
MQL	minimum qualification level
mpn	most probable number
NMAC	New Mexico Administrative Code
NMED	New Mexico Environment Department
NMIP	New Mexico NPDES permit implementation procedures
NOEC	No Observed Lethal Effect Concentration
NPDES	national pollutant discharge elimination system
POTW	publically owned treatment works
s.u.	standard units (for parameter pH)
TMDL	total maximum daily load
TN	total nitrogen
TP	total phosphorus
TRC	total residual chlorine
TSS	total suspended solids
WET	whole effluent toxicity

PART I – REQUIREMENTS FOR NPDES PERMITS

A. LIMITATIONS AND MONITORING REQUIREMENTS

1. FINAL Effluent Limits – 0.9 MGD

During the period beginning the effective date of the permit and lasting through the expiration date of the permit (unless otherwise noted), the permittee is authorized to discharge treated sanitary wastewater to Doggett Creek, according to New Mexico surface water quality standard 20.6.4.99 NMAC for Outfall 001. Such discharges shall be limited and monitored by the permittee as specified below in Table 1, Table 2 and Table 3.

Table 1

POLLUTANT	DISCHARGE LIMITATIONS		MONITORING REQUIREMENT	
	Minimum	Maximum	Measurement Frequency	Sample Type
pH (s.u.)	6.6	9.0	5/Week	Instantaneous Grab (field measurement) (*1)

Footnotes for Table 1:
(*1) Instantaneous grab a field measurement that is the analysis of a sample less than 15 minutes from the time of collection.

Table 2

Effluent Characteristics	Discharge Monitoring		Monitoring Requirements	
Whole Effluent Toxicity Testing (7 Day Static Renewal) (*1)	30-Day Avg Min	7-Day Min	Frequency	Sample Type
Pimephales promelas (fathead minnow)	Report	Report	Once per year	24-Hr. Composite
Ceriodaphnia dubia (water flea)	Report	Report	Once per year	24-Hr. Composite

Footnotes for Table 2:

(*1) Monitoring and reporting requirements begin on the effective date of this permit. See Part II, Whole Effluent Toxicity Testing Requirements for additional WET monitoring and reporting conditions.

NMED EXHIBIT 32

Table 3

PARAMETER	DISCHARGE LIMITATIONS						MONITORING REQUIREMENTS	
	Mass (lbs/ day, unless noted)			Concentration (mg/L, unless noted)			Measurement Frequency	Sample Type (1)
	30 Day Avg	Daily Max	7 Day Avg	30 Day Avg	Daily Max	7 Day Avg		
Flow	Report MGD		Report MGD	N/A	N/A	N/A	Daily	Daily Totalized (meter required)
BOD5 (influent) (2)				Report		Report	3/month	3-hour composite
BOD5 (effluent) (2)	225		338	30		45	3/month	3-hour composite
TSS (influent) (2)				Report		Report	3/month	3-hour composite
TSS (effluent) (2)	225		338	30		45	3/month	3-hour composite
BOD5 Percent Removal (min)	≥85%						1/month	Calculation (3)
TSS Percent Removal (min)	≥85%						1/month	Calculation (3)
E. coli Bacteria (4)				126 cfu/100 mL	410 cfu/100 mL		3/month	Grab (5) (field measurement)
TRC (6)					11 ug/l		5/week	Instantaneous Grab (5) (field measurement)
TN	46.7	Report	N/A	10.0	Report	N/A	3/month	3-hour composite
TP	14.0	Report	N/A	3.0	Report	N/A	3/month	3-hour composite

Footnotes for Factsheet Table 3:

1. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.
2. Effluent and Influent monitoring shall be conducted simultaneously
3. Percent removal is calculated using the following equation: (average monthly influent concentration – average monthly effluent concentration) ÷ average monthly influent concentration
4. Bacteria reporting units MUST be either cfu/100mL OR mpn
5. Regulations at 40 CFR Part 136 define "instantaneous grab" as analyzed within 15 minutes of collection. The effluent limitation for TRC is the instantaneous maximum and cannot be averaged for reporting purposes.
6. Chlorine shall be monitored when used for disinfection and/or when used in any treatment process at the facility

2. FLOATING SOLIDS, VISIBLE FOAM AND/OR OILS

There shall be no discharge of oils, scum, grease and other floating materials that would cause the formation of a visible sheen or visible deposits on the arroyo bottom or stream banks, or would damage or impair the normal growth, function or reproduction of human, animal, plant or aquatic life. Samples taken in compliance with the monitoring requirements specified above shall be taken at the discharge from the final treatment unit prior to the receiving stream.

B. SCHEDULE OF COMPLIANCE

The permittee shall develop a compliance schedule within one (1) year after the permit issuance date to comply with the TP and TN effluent limitations. The facility will need to develop and implement additional sampling procedures and may need to develop additional internal controls to ensure consistent treatment to remove nutrients and maintain water quality. It is the policy of the Water Quality Control Commission and EPA to allow schedules of compliance in NPDES permits in order for the facility modifications necessary to meet new water quality based requirements.

C. MONITORING AND REPORTING (MINOR DISCHARGERS)

Monitoring results must be reported to EPA on either the electronic or paper Discharge Monitoring Reports (DMRs) as specified in Part III.D. Monitoring results can be submitted electronically in lieu of the paper DMR Form. To submit electronically, access the NetDMR website at www.epa.gov/netdmr and contact the R6NetDMR@epa.gov in-box for further instructions. Until you are approved for Net DMR, you must report on EPA's paper DMR Form EPA. No. 3320-1. Monitoring results shall be submitted quarterly. Each quarterly submittal shall include separate forms for each month of the reporting period.

1. Reporting periods shall end on the last day of the months March, June, September and December.

2. The permittee is required to make regular monthly reports as described above postmarked no later than 28th day of the month following the end of each reporting period.

3. If any 30-day average, 7-day average, or daily maximum value exceeds the effluent limitations specified in Part I.A, the permittee shall report the excursion in accordance with the requirements of Part III.D.

4. Any 30-day average, 7-day average, or daily maximum value reported in the required DMR which is in excess of the effluent limitation specified in Part I.A shall constitute evidence of violation of such effluent limitation and of this permit.

5. Other measurements of oxygen demand (e.g., TOC and COD) may be substituted for BOD5 or for CBOD5, as applicable, where the permittee can demonstrate long-term correlation of the method with BOD5 or CBOD5 values, as applicable. Details of the correlation procedures used must be submitted and prior approval granted by the permitting authority for this procedure to be acceptable. Data reported must also include evidence to show that the proper correlation continues to exist after approval.

D. OVERFLOW REPORTING

The permittee shall report all overflows with the Discharge Monitoring Report submittal. These reports shall be summarized and reported in tabular format. The summaries shall include: the date, time, duration, location, estimated volume, and cause of the overflow; observed environmental impacts from the overflow; actions taken to address the overflow; and ultimate discharge location if not contained (e.g., storm sewer system, ditch, tributary).

Overflows that endanger health or the environment shall be orally reported to EPA at (214) 665-6595, and NMED Surface Water Quality Bureau at (505) 827-0187 within 24 hours from the time the permittee becomes aware of the circumstance. A written report of overflows that endanger health or the environment shall be provided to EPA and the NMED Surface Water Quality Bureau within 5 days of the time the permittee becomes aware of the circumstance.

E. POLLUTION PREVENTION REQUIREMENTS

The permittee shall institute a program within 12 months of the effective date of the permit (or continue an existing one) directed towards optimizing the efficiency and extending the useful life of the facility. The permittee shall consider the following items in the program:

(a) The influent loadings, flow and design capacity;

(b) The effluent quality and plant performance;

(c) The age and expected life of the wastewater treatment facility's equipment;

(d) Bypasses and overflows of the tributary sewerage system and treatment works;

(e) New developments at the facility;

(f) Operator certification and training plans and status;

(g) The financial status of the facility;

(h) Preventative maintenance programs and equipment conditions and;

(i) An overall evaluation of conditions at the facility.

The permittee shall certify in writing, within three days of the effective date of the permit, that this information is available. This certification shall be submitted to: Environmental Protection Agency, 6EN-WC, 1445 Ross Ave, Dallas, Texas, 75202-2733.

PART II - OTHER CONDITIONS

A. MINIMUM QUANTIFICATION LEVEL (MQL)

The permittee shall use sufficiently sensitive EPA-approved analytical methods (under 40 CFR part 136 or required under 40 CFR chapter I, subchapters N or O) when quantifying the presence of pollutants in a discharge for analyses of pollutants or pollutant parameters under the permit. In case the approved methods are not sufficiently sensitive to the limits, the most sufficiently sensitive methods (lowest minimum levels) must be used as defined under 40 CFR 122.44(i)(1)(iv)(A).

For pollutants listed on Appendix A of Part II with MQL's, analyses *may* be performed to the listed MQL. If any individual analytical test result is less than the MQL listed, a value of zero (0) may be used for that pollutant result for the Discharge Monitoring Report (DMR) reporting requirements.

