State of New Mexico

Water Quality Control Commission

2012 – 2014
State of New Mexico
Clean Water Act
§303(d)/§305(b)
Integrated Report

US EPA–Approved
May 8, 2012

Prepared by:
New Mexico Environment Department
Surface Water Quality Bureau
1190 St. Francis Dr.
Santa Fe, NM 87505
www.nmenv.state.nm.us/swqb

New Mexico Water Quality Control Commission (as of January 2012)

Butch Tongate, Chair
Environment Department

D L. Sanders, Designee
Office of the State Engineer

Daniel Sanchez, Designee
Energy, Minerals and Natural Resources Department
Oil Conservation Commission

Dave Gatterman, Designee
Energy, Minerals and Natural Resources Department
State Parks Division

Larry J. Dominguez, Designee
Department of Agriculture

Mike Sloane, Designee
Department of Game and Fish

Clark Taylor, Designee
Soil and Water Conservation Commission

Doug Bland, Designee
Bureau of Geology and Mineral Resources

Steve Glass, Representative
Municipal Environmental Quality Association

Heidi Krapfl, Designee
Department of Health

Edward Vigil, Member-at-Large

Hoyt Pattison, Member-at-Large

John Waters, Member-at-Large

Table of Contents

List of Figures

List of Tables

.

List of Appendices

List of Acronyms

ADB	Assessment Database
ARRA	American Recovery and Reinvestment Act
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DDT	dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DOE	Department of Energy
DWB	Drinking Water Bureau
E. coli	Escherichia coli
ECHO	Enforcement Compliance History Online Database
EMAP	Environmental Monitoring and Assessment Program
GIS	Geographic Information System
GRTS	Grant Reporting and Tracking System
GWUDI	Ground Water Under the Direct Influence (of surface water)
GWQB	Ground Water Quality Bureau
IR	Integrated Report
ISC	Interstate Stream Commission
LANL	Los Alamos National Laboratory
LRG	Lower Rio Grande
MAS	Monitoring and Assessment Section
MCL	Maximum Contaminant Level
NMAC	New Mexico Administrative Code
NMDGF	New Mexico Department of Game and Fish
NMDOH	New Mexico Department of Health
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
ONRW	Outstanding National Resource Water
OSE	Office of the State Engineer
PCB	Polychlorinated Biphenyls
PSRS	Point Source Regulation Program
QA/QC	Quality Assurance/ Quality Control
RCRA	Resource Conservation and Recovery Act
RLWTF	Radioactive Liquid Waste Treatment Facility
ROD	Record of Decision
RERI	River Ecosystem Restoration Initiative (RERI)
SDWA	Safe Drinking Water Act
STORET	Storage and Retrieval System
SWCD	Soil and Water Conservation District
SWPP	Source Water Protection Plan
SWQB	Surface Water Quality Bureau
SWWS	Sanitary Waste Water System
TMDL	Total Maximum Daily Load
TSI	Trophic State Index
UOC	Utility Operator Certification
USDA	United State Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WPP	Wetlands Program Plan
WPS	Watershed Protection Section
WQA	Water Quality Act (New Mexico)
WQCC	Water Quality Control Commission
WQMP/CPP	Water Quality Management Plan and Continuing Planning Process
WQS	Water Quality Standards
WQX	Water Quality Exchange

EXECUTIVE SUMMARY

New Mexico's Water Quality Management Programs

Under the New Mexico Water Quality Act, the New Mexico Water Quality Control Commission is the water pollution control agency for New Mexico. It is responsible for developing specific water quality policy in New Mexico consistent with the broader intent expressed by the legislature in passing the Act. In implementing the Act, the Commission adopts water quality standards intended to protect waters of the State, as well as regulations aimed at achieving those standards. In addition to its formal rulemaking role, the Commission serves as a forum to facilitate and advance a statewide policy dialogue on a variety of important water quality issues. However, the Commission is not responsible for executing its rules and policies; responsibilities for water quality management are delegated to constituent agencies.

The New Mexico Environment Department is the constituent agency with primary responsible for implementing and enforcing the regulations and standards adopted by the Commission. Moreover, the Department provides the principal source of technical expertise available to the Commission in its rulemaking and other policy-setting activities. Through the New Mexico Water Quality Management Plan, the Commission has designated the Department as the constituent agency to assist in:

- Maintaining, restoring, and improving the quality of the State's waters;
- Regulating discharges for compliance with regulations and standards;
- Developing water quality classifications and standards;
- Performing site application and design and specification reviews of new or expanding wastewater treatment facilities;
- Undertaking monitoring and enforcement of the statutes and permits pertinent to water quality;
- Coordinating water quality management planning;
- Managing state and federal construction grant and loan assistance programs which provide financial support to municipalities for construction or improvement of wastewater treatment facilities;
- Managing the ground water quality protection program with the goal of protecting the public health and beneficial use of ground water; and
- Providing technical assistance to local governments regarding water and wastewater treatment.

Surface Water Quality Protection in New Mexico

The protection of water quality in New Mexico is vitally important to the health and well-being of all New Mexicans and the aquatic life and wildlife that inhabit its waters. New Mexico uses a variety of mechanisms, including state, federal, and local programs, to protect and restore the quality of its surface and ground waters. The basic underpinnings of surface water protection as envisioned in the Clean Water Act and the Water Quality Act starts with the *State of New Mexico Standards for Interstate and Intrastate Surface Waters* [20.6.4 NMAC] which establish designated uses for surface waters. Designated uses include fish culture, public water supply, industrial water supply, domestic water supply, irrigation, primary and secondary contact

(including cultural, religious or ceremonial purposes), livestock watering, wildlife habitat, and aquatic life. To protect these uses and fulfill the requirements set forth in these laws, numerous programs have been developed to monitor, assess, protect, and restore surface water quality throughout New Mexico.

Like most states, New Mexico has utilized a targeted, rotational watershed approach to monitor and assess ambient surface water quality while still achieving comprehensive coverage of waters of the state. This approach was adopted in 1998 and has proven effective at achieving New Mexico's monitoring objectives given the level of financial and staff resources, and has provided:

- A systematic and detailed collection and review of water quality data that allows for more efficient use of human and budget resources;
- Information at a spatial scale where implementation of corrective actions is feasible;
- An established order of rotation and predicted sampling year for each watershed, which allows easier coordination efforts with other programs and other entities interested in water quality; and
- Enhanced program efficiency.

The process of correcting impairments begins with the identification of an impaired waterbody on the Clean Water Act §303(d) *List of Impaired Waterbodies*. Once a waterbody is listed, a total maximum daily load is developed and assigned to the waterbody, and incorporated into the *State of New Mexico Statewide Water Quality Management Plan and Continuing Planning Process*. This plan serves as an important planning tool for the prevention and correction of water quality impairments.

The principal mechanism used to protect waters from the adverse effects of municipal and industrial point source discharges is the federal National Pollutant Discharge Elimination System program. The U.S. Environmental Protection Agency Region 6 office in Dallas, Texas, issues and enforces these permits for discharges in New Mexico. As one of only five states in the nation without authorization to implement the permitting program, New Mexico's role is limited to certification of the permits pursuant to the Clean Water Act §401. Nevertheless, State certification ensures that permit limits for discharges into surface waters implement federal Clean Water Act and New Mexico Water Quality Act requirements, protect state water quality standards, and implement the *Water Quality Management Plan and Continuing Planning Process*. Once the permit is issued, New Mexico assists the Environmental Protection Agency with permit compliance tracking and on-site inspections.

The Environment Department also implements the New Mexico Utility Operators Certification Act for the Commission. The Act and its regulations require that all public drinking water and wastewater treatment facilities are operated by qualified operators. In many cases, wastewater treatment facilities discharging to impaired surface waters are required to meet stringent water quality based effluent limitations that increase the complexity of the treatment facility. Having qualified operators at wastewater treatment facilities is a key factor contributing to the quality of effluent discharge to a waterbody.