In addition, any additional pollutant sampling for purposes of this permit, including renewal applications or any other reporting, may be tested to the MQL, permit limit(s) or the state WQS. Results of analyses that are less than the listed MQL, permit limit(s) or the state WQS may be reported as "non-detect."

Upon written approval by the EPA Region 6 NPDES Permits Branch (6WQ-P), the effluent specific MQL may be utilized by the permittee for all future DMR reporting requirements until/or unless changes are required for adoption of a lower MQL.

D. WHOLE EFFLUENT TOXICITY (7-DAY CHRONIC NOEC FRESHWATER)

It is unlawful and a violation of this permit for a permittee or his designated agent, to manipulate test samples in any manner, to delay sample shipment, or to terminate or to cause to terminate a toxicity test. Once initiated, all toxicity tests must be completed unless specific authority has been granted by EPA Region 6 or the State NPDES permitting authority. The permittee shall submit a copy of an annual summary of the data that results from whole effluent toxicity testing to:

U.S. Fish and Wildlife Service Field Supervisor
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, NM 87113

And

Compliance Assurance and Enforcement Division
EPA Water Enforcement Branch (6EN-W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

And

Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

1. SCOPE AND METHODOLOGY

a. The permittee shall test the effluent for toxicity in accordance with the provisions in this section.

APPLICABLE TO FINAL OUTFALL(S):	001
REPORTED ON DMR AS FINAL OUTFALL:	001
CRITICAL DILUTION (%):	80%
EFFLUENT DILUTION SERIES (%):	25, 34, 45, 60, 80
COMPOSITE SAMPLE TYPE:	Defined at PART I
TEST SPECIES/METHODS:	40 CFR Part 136

Ceriodaphnia dubia chronic static renewal survival and reproduction test Method 1002.0, EPA-821-R-02-013, or the most recent update thereof. This test should be terminated when 60% of the surviving females in the control produce three broods or at the end of eight days, whichever comes first.

Pimephales promelas (Fathead minnow) chronic static renewal 7-day larval survival and growth test, Method 1000.0, EPA-821-R-02-013, or the most recent update thereof. A minimum of five (5) replicates with eight (8) organisms per replicate must be used in the control and in each effluent dilution of this test.

b. The NOEC (No Observed Lethal Effect Concentration) is herein defined as the greatest effluent dilution at and below which lethality that is statistically different from the control (0% effluent) at the 95% confidence level does not occur. Chronic lethal test failure is defined as a demonstration of a statistically significant lethal effect at test completion to a test species at or below the critical dilution. Chronic sub-lethal test failure is defined as a demonstration of a statistically significant sub-lethal effect (i.e., growth or reproduction) at test completion to a test species at or below the critical dilution.

c. This permit may be reopened to require whole effluent toxicity limits, chemical specific effluent limits, additional testing, and/or other appropriate actions to address toxicity.

d. This permit does not establish requirements to automatically increase the WET testing frequency after a test failure, or to begin a toxicity reduction evaluation (TRE) in the event of multiple test failures. However, upon failure of any WET test, the permittee must report the test results to NMED, Surface Water Quality Bureau, in writing, within 5 business days of notification the test failure. NMED will review the test results and determine the appropriate action necessary, if any.

2. REQUIRED TOXICITY TESTING CONDITIONS

a. Test Acceptance

The permittee shall repeat a test, including the control and all effluent dilutions, if the procedures and quality assurance requirements defined in the test methods or in this permit are not satisfied, including the following additional criteria:

i. The toxicity test control (0% effluent) must have survival equal to or greater than 80%.

ii. The mean number of *Ceriodaphnia dubia* neonates produced per surviving female in the control (0% effluent) must be 15 or more.

iii. 60% of the surviving control females must produce three broods.

iv. The mean dry weight of surviving Fathead minnow larvae at the end of the 7 days in the control (0% effluent) must be 0.25 mg per larva or greater.

v. The percent coefficient of variation between replicates shall be 40% or less in the control (0% effluent) for: the young of surviving females in the *Ceriodaphnia dubia* reproduction test; the growth and survival endpoints of the Fathead minnow test.

vi. The percent coefficient of variation between replicates shall be 40% or less in the critical dilution, unless significant lethal or nonlethal effects are exhibited for: the young of surviving females in the *Ceriodaphnia dubia* reproduction test; the growth and survival endpoints of the Fathead minnow test.

vii. a PMSD range of 13 - 47 for *Ceriodaphnia dubia* reproduction;

viii. a PMSD range of 12 - 30 for Fathead minnow growth.

Test failure may not be construed or reported as invalid due to a coefficient of variation value of greater than 40%. A repeat test shall be conducted within the required reporting period of any test determined to be invalid.

b. Statistical Interpretation

i. For the *Ceriodaphnia dubia* survival test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be Fisher's Exact Test as described in EPA/821/R-02-013 or the most recent update thereof.

ii. For the *Ceriodaphnia dubia* reproduction test and the Fathead minnow larval survival and growth test, the statistical analyses used to determine if there is a significant difference between the control and the critical dilution shall be in accordance with the methods for determining the No Observed Effect Concentration (NOEC) as described in EPA/821/R-02-013 or the most recent update thereof.

iii. If the conditions of Test Acceptability are met in Item 2.a above and the percent survival of the test organism is equal to or greater than 80% in the critical dilution concentration and all lower dilution concentrations, the test shall be considered to be a passing test, and the permittee shall report a survival NOEC of not less than the critical dilution for the DMR reporting requirements found in Item 3 below.

c. Dilution Water

i. Dilution water used in the toxicity tests will be receiving water collected as close to the point of discharge as possible but unaffected by the discharge. The permittee shall substitute synthetic dilution water of similar pH, hardness, and alkalinity to the closest downstream perennial water for;

(A) toxicity tests conducted on effluent discharges to receiving water classified as intermittent streams; and

(B) toxicity tests conducted on effluent discharges where no receiving water is available due to zero flow conditions.

ii. If the receiving water is unsatisfactory as a result of instream toxicity (fails to fulfill the test acceptance criteria of Item 3.a), the permittee may substitute synthetic dilution water for the receiving water in all subsequent tests provided the unacceptable receiving water test met the following stipulations:

(A) a synthetic dilution water control which fulfills the test acceptance requirements of Item 3.a was run concurrently with the receiving water control;

(B) the test indicating receiving water toxicity has been carried out to completion (i.e., 7 days);

(C) the permittee includes all test results indicating receiving water toxicity with the full report and information required by Item 4 below; and

(D) the synthetic dilution water shall have a pH, hardness, and alkalinity similar to that of the receiving water or closest downstream perennial water not adversely affected by the discharge, provided the magnitude of these parameters will not cause toxicity in the synthetic dilution water.

d. Samples and Composites

i. The permittee shall collect a minimum of three flow-weighted composite samples from the outfall(s) listed at Item 1.a above.

ii. The permittee shall collect second and third composite samples for use during 24-hour renewals of each dilution concentration for each test. The permittee must collect the composite samples such that the effluent samples are representative of any periodic episode of chlorination, biocide usage or other potentially toxic substance discharged on an intermittent basis.

iii. The permittee must collect the composite samples so that the maximum holding time for any effluent sample shall not exceed 72 hours. The permittee must have initiated the toxicity test within 36 hours after the collection of the last portion of the first composite sample. Samples shall be chilled to 6 degrees Centigrade during collection, shipping, and/or storage.

iv. If the flow from the outfall(s) being tested ceases during the collection of effluent samples, the requirements for the minimum number of effluent samples, the minimum number of effluent portions and the sample holding time are waived during that sampling period. However, the permittee must collect an effluent composite sample volume during the period of discharge that is sufficient to complete the required toxicity tests with daily renewal of effluent. When possible, the effluent samples used for the toxicity tests shall be collected on separate days if the discharge occurs over multiple days. The effluent composite sample collection duration and the static renewal protocol associated with the abbreviated sample collection must be documented in the full report required in Item 4 of this section.