The State's Nonpoint Source Management Program works to prevent and correct water quality impairments from nonpoint sources of surface water pollution. The Environment Department is the lead agency for this program, which utilizes a variety of state, local, and federal agency programs to achieve implementation of Best Management Practices to prevent and abate

nonpoint source pollution. The program annually prioritizes its efforts by ensuring that waterbodies listed as impaired receive greater consideration for funding under the Clean Water Act §319. The program also ensures that water quality standards are protected and the water quality management plan is implemented through the State certification of Clean Water Act §404 dredge-or-fill permits issued by the United States Army Corps of Engineers. The Department's Wetlands Program administers and directs wetland projects that serve to restore, protect, and reserve water quality pertinent to wetlands. All water quality programs have an associated outreach component to provide education and outreach for schools and interest groups wherever possible to help maintain, protect, and restore New Mexico's water quality.

Surface Water Quality in New Mexico

Knowledge about surface water quality in New Mexico is based primarily on chemical, physical, biological, and habitat data collected during:

- New Mexico Environment Department's Surface Water Quality Bureau's rotational surveys;
- Water quality monitoring of projects under the State's Nonpoint Source Pollution Management Program;
- Total maximum daily load surveys and studies;
- Special studies conducted to address specific localized water quality concerns;
- Analysis of fish tissues for development of Fish Consumption Advisories,
- Water quality compliance monitoring conducted under the National Pollutant Discharge Elimination System; and
- Long-term water quality monitoring collected by the U.S. Geological Survey at stream gages.

Additionally, other entities are invited to contribute quality environmental data to be used for assessment purposes during a public data solicitation effort that is part of the development of this report.

From the approximately 7,000 categorized mostly perennial stream miles in New Mexico, nearly 2,500 assessed miles, or 35 percent, have identified impairments where water quality does not support the designated or attainable uses. Approximately 60,833 out of 94,310 (65 percent), categorized publically-owned lake, reservoir, or playa acres do not fully support designated uses either. The State has issued fish consumption advisories for a variety of fish species in 26 lakes and reservoirs and three rivers due to elevated concentrations of various contaminants, including mercury, dichlorodiphenyltrichloroethane (DDT), and polychlorinated biphenyls (PCBs).

Using all available data assessed against current designated, existing, or attainable uses utilizing established Assessment Protocols, the Department has found that temperature, nutrient/eutrophication, and *E. coli* are the three most common causes of river and stream water quality impairments in New Mexico. Mercury and PCBs in fish tissue, and temperature are the three most common causes of water quality impairments in lakes and reservoirs. The vast majority of surface water quality impairments identified in New Mexico are due to nonpoint sources of water pollution. The probable sources are diverse, but include agricultural activities, grazing by wild and domestic animals, construction, habitat and flow alterations, industrial and municipal discharges, waste disposal, storm water run-off, recreation, resource extraction, silviculture, spills, unpermitted discharges, and atmospheric deposition. Rangeland grazing, natural sources, loss of riparian habitat, and unknown sources are the leading sources of

impairment in New Mexico's rivers and streams. Atmospheric deposition, contaminated sediments, natural sources, and rangeland grazing are the leading probable sources of impairment in New Mexico's lakes and reservoirs.

Ground Water Quality Protection in New Mexico

New Mexico's ground water resources are also of vital importance and must be preserved for present and future generations. Approximately 78 percent of New Mexicans depend on ground water for drinking water.

As with surface water, New Mexico relies on several programs established under a variety of statutory authorities to protect and maintain ground water quality. The New Mexico Water Quality Act authorizes the Water Quality Control Commission to adopt ground water quality protection regulations and standards. The New Mexico Oil and Gas Act, Hazardous Waste Act, Ground Water Protection Act, Solid Waste Act, Emergency Management Act, Voluntary Remediation Act, Mining Act, and Environmental Improvement Act also contain provisions which are designed to protect ground water quality and which implement the ground water regulations and water quality standards directly or by reference. In addition, the State cooperates with local and federal governments on various programs relevant to ground water pollution control.