3. REPORTING

a. The permittee shall prepare a full report of the results of all tests conducted pursuant to this section in accordance with the Report Preparation Section of EPA/821/R-02-013, or the most current publication, for every valid or invalid toxicity test initiated whether carried to completion or not. The permittee shall retain each full report pursuant to the provisions of PART III.C.3 of this permit. The permittee shall submit full reports upon the specific request of the Agency. For any test which fails, is considered invalid or which is terminated early for any reason, the full report must be submitted for agency review.

b. A valid test for each species must be reported during each reporting period specified in PART I of this permit unless the permittee is performing a TRE which may increase the frequency of testing and reporting. Only <u>ONE</u> set of biomonitoring data for each species is to be recorded for each reporting period. The data submitted should reflect the <u>LOWEST</u> lethal and sub-lethal effects results for each species during the reporting period. All invalid tests, repeat tests (for invalid tests), and retests (for tests previously failed) performed during the reporting period must be attached for EPA review.

c. The permittee shall submit the results of each valid toxicity test as follows below. Submit retest information, if required, clearly marked as such. Only results of valid tests are to be reported.

i. Pimephales promelas (Fathead Minnow)

(A) If the No Observed Effect Concentration (NOEC) for survival is less than the critical dilution, enter a ‘1’; otherwise, enter a ‘0’ for Parameter No. TLP6C

(B) Report the NOEC value for survival, Parameter No. TOP6C

(C) Report the LOEC value for survival, Parameter No. TXP6C

(D) Report the NOEC value for growth, Parameter No. TPP6C

(E) Report the LOEC value for growth, Parameter No. TYP6C

(F) If the No Observed Effect Concentration (NOEC) for growth is less than the critical dilution, enter a ‘1’; otherwise, enter a ‘0’ for Parameter No. TGP6C

(G) Report the highest (critical dilution or control) Coefficient of Variation, Parameter No. TQP6C

ii. Ceriodaphnia dubia

(A) If the NOEC for survival is less than the critical dilution, enter a ‘1’; otherwise, enter a ‘0’ for Parameter No. TLP3B

(B) Report the NOEC value for survival, Parameter No. TOP3B

(C) Report the LOEC value for survival, Parameter No. TXP3B

(D) Report the NOEC value for reproduction, Parameter No. TPP3B

(E) Report the LOEC value for reproduction, Parameter No. TYP3B

(F) If the No Observed Effect Concentration (NOEC) for reproduction is less than the critical dilution, enter a ‘1’; otherwise, enter a ‘0’ for Parameter No. TGP3B

(G) Report the higher (critical dilution or control) Coefficient of Variation, Parameter No. TQP3B

d. If retests are required by NMED, enter the following codes:

i. For retest number 1, Parameter 22415, enter a ‘1’ if the NOEC for survival is less than the critical dilution; otherwise, enter a ‘0’

ii. For retest number 2, Parameter 22416, enter a ‘1’ if the NOEC for survival is less than the critical dilution; otherwise, enter a ‘0’

PART III - STANDARD CONDITIONS FOR NPDES PERMITS

A. GENERAL CONDITIONS

1. INTRODUCTION
In accordance with the provisions of 40 CFR Part 122.41, et. seq., this permit incorporates by reference ALL conditions and requirements applicable to NPDES Permits set forth in the Clean Water Act, as amended, (hereinafter known as the "Act") as well as ALL applicable regulations.

2. DUTY TO COMPLY
The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. TOXIC POLLUTANTS

   a. Notwithstanding Part III.A.5, if any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition.

   b. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

4. DUTY TO REAPPLY
If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Continuation of expiring permits shall be governed by regulations promulgated at 40 CFR Part 122.6 and any subsequent amendments.

5. PERMIT FLEXIBILITY
This permit may be modified, revoked and reissued, or terminated for cause in accordance with 40 CFR 122.62-64. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. PROPERTY RIGHTS
This permit does not convey any property rights of any sort, or any exclusive privilege.

7. DUTY TO PROVIDE INFORMATION
The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. CRIMINAL AND CIVIL LIABILITY
Except as provided in permit conditions on "Bypassing" and "Upsets", nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act, or applicable regulations, which avoids or effectively defeats the regulatory purpose of the Permit may subject the Permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

9. OIL AND HAZARDOUS SUBSTANCE LIABILITY
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

10. STATE LAWS
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

11. SEVERABILITY
The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

B. PROPER OPERATION AND MAINTENANCE

1. NEED TO HALT OR REDUCE NOT A DEFENSE
It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failure either by means of alternate power sources, standby generators or retention of inadequately treated effluent.

2. DUTY TO MITIGATE
The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

3. PROPER OPERATION AND MAINTENANCE

a. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by permittee as efficiently as possible and in a manner which will minimize upsets and discharges of excessive pollutants and will achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

b. The permittee shall provide an adequate operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

4. BYPASS OF TREATMENT FACILITIES

a. BYPASS NOT EXCEEDING LIMITATIONS
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.B.4.b. and 4.c.

b. NOTICE

(1)ANTICIPATED BYPASS
If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2)UNANTICIPATED BYPASS
The permittee shall, within 24 hours, submit notice of an unanticipated bypass as required in Part III.D.7.

c. PROHIBITION OF BYPASS

(1)Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(a)Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b)There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and,

(c)The permittee submitted notices as required by Part III.B.4.b.

(2)The Director may allow an anticipated bypass after considering its adverse effects, if the Director determines that it will meet the three conditions listed at Part III.B.4.c(1).

5. UPSET CONDITIONS

a. EFFECT OF AN UPSET
An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Part III.B.5.b. are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

b. CONDITIONS NECESSARY FOR A DEMONSTRATION OF UPSET

A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1)An upset occurred and that the permittee can identify the cause(s) of the upset;

(2)The permitted facility was at the time being properly operated;

(3)The permittee submitted notice of the upset as required by Part III.D.7; and,

(4)The permittee complied with any remedial measures required by Part III.B.2.

c. BURDEN OF PROOF
In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

6. REMOVED SUBSTANCES
Unless otherwise authorized, solids, sewage sludges, filter backwash, or other pollutants removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. PERCENT REMOVAL (PUBLICLY OWNED TREATMENT WORKS)
For publicly owned treatment works, the 30-day average (or Monthly Average) percent removal for Biochemical Oxygen Demand and Total Suspended Solids shall not be less than 85 percent unless otherwise authorized by the permitting authority in accordance with 40 CFR 133.103.

C. MONITORING AND RECORDS

1. INSPECTION AND ENTRY
The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by the law to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

2. REPRESENTATIVE SAMPLING
Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

3. RETENTION OF RECORDS
The permittee shall retain records of all monitoring information, including all calibration and

maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.

4. RECORD CONTENTS
Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individual(s) who performed the sampling or measurements;
c. The date(s) and time(s) analyses were performed;
d. The individual(s) who performed the analyses;
e. The analytical techniques or methods used; and
f. The results of such analyses.

5. MONITORING PROCEDURES

a. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.

b. The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.

c. An adequate analytical quality control program, including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory.

6. FLOW MEASUREMENTS
Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to insure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from true discharge rates throughout the range of expected discharge volumes.

D. REPORTING REQUIREMENTS

1. PLANNED CHANGES

a. INDUSTRIAL PERMITS
The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

(1)The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR Part 122.29(b); or, (2)The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements listed at Part III.D.10.a.

b. MUNICIPAL PERMITS
Any change in the facility discharge (including the introduction of any new source or significant discharge or significant changes in the quantity or quality of existing discharges of pollutants) must be reported to the permitting authority. In no case are any new connections, increased flows, or significant changes in influent quality permitted that will cause violation of the effluent limitations specified herein.

2. ANTICIPATED NONCOMPLIANCE
The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. TRANSFERS
This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Act.

4. DISCHARGE MONITORING REPORTS AND OTHER REPORTS
Monitoring results must be reported to EPA on either the electronic or paper Discharge Monitoring Report (DMR) approved formats. Monitoring results can be submitted electronically in lieu of the paper DMR Form. To submit electronically, access the NetDMR website at www.epa.gov/netdmr and contact the R6NetDMR@epa.gov in-box for further instructions. Until you are approved for Net DMR, you must report on the Discharge Monitoring Report (DMR) Form EPA. No. 3320-1 in accordance with the "General Instructions" provided on the form. No additional copies are needed if reporting electronically, however when submitting paper form EPA No. 3320-1, the permittee shall submit the original DMR signed and certified as required by Part III.D.11 and all other reports required by Part III.D. to the EPA at the address below. Duplicate copies of paper DMR's and all other reports shall be submitted to the appropriate State agency (ies) at the following address (es):

EPA:
Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. Environmental Protection Agency, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733

New Mexico:
Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

A copy of Whole Effluent Toxicity Testing results shall also be sent to

U.S. Fish and Wildlife Service
New Mexico Ecological Services
2105 Osuna NE
Albuquerque, NM 87113
Attn: Field Supervisor

5. ADDITIONAL MONITORING BY THE PERMITTEE

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Discharge Monitoring Report (DMR). Such increased monitoring frequency shall also be indicated on the DMR.

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.

6. AVERAGING OF MEASUREMENTS

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

7. TWENTY-FOUR HOUR REPORTING

a. The permittee shall report any noncompliance which may endanger health or the environment. Notification shall be made to the EPA at the following e-mail address: R6_NPDES_Reporting@epa.gov, as soon as possible, but within 24 hours from the time the permittee becomes aware of the circumstance. Oral notification shall also be to the New Mexico Environment Department at (505) 827-0187 as soon as possible, but within 24 hours from the time the permittee becomes aware of the circumstance. A written submission shall be provided within 5 days of the time the permittee becomes aware of the circumstances. The report shall contain the following information:

(1) A description of the noncompliance and its cause;

(2) The period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,

(3) Steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. The following shall be included as information which must be reported within 24 hours:

(1) Any unanticipated bypass which exceeds any effluent limitation in the permit;

(2) Any upset which exceeds any effluent limitation in the permit; and,

(3) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part II (industrial permits only) of the permit to be reported within 24 hours.

c. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

8. OTHER NONCOMPLIANCE
The permittee shall report all instances of noncompliance not reported under Parts III.D.4 and D.7 and Part I.B (for industrial permits only) at the time monitoring reports are submitted. The reports shall contain the information listed at Part III.D.7.

9. OTHER INFORMATION
Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information.

10. CHANGES IN DISCHARGES OF TOXIC SUBSTANCES
All existing manufacturing, commercial, mining, and silvacultural permittees shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1)One hundred micrograms per liter (100 μg/L);
(2)Two hundred micrograms per liter (200 μg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 μg/L) for 2,4-dinitro-phenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
(3)Five (5) times the maximum concentration value reported for that pollutant in the permit application; or
(4)The level established by the Director.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

(1)Five hundred micrograms per liter (500 μg/L);
(2)One milligram per liter (1 mg/L) for antimony;
(3)Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or
(4)The level established by the Director.

11. SIGNATORY REQUIREMENTS
All applications, reports, or information submitted to the Director shall be signed and certified.

a. ALL PERMIT APPLICATIONS shall be signed as follows:

(1)FOR A CORPORATION - by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(a)A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

(b)The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2)FOR A PARTNERSHIP OR SOLE PROPRIETORSHIP - by a general partner or the proprietor, respectively.

(3)FOR A MUNICIPALITY, STATE, FEDERAL, OR OTHER PUBLIC AGENCY - by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(a)The chief executive officer of the agency, or

(b)A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

b. ALL REPORTS required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1)The authorization is made in writing by a person described above;

(2)The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

(3)The written authorization is submitted to the Director.

c. CERTIFICATION
Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

12. AVAILABILITY OF REPORTS
Except for applications, effluent data permits, and other data specified in 40 CFR 122.7, any information submitted pursuant to this permit may be claimed as confidential by the submitter. If no claim is made at the time of submission, information may be made available to the public without further notice.

E. PENALTIES FOR VIOLATIONS OF PERMIT CONDITIONS

1. CRIMINAL

a. NEGLIGENT VIOLATIONS
The Act provides that any person who negligently violates permit conditions implementing Section 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both.

b. KNOWING VIOLATIONS
The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both.

c. KNOWING ENDANGERMENT
The Act provides that any person who knowingly violates permit conditions implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fme of not more than $250,000, or by imprisonment for not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

d. FALSE STATEMENTS
The Act provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring device or method required to be maintained under the Act, shall upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or by both. (See Section 309.c.4 of the Clean Water Act)

2. CIVIL PENALTIES
   The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to a civil penalty not to exceed $37,500 per day for each violation.

3. ADMINISTRATIVE PENALTIES
   The Act provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act is subject to an administrative penalty, as follows:

   a. CLASS I PENALTY
      Not to exceed $16,000 per violation nor shall the maximum amount exceed $37,500.

   b. CLASS II PENALTY
      Not to exceed $16,000 per day for each day during which the violation continues nor shall the maximum amount exceed $177,500.

F. DEFINITIONS
   All definitions contained in Section 502 of the Act shall apply to this permit and are incorporated herein by reference. Unless otherwise specified in this permit, additional definitions of words or phrases used in this permit are as follows:

1. ACT means the Clean Water Act (33 U.S.C. 1251 et. seq.), as amended.

2. ADMINISTRATOR means the Administrator of the U.S. Environmental Protection Agency.

3. APPLICABLE EFFLUENT STANDARDS AND LIMITATIONS means all state and Federal effluent standards and limitations to which a discharge is subject under the Act, including, but not limited to, effluent limitations, standards or performance, toxic effluent standards and prohibitions, and pretreatment standards.

4. APPLICABLE WATER QUALITY STANDARDS means all water quality standards to which a discharge is subject under the Act.

5. BYPASS means the intentional diversion of waste streams from any portion of a treatment facility.

6. DAILY DISCHARGE means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the sampling day. "Daily discharge" determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the "daily discharge" determination of concentration shall be arithmetic average (weighted by flow value) of all samples collected during that sampling day.

7. DAILY MAXIMUM discharge limitation means the highest allowable "daily discharge" during the calendar month.

8. DIRECTOR means the U.S. Environmental Protection Agency Regional Administrator or an authorized representative.

9. ENVIRONMENTAL PROTECTION AGENCY means the U.S. Environmental Protection Agency.

10. GRAB SAMPLE means an individual sample collected in less than 15 minutes.

11. INDUSTRIAL USER means a nondomestic discharger, as identified in 40 CFR 403, introducing pollutants to a publicly owned treatment works.

12. MONTHLY AVERAGE (also known as DAILY AVERAGE) discharge limitations means the highest allowable average of "daily discharge(s)" over a calendar month, calculated as the sum of all "daily discharge(s)" measured during a calendar month divided by the number of "daily discharge(s)" measured during that month. When the permit establishes daily average concentration effluent limitations or conditions, the daily average concentration means the arithmetic average (weighted by flow) of all "daily discharge(s)" of concentration determined during the calendar month where C = daily concentration, F = daily flow, and n = number of daily samples; daily average discharge =

$$\frac{C_1F_1 + C_2F_2 + \ldots + C_nF_n}{F_1 + F_2 + \ldots + F_n}$$

13. NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 318, 402, and 405 of the Act..

14. SEVERE PROPERTY DAMAGE means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

15. SEWAGE SLUDGE means the solids, residues, and precipitates separated from or created in sewage by the unit processes of a publicly owned treatment works. Sewage as used in this definition means any wastes, including wastes from humans, households, commercial establishments, industries, and storm water runoff that are discharged to or otherwise enter a publicly owned treatment works.

16. TREATMENT WORKS means any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature to implement Section 201 of the Act, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances, extension, improvement, remodeling, additions, and alterations thereof.

17. UPSET means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack

of preventive maintenance, or careless or improper operation.

18. FOR FECAL COLIFORM BACTERIA, a sample consists of one effluent grab portion collected during a 24-hour period at peak loads.

19. The term "MGD" shall mean million gallons per day.

20. The term "mg/L" shall mean milligrams per liter or parts per million (ppm).

21. The term "µg/L" shall mean micrograms per liter or parts per billion (ppb).

22. MUNICIPAL TERMS

a. 7-DAY AVERAGE or WEEKLY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The 7-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

b. 30-DAY AVERAGE or MONTHLY AVERAGE, other than for fecal coliform bacteria, is the arithmetic mean of the daily values for all effluent samples collected during a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. The 30-day average for fecal coliform bacteria is the geometric mean of the values for all effluent samples collected during a calendar month.

c. 24-HOUR COMPOSITE SAMPLE consists of a minimum of 12 effluent portions collected at equal time intervals over the 24-hour period and combined proportional to flow or a sample collected at frequent intervals proportional to flow over the 24-hour period.

d. 12-HOUR COMPOSITE SAMPLE consists of 12 effluent portions collected no closer together than one hour and composited according to flow. The daily sampling intervals shall include the highest flow periods.

e. 6-HOUR COMPOSITE SAMPLE consists of six effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

f. 3-HOUR COMPOSITE SAMPLE consists of three effluent portions collected no closer together than one hour (with the first portion collected no earlier than 10:00 a.m.) and composited according to flow.

MINOR - SEWAGE SLUDGE REQUIREMENTS

INSTRUCTIONS TO PERMITTEES

Select only those Elements and Sections which apply to your sludge reuse or disposal practice. **The sludge conditions do not apply to wastewater treatment lagoons where sludge is not wasted for final reuse/disposal. If the sludge is not removed, the permittee shall indicate on the DMR "No Discharge".**

Although reporting is not required at this time, this permit may be modified or revoked and reissued to require an annual DMR.

ELEMENT 1 - LAND APPLICATION

ELEMENT 2 - SURFACE DISPOSAL

ELEMENT 3 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

ELEMENT 1 - LAND APPLICATION

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with Section 405 of the Clean Water Act and all other applicable Federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present in the sludge.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated at Section 405(d)(2) of the Clean Water Act. If new limits for Molybdenum are promulgated prior to permit expiration, then those limits shall become directly enforceable.

3. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

4. The permittee shall give prior notice to EPA (Chief, Permits Branch, Water Management Division, Mail Code 6W-P, EPA Region 6, 1445 Ross Avenue, Dallas, Texas 75202) of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR Part 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR Part 122.62(a)(1).

B. Testing Requirements

1. Sewage Sludge

Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Element 1, Section I.C.

TABLE 1

Pollutant	Ceiling Concentration (milligrams per kilogram)*
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49

Selenium	100
Zinc	7500

* Dry weight basis

2. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by either the Class A or Class B pathogen requirements. Sewage sludge that is applied to a lawn or home garden shall be treated by the Class A pathogen requirements. Sewage sludge that is sold or given away in a bag shall be treated by Class A pathogen requirements.

a. Six alternatives are available to demonstrate compliance with Class A sewage sludge. All 6 options require either the density of fecal coliform in the sewage sludge be less than 1000 Most Probable Number (MPN) per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land. Below are the additional requirements necessary to meet the definition of a Class A sludge. Alternatives 5 and 6 are not authorized to demonstrate compliance with Class A sewage sludge in Texas permits.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time. See 503.32(a)(3)(ii) for specific information.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours.