Nonpoint sources of ground water pollution are predominantly household septic tanks or cesspools and are the major sources of contamination of New Mexico's ground water. Nonpoint source contamination may be caused by large numbers of small septic tanks spread over a subdivision, residual minerals from evapotranspiration, animal feedlot operations, areas disturbed by mineral exploration or storage of waste products, urban runoff, or application of agricultural chemicals. Point source contributions to ground water contamination include publicly- and privately-owned sewage treatment plants, dairy lagoons, mines, food processing operations, industrial discharges, landfills, and spills or leaks.

Integrated Report Highlights

The Water Quality Control Commission completed its last triennial review under §303(c)(1) of the Clean Water Act in November 2010. In April 2011, the U.S. Environmental Protection Agency approved nearly all water quality standard amendments to 20.6.4. NMAC leaving a few amendments for which they have yet to take final action. Revisions include the establishment of new public water supply and coolwater aquatic life designated uses, revision to current temperature criteria, and the addition of a narrative biological criterion.

Sediment impairments are of special note, as excessive deposition of fine sediment on the bottom substrate of streams and rivers can negatively impact aquatic life. The New Mexico Environment Department and U.S. Environmental Protection Agency Region 6 secured the services of specialists to develop methods that identify where sedimentation expectations are not met. The results of this effort led to quantitative sedimentation threshold recommendations for New Mexico perennial streams. The Department used these recommendations to substantially revise the sedimentation/siltation assessment protocol for the 2012 listing cycle.

Also of note is New Mexico's Wetlands Program, whose importance to protecting the State's water quality has been underscored with the commitment of new resources in 2011. The overall goals are to protect and restore New Mexico's remaining wetlands and riparian areas and to increase self-sustaining and naturally functioning wetlands and riparian areas. To meet these goals, the Program is developing and implementing "Wetlands Action Plans" with watershed

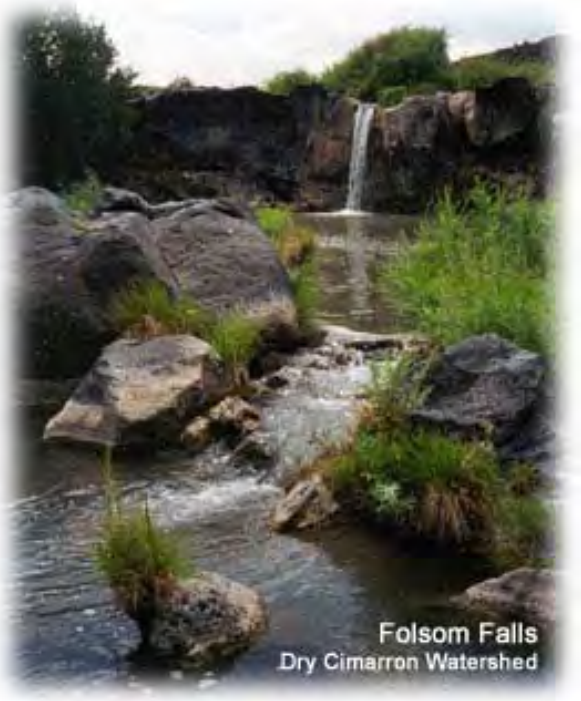
groups. The program is also completing a wetlands inventory, collecting baseline monitoring information, identifying permanent monitoring sites, and assessing the status and function of wetlands.

With respect to drinking water protection, the State of New Mexico received authority on February 9, 2011 from the U.S. Environmental Protection Agency to implement three more drinking water rules. As drinking water standards become increasingly more stringent, ground water that can meet regulatory requirements with little or no treatment becomes less available. During the last six years, many ground water systems have had difficulty complying with new arsenic and uranium level. While ground water continues to be the source for the majority of public water systems in the state, two of the largest systems in New Mexico -- Albuquerque and Santa Fe -- have added surface water as a significant source of drinking water in the last three years.

Finally, significant statutory changes have affected New Mexico's water quality programs. The Water Quality Act was amended in 2009 to require the adoption of industry-specific dairy and copper mining wastewater discharge regulations by the Water Quality Control Commission. After negotiations between the dairy industry and the New Mexico Environment Department, the Commission approved the new dairy rules in late 2011 and the rule became effective on December 31, 2011. The New Mexico Environment Department is now in the process of implementing a schedule of issuing discharge permits to dairy facilities pursuant to the new rules. The Department is now working with industry and stakeholder groups to develop the copper rules.

PART A - INTRODUCTION

The *State of New Mexico Clean Water Act (CWA) §303(d)/ §305(b) Integrated Report* (Integrated Report) is designed to satisfy the statutory requirements of §§ 303(d), 305(b), and 314 of the federal Water Pollution Control Act [33 U.S.C. 1251 *et seq*.], commonly known as the Clean Water Act. The Integrated Report also conveys basic information on water quality and water pollution control programs in New Mexico to the United States Environmental Protection Agency (USEPA) and the United States Congress, as well as to the general public.


Folsom Falls
Dry Cimarron Watershed

In accordance with the statutory requirements of the CWA, the Integrated Report contains:

- An assessment of water quality;
- An analysis of the extent to which the CWA §101(a)(2) goal of surface water quality -- protection and propagation of fish, shellfish, and wildlife and recreation in and on the water -- is being achieved;
- An overview of progress in water pollution control and recommendations for further action; and
- A description of the nature of nonpoint source pollution and programs for nonpoint source pollution control.

In accordance with current USEPA integrated listing guidance, New Mexico uses the designated use determinations of Fully Supporting, Not Supporting, and Not Assessed for each individual designated use to determine an integrated report (IR) category for every assessment unit on the Integrated List. New Mexico's IR categories are defined in Table 1. Waterbodies classified as Category 5 constitute the *CWA §303(d) List of Impaired Waters*.

The IR categories document attainment of applicable water quality standards, enable the development of monitoring and corrective action strategies that effectively respond to the needs identified in the assessment process, and ensure that the attainment status of each water quality standard applicable to a particular segment is addressed.

The format of the Integrated Report has not changed significantly from the 2006-2008 version that was developed in accordance with USEPA's Integrated Report Guidance (USEPA 2005). The common organizational structure and method of reporting water quality status from year to year facilitates the review that Congress and members of the public conduct on state reports and lists. Additionally, this 2012 - 2014 version adheres to the guidance in USEPA's most recent recommendations (USEPA 2011).

Table 1. New Mexico's Integrated Report Categories

Category	Description
1	All designated uses are supported.
2	Available data and/or information indicate that some, but not all, designated or existing uses are supported based on numeric and narrative parameters that were tested.
3	There are insufficient available data and/or information to make a support determination.
4A	Available data and/or information indicate that at least one designated or existing use is not being supported, but a Total Maximum Daily Load (TMDL) is not needed because TMDLs have been already been established.
4B	Available data and/or information indicate that at least one designated or existing use is not being supported, but a TMDL is not needed because other pollution control requirements are reasonably expected to result in attainment of the water quality standard in the near future.
4C	Available data and/or information indicate that at least one designated or existing use is not being supported, but a TMDL is not needed because impairment is not caused by a pollutant.
5A	Available data and/or information indicate that at least one designated or existing use is not being supported and necessary TMDLs are underway or scheduled.
5B	Available data and/or information indicate that at least one designated or existing use is not being supported and a review of the water quality standard will be conducted to verify appropriateness.
5C	Available data and/or information indicate that at least one designated or existing use is not being supported but additional data are necessary to verify the listing before TMDLs are scheduled.

PART B - BACKGROUND

B.1 Scope of Waters included in Integrated Report

New Mexico is characterized by high mountains, expansive plains and plateaus, river gorges, and broad valleys. Land surface elevations in New Mexico vary from just under 3,000 feet above sea level at the Texas border in the southeastern portion of the state to just over 13,000 feet in the northern mountains. New Mexico is the fifth largest of the fifty states, with a total area of 121,607 square miles. Of this, 33.9 % is federal land, 11.7% is State land, 10.4% is Native American land, and 44.0% is privately owned (BLM 2005). While the state's climate is generally arid to semiarid, New Mexico's mountainous areas impart a cooler and wetter climate in a significant portion of the state. Average annual precipitation ranges from less than eight inches in desert valleys to over 30 inches in the mountains. About half of annual precipitation is received during the period with brief but intense summer storms, commonly referred to as the "monsoon season." Much of the winter precipitation falls as snow in the high mountains and as snow or rain at lower elevations. Average annual snowfall ranges from approximately 3 inches in desert and plains regions to well over 100 inches in mountain areas. Statewide, the annual average precipitation is much less than evaporation from open water surfaces (BOR 1976).