The temperature of the sewage sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12.

At the end of the 72 hour period during which the pH of the sewage sludge is above 12, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50 percent.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(ii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(iii) for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sludge is prepared for sale or give away in a bag or other container for application to the land.

The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sewage sludge is prepared for sale or give away in a bag or other container for application to the land.

Alternative 5 - Sewage sludge shall be treated by one of the Processes to Further Reduce Pathogens (PFRP) described in 503 Appendix B. PFRPs include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 - Sewage sludge shall be treated by a process that is equivalent to a Process to Further Reduce Pathogens, if individually approved by the Pathogen Equivalency Committee representing the EPA.

b. Three alternatives are available to demonstrate compliance with Class B sewage sludge. Alternatives 2 and 3 are not authorized to demonstrate compliance with Class B sewage sludge in Texas permits.

Alternative 1 -(i) Seven random samples of the sewage sludge shall be collected for one monitoring episode at the time the sewage sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge shall be treated in one of the Processes to significantly Reduce Pathogens described in 503 Appendix B.

Alternative 3 -Sewage sludge shall be treated in a process that is equivalent to a PSRP, if individually approved by the Pathogen Equivalency Committee representing the EPA.

In addition, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn, unless otherwise specified by the permitting authority.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

3. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following alternatives 1 through 10 for Vector Attraction Reduction. If bulk sewage sludge is applied to a home garden, or bagged sewage sludge is applied to the land, only alternative 1 through alternative 8 shall be used.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. Volatile solids must be reduced by less than 17 percent to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. Volatile solids must be reduced by less than 15 percent to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40 degrees Celsius and the average temperature of the sewage sludge shall be higher than 45 degrees Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 -(i) Sewage sludge shall be injected below the surface of the land.

(ii) No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

(iii) When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 -(i) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

(ii) When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

All other pollutants shall be monitored at the frequency shown below:

Table 2

Amount of sewage sludge* (metric tons per 365 day period)	Frequency
0 ≤ Sludge < 290	Once/Year
290 ≤ Sludge < 1,500	Once/Quarter
1,500 ≤ Sludge < 15,000	Once/Two Months
15,000 ≤ Sludge	Once/Month

* Either the amount of bulk sewage sludge applied to the land or the amount of sewage sludge received by a person who prepares sewage sludge that is sold or given away in a bag or other container for application to the land (dry weight basis).

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 40 CFR 503.8(b).

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A or B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A or B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below those listed in Table 3 found in Element I, Section III, the following conditions apply:

1. Pollutant Limits

Table 3
Cumulative Pollutant Loading Rate

Pollutant	(kilograms per hectare)
Arsenic	41
Cadmium	39
Chromium	3000
Copper	1500
Lead	300
Mercury	17
Molybdenum	Monitor
Nickel	420
Selenium	100
Zinc	2800

2. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by either Class A or Class B pathogen reduction requirements as defined above in Element 1, Section I.B.3.

3. Management Practices

a. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the U.S., as defined in 40 CFR 122.2, except as provided in a permit issued pursuant to section 404 of the CWA.

b. Bulk sewage sludge shall not be applied within 10 meters of a water of the U.S.

c. Bulk sewage sludge shall be applied at or below the agronomic rate in accordance with recommendations from the following references:

i. STANDARDS 1992, Standards, Engineering Practices and Data, 39th Edition (1992) American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085-9659.

ii. National Engineering Handbook Part 651, Agricultural Waste Management Field Handbook (1992), P.O. Box 2890, Washington, D.C. 20013.

iii. Recommendations of local extension services or Soil Conservation Services.

iv. Recommendations of a major University's Agronomic Department.

d. An information sheet shall be provided to the person who receives bulk sewage sludge sold or given away. The information sheet shall contain the following information:

i. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

ii. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

iii. The annual whole sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Element I, Section III below are met.

4. Notification requirements

a. If bulk sewage sludge is applied to land in a State other than the State in which the sludge is prepared, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

i. The location, by either street address or latitude and longitude, of each land application site.

ii. The approximate time period bulk sewage sludge will be applied to the site.

iii. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who prepares the bulk sewage sludge.

iv. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply Fr4fthe bulk sewage sludge.

b. The permittee shall give 60 days prior notice to the Director of any change planned in the sewage sludge practice. Any change shall include any planned physical alterations or additions to the permitted treatment works, changes in the permittee's sludge use or disposal practice, and also alterations, additions, or deletions of disposal sites. These changes may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional disposal sites not reported during the permit application process or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR 122.62(a)(1).

c. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely effect a National Historic Site, cease use of such area.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other NPDES records.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 for persons who land apply.

a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 found in Element I, Section III and the applicable pollutant concentration criteria (mg/Kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (kg/ha) listed in Table 2 above.

b. A description of how the pathogen reduction requirements are met (including site restrictions for Class B sludges, if applicable).

c. A description of how the vector attraction reduction requirements are met.

d. A description of how the management practices listed above in Section II.3 are being met.

e. The recommended agronomic loading rate from the references listed in Section II.3.c. above, as well as the actual agronomic loading rate shall be retained.

f. A description of how the site restrictions in 40 CFR Part 503.32(b)(5) are met for each site on which Class B bulk sewage sludge is applied.

g. The following certification statement:

"I certify, under penalty of law, that the management practices in §503.14 have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

h. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 40 CFR 503.17(a)(4)(i)(B) or 40 CFR Part 503.17(a)(5)(i)(B) as applicable to the permittees sludge treatment activities.

i. The permittee shall maintain information that describes future geographical areas where sludge may be land applied.

j. The permittee shall maintain information identifying site selection criteria regarding land application sites not identified at the time of permit application submission.

k. The permittee shall maintain information regarding how future land application sites will be managed.

The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for recordkeeping found in 40 CFR 503.17 for persons who land apply.

a. The location, by either street address or latitude and longitude, of each site on which sludge is applied.

b. The number of hectares in each site on which bulk sludge is applied.

c. The date and time sludge is applied to each site.

d. The cumulative amount of each pollutant in kilograms/hectare listed in Table 2 applied to each site.

e. The total amount of sludge applied to each site in metric tons.

f. The following certification statement:

"I certify, under penalty of law, that the requirements to obtain information in §503.12(e)(2) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the requirements to obtain information have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

g. A description of how the requirements to obtain information in §503.12(e)(2) are met.

6. Reporting Requirements - None.

SECTION III. <u>REQUIREMENTS SPECIFIC TO BULK OR BAGGED SEWAGE SLUDGE MEETING POLLUTANT CONCENTRATIONS IN TABLE 3 AND CLASS A PATHOGEN REDUCTION REQUIREMENTS</u>

For those permittees with sludge that contains concentrations of pollutants below those pollutant limits listed in Table 3 for bulk or bagged (containerized) sewage sludge and also meet the Class A pathogen reduction requirements, the following conditions apply (Note: All bagged sewage sludge <u>must</u> be treated by Class A pathogen reduction requirements.):

1. Pollutant limits - The concentration of the pollutants in the municipal sewage sludge is at or below the values listed.

Table 3

Monthly Average Concentration

Pollutant	(milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Monitor
Nickel	420
Selenium	36
Zinc	2800

NMED EXHIBIT 32

2. Pathogen Control

   All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, or lawn or home garden shall be treated by the Class A pathogen reduction requirements as defined above in Element I, Section I.B.3. All bagged sewage sludge must be treated by Class A pathogen reduction requirements.

3. Management Practices - None.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

   a. The concentration (mg/Kg) in the sludge of each pollutant listed in Table 3 and the applicable pollutant concentration criteria listed in Table 3.

   b. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 503.17(a)(1)(ii) or 503.17(a)(3)(i)(B), whichever applies to the permittees sludge treatment activities.

   c. A description of how the Class A pathogen reduction requirements are met.

   d. A description of how the vector attraction reduction requirements are met.

6. Reporting Requirements - None.

SECTION IV. REQUIREMENTS SPECIFIC TO SLUDGE SOLD OR GIVEN AWAY IN A BAG OR OTHER CONTAINER FOR APPLICATION TO THE LAND THAT DOES NOT MEET THE MINIMUM POLLUTANT CONCENTRATIONS

1. Pollutant Limits

Table 4

Annual Pollutant Loading Rate

Pollutant	(kilograms per hectare per 365 day period)
Arsenic	2
Cadmium	1.9
Chromium	150
Copper	75
Lead	15
Mercury	0.85
Molybdenum	Monitor
Nickel	21
Selenium	5
Zinc	140

2. Pathogen Control

All sewage sludge that is sold or given away in a bag or other container for application to the land shall be treated by the Class A pathogen requirements as defined above in Section I.B.3.a. above.

3. Management Practices

Either a label shall be affixed to the bag or other container in which sewage sludge that is sold or given away for application to the land, or an information sheet shall be provided to the person who receives sewage sludge sold or given away in an other container for application to the land. The label or information sheet shall contain the following information:

a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instructions on the label or information sheet.

c. The annual whole sludge application rate for the sewage sludge that will not cause any of the annual pollutant loading rates in Table 4 above to be exceeded.