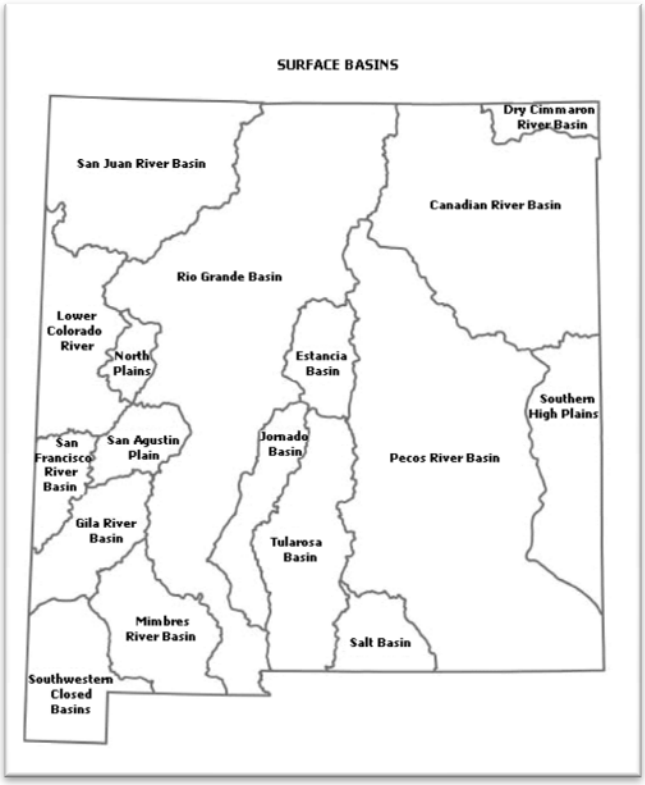


Figure 1. New Mexico Surface Water Basins

New Mexico's surface waters are located within basins (Figure 1) as defined by the New Mexico Office of the State Engineer (OSE). These surface waters include headwater portions of three of the nation's principal drainage systems: the San Juan River and Lower Colorado River basins contribute to the Colorado River, drainage from the Arkansas-White-Red River Basin contributes to the Mississippi River, and the three Rio Grande basins and the Pecos River basin contribute discharge to the Rio Grande. Other streams are in topographically closed basins and drain internally, but are still considered waters of the state. Table 2 summarizes water resource information.

Total annual stream flow averages over 5.7 million acre-feet. Precipitation falling within the state boundaries accounts for 3.3 million acre-feet of this total. Observed average precipitation for water years (October – September) during the period from 1971-2000 was 14.5 inches

(NMOSE/ISC 2006). Other states, principally Colorado via the Rio Grande and the San Juan River, contribute the rest. Downstream states receive 3.6 million acre-feet from New Mexico (BOR 1976). The state's surface water supply is almost fully applied to beneficial uses under existing water rights and interstate compacts or reserved for specified beneficial uses under water rights filings.

Table 2. Summary of New Mexico's Water Surface Resources

Topic	Value
State population[1]	2,059,179
State Surface Area	121,607 sq mi
Number of water quality basins	11
Total number of stream miles[2]	108,649 mi
Perennial stream miles[2]	6,590 mi
Intermittent/Ephemeral stream miles[2]	99,332 mi
Ditch/canal miles[2]	2,727 mi
Stream miles bordering other states[2]	0 mi
Number of public lakes/reservoirs[2,3]	196
Acres of public lakes/reservoirs[2,3]	108,905 acres
Acres of freshwater wetlands[4]	740,600 acres

[1]United States Census Bureau 2010. This represents a 13.2% increase since the 2000 census.
[2]Derived by SWQB are based on the lengths of arc segments and areas of polygons from the USGS National Hydrography Dataset (USGS 2012). Established Assessment Units do not cover every waterbody in the NHD dataset. Water resource information reported by USEPA may also differ from information reported by SWQB. These differences can be attributed to the different topographical map scales each agency uses to develop these estimates. Additionally, the two agencies may have used GIS information updated from satellite or aerial photos taken at different times.
[3]This includes publicly-owned high-altitude natural lakes, playa lakes, and sink holes as well as lakes and reservoirs based on the USGS National Hydrography Dataset. Large reservoir areas are based on the conservation pool.
[4]United States Department of Agriculture Natural Resources Conservation Service (USDA/NRCS) 2000

New Mexico ground water supplies are estimated to be 20 billion acre-feet. Of this amount, an estimated three billion acre-feet of fresh water and 1.4 billion acre-feet of slightly saline water are recoverable. In some areas with significant ground water use, ground water levels have declined in part due to withdrawals in excess of recharge (BOR 1976). Ground water levels may decline in the vicinity of pumping even when withdrawals do not exceed basin recharge because pumping ground water draws down aquifer storage, which can only be replenished by recharge over time once pumping decreases or stops.

B.2 Water Pollution Control in New Mexico's Surface Waters

The New Mexico Water Quality Act (WQA) was adopted in 1967 to protect water quality in New Mexico. The New Mexico Legislature has revised the WQA [NMSA 74-6-1 *et seq*.] numerous times to improve the management and protection of New Mexico's water resources. Several of the revisions expanded the duties and powers of the New Mexico Water Quality Control Commission (WQCC). These duties include adoption of water quality standards and the adoption of regulations "to prevent or abate water pollution in the State or in any specific geographic area or watershed of the state...or for any class of waters." Under the WQA, water is defined as "all water including water situated wholly or partly within, or bordering upon, the state, whether surface or subsurface, public or private, except private waters that do not combine with other surface or subsurface water." The WQCC is the State water pollution control agency for all purposes of the federal CWA and may take all necessary actions under the WQA to secure the benefits of the WQA.

Under the authority of the WQA, the WQCC has adopted the basic framework for water quality management in New Mexico (Figure 2). A more detailed description of this framework is provided in the *State of New Mexico Statewide Water Quality Management Plan/Continuing Planning Process* (WQMP/CPP (NMWQCC 2011).

Responsibilities for water quality management activities are delegated to constituent agencies, primarily the New Mexico Environment Department (NMED). Responsibilities for most water quality management activities involving surface waters are further delegated to NMED's Surface Water Quality Bureau (SWQB). NMED's Ground Water Quality Bureau (GWQB) is delegated most responsibilities for activities involving protection and restoration of ground water quality. A significant exception is that the New Mexico Oil Conservation Division is delegated responsibility regarding most of the regulation of ground water quality protection associated with oil and gas production. Several other state agencies conduct activities that concern water quality, including but are not limited to: Office of the State Engineer; Interstate Stream Commission; Department of Game and Fish; Energy, Minerals and Natural Resources Department; Oil Conservation Commission; Soil and Water Conservation Districts; and Department of Agriculture.

The State conducts water quality planning on a statewide level. Nevertheless, some individual programs use a watershed-level focus to augment and better support statewide planning efforts. NMED strives to use an integrated planning and management strategy to protect or attain the desired uses and levels of water quality within a watershed. The fundamental programs within this water quality management approach are described below. Figure 3 describes the iterative process New Mexico implements to identify water quality problems, develop solutions to address them, and assess the effectiveness of the implemented solutions. Problem identification begins with establishing water quality standards and follows with collecting data to identify impaired waters. Problem solving involves the development of Total Maximum Daily Loads (TMDLs) which guide NPDES permit limits and §319 restoration projects to help a waterbody achieve water quality standards. Each program is an integral part of this approach.