4. Notification Requirements - None.

5. Recordkeeping Requirements - The sludge documents will be retained on site at the same location as other NPDES records.

The person who prepares sewage sludge or a sewage sludge material shall develop the following information and shall retain the information for five years.

a. The concentration in the sludge of each pollutant listed above in found in Element I, Section I, Table 1.

b. The following certification statement found in §503.17(a)(6)(iii).

"I certify, under penalty of law, that the management practice in §503.14(e), the Class A pathogen requirement in §503.32(a), and the vector attraction reduction requirement in (insert vector attraction reduction option) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practice, pathogen requirements, and vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

c. A description of how the Class A pathogen reduction requirements are met.

d. A description of how the vector attraction reduction requirements are met.

e. The annual whole sludge application rate for the sewage sludge that does not cause the annual pollutant loading rates in Table 4 to be exceeded. See Appendix A to Part 503 - Procedure to Determine the Annual Whole Sludge Application Rate for a Sewage Sludge.

6. Reporting Requirements - None.

ELEMENT 2- SURFACE DISPOSAL

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE SURFACE DISPOSAL

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with Section 405 of the Clean Water Act and all other applicable Federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated at Section 405(d)(2) of the Clean Water Act.

3. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person (owner or operator of a sewage sludge unit) for disposal in a surface disposal site, the permit holder shall provide all necessary information to the parties who receive the sludge to assure compliance with these regulations.

4. The permittee shall give prior notice to EPA (Chief, Permits Branch, Water Management Division, Mail Code 6W-P, EPA Region 6, 1445 Ross Avenue, Dallas, Texas 75202) of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR Part 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR Part 122.62(a)(1).

5. The permittee or owner/operator shall submit a written closure and post closure plan to the permitting authority 180 days prior to the closure date. The plan shall include the following information:

   (a) A discussion of how the leachate collection system will be operated and maintained for three years after the surface disposal site closes if it has a liner and leachate collection system.

   (b) A description of the system used to monitor continuously for methane gas in the air in any structures within the surface disposal site. The methane gas concentration shall not exceed 25% of the lower explosive limit for methane gas for three years after the sewage sludge unit closes. A description of the system used to monitor for methane gas in the air at the property line of the site shall be included. The methane gas concentration at the surface disposal site property line shall not exceed the lower explosive limit for methane gas for three years after the sewage sludge unit closes.

   (c) A discussion of how public access to the surface disposal site will be restricted for three years after it closes.

B. Management Practices

1. An active sewage sludge unit located within 60 meters of a fault that has displacement in Holocene time shall close by March 22, 1994.

2. An active sewage sludge unit located in an unstable area shall close by March 22, 1994.

3. An active sewage sludge unit located in a wetland shall close by March 22, 1994.
4. Surface disposal shall not restrict the flow of the base 100-year flood.

5. The run-off collection system for an active sewage sludge unit shall have the capacity to handle run-off from a 25-year, 24-hour storm event.

6. A food crop, feed crop, or a fiber crop shall not be grown on a surface disposal site.

7. Animals shall not be grazed on a surface disposal site.

8. Public access shall be restricted on the active surface disposal site and for three years after the site closes.

9. Placement of sewage sludge shall not contaminate an aquifer. This shall be demonstrated through one of the following:

   (a) Results of a ground-water monitoring program developed by a qualified ground-water scientist.

   (b) A certification by a qualified ground-water scientist may be used to demonstrate that sewage sludge placed on an active sewage sludge unit does not contaminate an aquifer.

10. When a cover is placed on an active surface disposal site, the concentration of methane gas in air in any structure within the surface disposal site shall not exceed 25 percent of the lower explosive limit for methane gas during the period that the sewage sludge unit is active. The concentration of methane gas in air at the property line of the surface disposal site shall not exceed the lower explosive limit for methane gas during the period that the sewage sludge unit is active. Monitoring shall be continuous.

C. Testing Requirements

1. Sewage sludge shall be tested at the frequency show below in Element 2, Section I.D. for PCBs. Any sludge exceeding a concentration of 50 mg/Kg shall not be surface disposed.

2. Pathogen Control

All sewage sludge that is disposed of in a surface disposal site shall be treated by either the Class A or Class B pathogen requirements unless sewage sludge is placed on an active surface disposal site, and is covered with soil or other material at the end of each operating day.

(a) Six alternatives are available to demonstrate compliance with Class A sewage sludge. All 6 alternatives require either the density of fecal coliform in the sewage sludge be less than 1000 MPN per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the sewage sludge be less than three Most Probable Number per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed; at the time the sewage sludge is prepared for sale or given away in a bag or other container for application to the land. Below are the additional requirements necessary to meet the definition of a Class A sludge. Alternatives 5 and 6 are not authorized to demonstrate compliance with Class A sewage sludge in Texas permits.

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at a specific value for a period of time. See 503.32(a)(3)(ii) for specific information.

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 and shall remain above 12 for 72 hours.

The temperature of the sewage sludge shall be above 52 degrees Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12.

At the end of the 72 hour period during which the pH of the sewage sludge is above 12, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50 percent.

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(ii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 503.32(a)(5)(iii) for specific information.

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sludge is prepared for sale or give away in a bag or other container for application to the land.

The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed or at the time the sewage sludge is prepared for sale or give away in a bag or other container for application to the land.

Alternative 5 - Sewage sludge shall be treated by one of the Processes to Further Reduce Pathogens (PFRP) described in 503 Appendix B. PFRPs include composting, heat drying, heat treatment, and thermophilic aerobic digestion.

Alternative 6 - Sewage sludge shall be treated by a process that is equivalent to a Process to Further Reduce Pathogens, if individually approved by the Pathogen Equivalency Committee representing the EPA.

(b) Four alternatives are available to demonstrate compliance with Class B sewage sludge. Alternatives 2, 3, and 4 are not authorized to demonstrate compliance with Class B sewage sludge in Texas permits.

Alternative 1 - (i) Seven random samples of the sewage sludge shall be collected for one monitoring episode at the time the sewage sludge is used or disposed.

(ii) The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 Most Probable Number per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge shall be treated in one of the Processes to significantly Reduce Pathogens described in 503 Appendix B.

Alternative 3 - Sewage sludge shall be treated in a process that is equivalent to a PSRP, if individually approved by the Pathogen Equivalency Committee representing the EPA.

Alternative 4 - Sewage sludge placed on an active surface disposal site is covered with soil or other material at the end of each operating day.

3. Vector Attraction Reduction Requirements

All sewage sludge that is disposed of in a surface disposal site shall be treated by one of the following alternatives 1 through 11 for Vector Attraction Reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38 percent.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30 and 37 degrees Celsius. Volatile solids must be reduced by less than 17 percent to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with a percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20 degrees Celsius. Volatile solids must be reduced by less than 15 percent to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20 degrees Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40 degrees Celsius and the average temperature of the sewage sludge shall be higher than 45 degrees Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then at 11.5 or higher for an additional 22 hours.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or an anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90 percent based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or an anaerobic treatment process.

Alternative 9 - (i) Sewage sludge shall be injected below the surface of the land.

(ii) No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

(iii) When sewage sludge that is injected below the surface of the land is Class A with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10 - (i) Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

(ii) When sewage sludge that is incorporated into the soil is Class A with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

Alternative 11 - Sewage sludge placed on an active sewage sludge unit shall be covered with soil or other material at the end of each operating day.

4. Methane Gas Control Within a Structure On Site

When cover is placed on an active surface disposal site, the methane gas concentration in the air in any structure shall not exceed 25% of the lower explosive limit (LEL) for methane gas during the period that the disposal site is active.

5. Methane Gas Control at Property Line

The concentration of methane gas in air at the property line of the surface disposal site shall not exceed the LEL for methane gas during the period that the disposal site is active.

D. Monitoring Requirements

Methane Gas in covered structures on site - Continuous

Methane Gas at property line - Continuous

All other pollutants shall be monitored at the frequency shown below:

Amount of sewage sludge* (metric tons per 365 day period)	Frequency
$0 \leq$ Sludge < 290	Once/Year
$290 \leq$ Sludge $< 1,500$	Once/Quarter
$1,500 \leq$ Sludge $< 15,000$	Once/Two Months
$15,000 \leq$ Sludge	Once/Month

* Amount of sewage sludge placed on an active sewage sludge unit (dry weight basis). Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 40 CFR 503.8(b).

SECTION II. REQUIREMENTS SPECIFIC TO SURFACE DISPOSAL SITES WITHOUT A LINER AND LEACHATE COLLECTION SYSTEM.

1. Pollutant limits - Sewage sludge shall not be applied to a surface disposal site if the concentration of the listed pollutants exceed the corresponding values based on the surface disposal site boundary to the property line distance:

TABLE 5

Unit boundary to property line distance (meters)	Pollutant Concentrations* Arsenic (mg/kg)	Chromium (mg/kg)	Nickel (mg/kg)	PCB's (mg/kg)
0 to less than 25	30	200	210	49
25 to less than 50	34	220	240	49
50 to less than 75	39	260	270	49
75 to less than 100	46	300	320	49
100 to less than 125	53	360	390	49
125 to less than 150	62	450	420	49
≥ 150	73	600	420	49

* Dry weight basis

2. Management practices - Listed in Section I.B. above.

3. Notification requirements

   a. The permittee shall assure that the owner of the surface disposal site provide written notification to the subsequent site owners that sewage sludge was placed on the land.

   b. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

   The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

4. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

   a. The distance of the surface disposal site from the property line and the concentration (mg/Kg) in the sludge of each pollutant listed above in Table 5, as well as the applicable pollutant concentration criteria listed in Table 5.

b. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 503.27(a)(1)(ii) or 503.27(a)(2)(ii) as applicable to the permittees sludge disposal activities.

c. A description of how either the Class A or Class B pathogen reduction requirements are met, or whether sewage sludge placed on a surface disposal site is covered with soil or other material at the end of each operating day.

d. A description of how the vector attraction reduction requirements are met.

e. Results of a groundwater monitoring program developed by a qualified ground-water scientist, or a certification by a qualified groundwater scientist may be used to demonstrate that sewage sludge placed on an active sewage sludge unit does not contaminate an aquifer. A qualified groundwater scientist is an individual with a baccalaureate or post graduate degree in the natural sciences or engineering who has sufficient training and experience in groundwater hydrology and related fields, as may be demonstrated by State registration, professional certification or completion of accredited university programs, to make sound professional judgements regarding groundwater monitoring, pollutant fate and transport, and corrective action.

5. Reporting Requirements - None.

SECTION III. REQUIREMENTS SPECIFIC TO SURFACE DISPOSAL SITES WITH A LINER AND LEACHATE COLLECTION SYSTEM.

1. Pollutant limits - None.

2. Management Practices - Listed in Section I.B. above.

3. Notification requirements

a. The permittee shall assure that the owner of the surface disposal site provide written notification to the subsequent owner of the site that sewage sludge was placed on the land.

b. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

4. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

a. The following certification statement found in 503.27(a)(1)(ii).

"I certify, under penalty of law, that the pathogen requirements (define option used) and the vector attraction reduction requirements in (define option used) have been met. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine the (pathogen requirements and vector attraction reduction requirements, if appropriate) have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.

b. A description of how either the Class A or Class B pathogen reduction requirements are met or whether sewage sludge placed on a surface disposal site is covered with soil or other material at the end of each operating day.

c. A description of how the vector attraction reduction requirements are met.

d. Results of a ground-water monitoring program developed by a qualified ground-water scientist, or

A certification by a qualified ground-water scientist may be used to demonstrate that sewage sludge placed on an active sewage sludge unit does not contaminate an aquifer.

5. Reporting Requirements - None.

ELEMENT 3 - MUNICIPAL SOLID WASTE LANDFILL DISPOSAL

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

1. The permittee shall handle and dispose of sewage sludge in accordance with Section 405 of the Clean Water Act and all other applicable Federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 40 CFR 258 concerning the quality of the sludge disposed in a municipal solid waste landfill.

2. If requirements for sludge management practices or pollutant criteria become more stringent than the sludge pollutant limits or acceptable management practices in this permit, or control a pollutant not listed in this permit, this permit may be modified or revoked and reissued to conform to the requirements promulgated at Section 405(d)(2) of the Clean Water Act.

3. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a MSWLF for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

4. The permittee shall give prior notice to EPA (Chief, Permits Branch, Water Management Division, Mail Code 6W-P, EPA Region 6, 1445 Ross Avenue, Dallas, Texas 75202) of any planned changes in the sewage sludge disposal practice, in accordance with 40 CFR Part 122.41(l)(1)(iii). These changes may justify the application of permit conditions that are different from or absent in the existing permit. Change in the sludge use or disposal practice may be cause for modification of the permit in accordance with 40 CFR Part 122.62(a)(1).

5. The permittee shall provide the location of all existing sludge disposal/use sites to the State Historical Commission within 90 days of the effective date of this permit. In addition, the permittee shall provide the location of any new disposal/use site to the State Historical Commission prior to use of the site.

   The permittee shall within 30 days after notification by the State Historical Commission that a specific sludge disposal/use area will adversely affect a National Historic Site, cease use of such area.

6. Recordkeeping requirements - The permittee shall develop the following information and shall retain the information for five years. The sludge documents will be retained on site at the same location as other NPDES records.

   a. The description and results of the tests performed, required by the owner/operator of the MSWLF to demonstrate compliance with the 40 CFR 258 regulations.

   b. A certification that sewage sludge meets the requirements in 40 CFR 258 concerning the quality of the sludge disposed in a municipal solid waste landfill unit.

7. Reporting requirements - None.

Raton Water Works

Water Department

P.O. Box 99 / Raton, New Mexico 87740 / (575) 445-3861

April 25, 2019

Shelly Lemon
NMED
Surface Water Quality Bureau
PO Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502-5469

Re: Temporary Standard Schedule

Ms. Lemon,

The Raton Water Board met on April 16, 2019 and approved the attached 20 year implementation schedule for a temporary standard goal of achieving a 30 day average nutrient concentration of 8 mg/l total nitrogen and 1.6 mg/l total phosphorus. This schedule proposes both optimization and modification of our existing treatment facility. The goal will require both, capital and operational expense from the utility budget. The impact upon the utility budget will be difficult to fund due to the poor economic condition of the City. The schedule proposes to evaluate the progress every five years during the NPDES application process.

Raton Water Works will keep NMED updated as the design and funding portions of each project phase progress. Please move the temporary standard process forward and keep us informed of how we can assist. If further information is required or additional changes are needed please contact me.

Sincerely,

Dan Campbell
General Manager

Enclosed – Temporary Standard Implementation Schedule

City of Raton/Raton Water Works (NPDES Permit #NM0020273)
Nutrient Removal Schedule

Goal 2020 – 2040
1.6 MG/L TP
8.0 MG/L TN
30 day average

IMPLEMENTATION SCHEDULE

Task	Target Completion Period
WWTP – Nutrient Removal - NPDES Permit Application/Renewal - Continued Optimization Efforts of Existing system - PER for SBR Upgrades to Achieve Nutrient Removal Goal - Pilot Testing of Coagulation - Design for Phase 1 (Coagulation) - Funding Applications	Jan. 2020 – Jan. 2025
NPDES Permit Application - Evaluate Temporary Standard Progress - Final Design Completion - Bidding & Contract Award - Construction of Phase 1 - Construction Completion & Start Up	Jan. 2025 – Jan. 2029
- Optimization of Facility - Evaluation of Process Changes - Review & Evaluate PER Goals/Objectives and Plans	Jan. 2029 – Jan. 2030
NPDES Permit Application - NPDES Permit Application/Renewal - Evaluate Nutrient Removal Temporary Standard - Design Phase 2 (Aeration Control Upgrade for TN Removal)	Jan. 2030 – Jan. 2031
- Pursue Funding - Complete Final Design	Jan. 2031 – Jan. 2032
- Bidding & Contract Award - Construction - Construction Completion & Start Up	Jan. 2032 – Jan. 2035
NPDES Permit Application - Optimization of New Processes - Evaluation of Temporary Standard Progress	Jan. 2035 – Jan. 2037
- Continued Optimization - Evaluation of Progress	Jan. 2037 – Jan. 2040

Factors Determining Scheduling Compliance:

- Time needed to complete and approve final design of each phase;
- Time needed to successfully obtain financing;
- Successful bidding and construction processes within budget;
- Staff training for complete facility optimization;
- Evaluation of targeted steps to the goals of the temporary standard.

Temporary Standard Timeframe

The temporary standard is subject to review at each WQCC triennial review. At each NPDES permit application the progress will be reviewed and schedule modified if necessary.

STATE OF NEW MEXICO
WATER QUALITY CONTROL COMMISSION

IN THE MATTER OF PROPOSED AMENDMENTS TO 20.6.4 NMAC ESTABLISHING A NUTRIENT TEMPORARY STANDARD **WQCC No. 19-46(R)**

New Mexico Environment Department,
Water Protection Division,
Surface Water Quality Bureau

Petitioner.

ORDER AND STATEMENT OF REASONS

This matter comes before the Water Quality Control Commission ("Commission") upon a petition filed by the New Mexico Environment Department ("Department") on October 29, 2019, to amend the Standards for Interstate and Intrastate Surface Waters (20.6.4 NMAC) to create a new section, 20.6.4.318 NMAC, for Doggett Creek and establish a Temporary Water Quality Standard ("TS") for the City of Raton Wastewater Treatment Plant ("WWTP"), NPDES Permit No. NM0020273. The Commission met with a quorum on March 10, 2020, to conduct the public hearing, which was held in Santa Fe, New Mexico, in accordance with the rulemaking procedures, 20.1.6 NMAC. The public hearing was transcribed by Albuquerque Court Reporting Services.

Notice of the March 10, 2020 public hearing ("notice") was published in English and Spanish in the *Taos News* on December 26, 2019, and the *Santa Fe New Mexican* on December 30, 2019. (NMED Exhibits 7-10). Notice was published in English and Spanish in the *New Mexico Register* on December 31, 2019. (NMED Exhibits 11 and 12). Notice was published on the Public Notice page on the Department's website. (NMED Exhibits 15 and 16). Notice was posted on the New Mexico Sunshine Portal and provided to the Legislative Counsel Service on December 6,

2019. (NMED Exhibit 14). All other notice requirements under the State Rules Act, NMSA 1978, Section 14-4-5.2 (2017), The Water Quality Act, § 74-6-6 (1967 as amended through 1993), 20.1.6 NMAC, 40 C.F.R. § 25.4, and the Department's Public Involvement Plan for this proceeding were met. (NMED Exhibits 17, 18, 22, and 23).

During the hearing, the Commission heard technical testimony from and questioned the Department's witnesses and admitted the Department's exhibits. Members of the public were present for the hearing and provided comment. The Commission closed the record on March 10, 2020.

The Commission deliberated the establishment of a temporary standard and associated amendments to 20.6.4 NMAC, on ______________, 2020. After deliberation, the Commission voted unanimously to create a new section, 20.6.4.318 NMAC, for Doggett Creek and establish a Temporary Water Quality Standard for the City of Raton Wastewater Treatment Plant, NPDES Permit No. NM0020273, as proposed by the Department in NMED Exhibit 1 of the Department's Notice of Intent to Present Technical Testimony, for the reasons that follow:

STATEMENT OF REASONS

1. Pursuant to the Water Quality Act ("Act"), NMSA 1978, Sections 74-6-1 to -17 (1967 as amended through 2019), and the *Standards for Interstate and Intrastate Surface Waters*, 20.6.4 NMAC, the Commission is authorized to "adopt water quality standards for surface and ground waters of the state based on credible scientific data and other evidence appropriate under the [Act] . . . [giving the] weight it deems appropriate to all facts and circumstances." §74-6-4(D). The Act authorizes the Commission to adopt regulations to "specify a standard of performance for new sources that reflects the greatest reduction in the concentration of water contaminants," giving due consideration of and weight to "the

technical practicability and economic reasonableness of reducing or eliminating water contaminants from the sources involved . . ." NMSA 1978, § 74-6-4(E).

2. Pursuant to 20.1.6.200 NMAC, any person may file a petition with the Commission to adopt, amend or repeal any regulation within the jurisdiction of the Commission. The Department is a "person" under 20.1.6.7 NMAC.

3. On October 29, 2019, the Department filed a petition and with the Commission for a public hearing in this matter. On November 12, 2019, the Commission granted the Department's request for a hearing and scheduled a public hearing in this matter for March 10, 2020 and continuing thereafter as necessary. The Commission appointed Jennifer Pruett to serve as Hearing Officer in this matter pursuant to 20.1.6.100 NMAC.

4. Pursuant to 20.1.6.202 NMAC, the Department filed a Notice of Intent to Present Technical Testimony on February 17, 2020.

5. Nutrients are one of the leading causes of water quality impairment in New Mexico waters. According to the state's 2018-2020 Integrated Report, nutrients are the second leading cause of impairment in New Mexico's perennial rivers and streams and the fourth leading cause of impairment in lakes and reservoirs, impairing 1,140 miles and 5,750 acres, respectively. Nutrient pollution in waterbodies results in large daily swings of dissolved oxygen, which can change aquatic community dynamics. In some cases, these changes can result in nuisance algal blooms that lead to fish kills and other harmful effects.

6. The *Standards for Interstate and Intrastate Surface Waters*, 20.6.4 NMAC, include a narrative criterion for distinguishing nutrient conditions that contribute to production of undesirable or nuisance aquatic life. The state interprets this narrative criterion using numeric nutrient threshold values that are based on reference conditions and applied to

specific site classes in perennial, wadeable streams.

7. Facilities discharging to surface waters covered by the thresholds often need water quality-based effluent limits ("WQBELs") for nutrients. Because of the limited available dilution in many receiving waters, some facilities will have WQBELs (whether based on total maximum daily loads or not) that require the threshold concentrations to be met "end-of-pipe." However, these required WQBELs might not be economically or technologically achievable for many permittees; in these instances, the adoption of a temporary water quality standard may be appropriate.

8. New Mexico's temporary standards regulations at 20.6.4.10(F) NMAC are based on the U.S. Environmental Protection Agency ("EPA") regulation on Water Quality Standard variances at 40 C.F.R. 131.14. The New Mexico regulation defines a temporary standard as "a time-limited designated use and criterion for a specific pollutant(s) or water quality parameter(s) that reflect the highest attainable condition ("HAC") during the term of the temporary standard" 20.6.4.10(F)(12) NMAC.

9. A temporary standard provides a mechanism for making progress toward attaining a designated use and water quality criterion that are not currently attainable. If a temporary standard has a term longer than five (5) years, the HAC must be re-evaluated at least once every five (5) years with the opportunity for public input. 40 C.F.R. 131.14(b)(1)(v). Further, all temporary standards in New Mexico are subject to a required review during each succeeding triennial review of water quality standards. 20.6.4.10(F)(8) NMAC.

10. In 2017, the Commission approved 20.6.4.10(F) NMAC, creating a framework for adopting temporary standards. The New Mexico temporary standards regulation is based on the EPA regulation on Water Quality Standard variances at 40 C.F.R. 131.14. The EPA

approved the New Mexico regulation under the Clean Water Act effective on August 11, 2017.

11. The Department has conducted a substantial and widespread economic and social impact and HAC analysis for the City of Raton Wastewater Treatment Plant ("WWTP"), in accordance with 40 C.F.R. § 131.10(g) and 20.6.4.10(F) NMAC, to determine if the underlying nutrients standard is attainable now or within a defined period of time. The Department's analysis was thoroughgoing and sufficient.

12. The underlying nutrients Water Quality Standard, including numeric interpretations of narrative criteria, is not attainable by the WWTP because "controls more stringent than those required by sections 301(b) and 306 of the [Clean *Water]* Act would result in substantial and widespread economic and social impact" to the City of Raton and the surrounding community. 40 C.F.R. § 131.10(g)(6).

13. The analysis undertaken by the Department identifies the highest attainable interim effluent condition to be achieved during the term of the temporary standard.

14. To implement the nutrients temporary standard for the City of Raton WWTP, it is necessary to adopt a new water quality segment: 20.6.4.318 NMAC – *Doggett Creek,* and establish a discharger-specific temporary standard for the City of Raton WWTP, NPDES Permit No. NM0020273.

15. A temporary standard is appropriate in this case because all the following are met:

a. Technology-based effluent limitations for nutrients do not exist, therefore this requirement does not apply. [20.6.4.10(F)(1)(c) NMAC];

b. The underlying designated use and criterion, including numeric interpretations of narrative criteria, are not attainable now or within a defined period of time, but may be attainable in the longer term [20.6.4.10(F)(1)(a) NMAC];

c. It is feasible to make incremental improvements in water quality during the proposed term of the temporary standard; and

d. The temporary standard will not result in any lowering of existing uses or currently attained ambient water quality [20.6.4.10(F)(1)(b) NMAC].

16. In considering the proposed amendments in this matter, the Commission is required to give the weight it deems appropriate to all relevant facts and circumstances presented at the public hearing, including but not limited to: "(1) the character and degree of injury to or interference with health, welfare, environment and property; (2) the public interest, including the social and economic value of the sources of water contaminants; (3) the technical practicability and economic reasonableness of reducing or eliminating water contaminants from the sources involved and previous experience with equipment and methods available to control the water contaminants involved; (4) the successive uses, including domestic, commercial, industrial, pastoral, agricultural, wildlife and recreational uses; (5) feasibility of a user or a subsequent user treating the water before a subsequent use; (6) property rights and accustomed uses; and (7) federal water quality requirements." § 74-6-4(E).

17. The Commission has considered all facts and circumstances and concludes that the proposed amendments and temporary standard as adopted by the Commission does not cause injury or interference with health, welfare, animal and plant life, and property and the environment. The Commission further concludes that the proposed amendment and

temporary standard as adopted by the Commission is technically practical, economically reasonable, and in the public interest.

ORDER

By a vote of the Commissioners present, ____ voted for and ____voted against thereby approving the proposed amendments to 20.6.4 NMAC. The Commission hereby amends 20.6.4 NMAC to include a new section, 20.6.4.318 NMAC, for Doggett Creek and establishes a Temporary Water Quality Standard for the City of Raton Wastewater Treatment Plant, NPDES Permit No. NM0020273, as proposed by the Department in NMED Exhibit 1 to the Department's Notice of Intent to Present Technical Testimony in this matter. Title 20 Chapter 6, Part 4 of the New Mexico Administrative Code is hereby amended as set forth in NMED Exhibit 1A, with any appropriate corrections of formatting or other changes necessary to file these rules with the New Mexico State Records Center.

IT IS SO ORDERED.

________________________________ Date: ________________________

JENNIFER PRUETT, Chair
Water Quality Control Commission
1190 St. Francis Drive, Suite S2100
Santa Fe, New Mexico 87505