Figure 2. New Mexico's Water Quality Management Framework

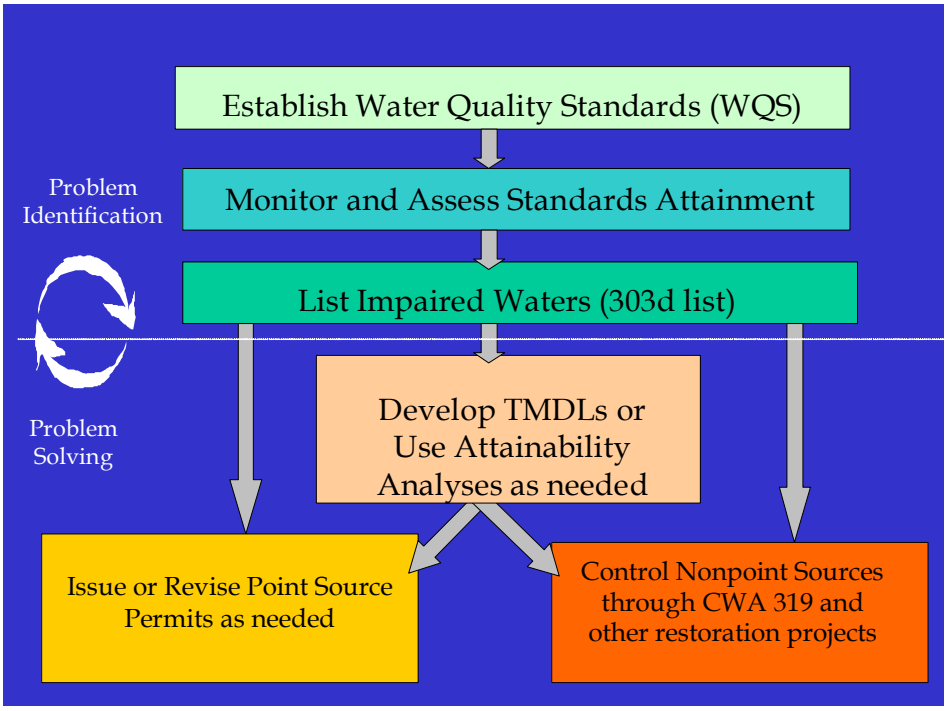


Figure 3. General framework for identifying and restoring New Mexico's surface waters

Surface Water Quality Standards Program

New Mexico's Surface Water Quality Standards Program maintains and refines the State's surface water quality standards (WQS). The WQS define the water quality goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to preserve water quality. New Mexico continually evaluates the WQS using applicable guidance documents, data, and other sources of information to identify provisions that may need to be modified or added to refine and improve the WQS. In accordance with CWA §303(c)(1), the State must hold a hearing to examine the WQS on a three-year basis. This process is known as the "triennial review" and is also governed by the WQA which assigns authority for the adoption of WQS to the WQCC.


Rio Nambe, high in the Pecos Wilderness

The WQCC completed its last triennial review in November 2010. Almost all of the adopted WQS amendments were approved by Region 6 USEPA in April 2011. In April 2011, the USEPA approved nearly all water quality standard amendments adopted by the WQCC. NMED is working to resolve the remaining issues for amendments which USEPA has yet to take final action. Among the adopted amendments are the following changes: NMED is working with

USEPA to resolve the remaining issues (see Section B.4 for more details). Among the adopted amendments are the following:

- Revised aquatic life criteria that include acute and chronic thresholds and a new coolwater aquatic life use;
- A new provision for approving site-specific criteria, and criteria based on natural background;
- Amended segment descriptions that explicitly exclude tribal waters and acknowledge waters under joint jurisdiction with tribes and pueblos;
- Revised definitions for “perennial”, “intermittent”, and “ephemeral”;
- Revised standards for unclassified waters;
- Updates to human health criteria for 17 pollutants;
- A new general criterion to protect biological integrity;
- Revised Domestic Water Supply criteria;
- An expedited use attainability analysis process for certain ephemeral waters;
- Standards for previously unclassified waters, including Lake Farmington, Ramah Lake, Rio Nutria in the Zuni Watershed, and Klauer Spring; and
- Numeric salinity benchmarks for the Lower Pecos River.

For additional information on New Mexico’s water quality standards, visit:
http://www.nmenv.state.nm.us/swqb/Standards/

Point Source Regulation Program

The NPDES Program as established in CWA §402 is responsible for the protection of surface water quality by regulating point source discharges of pollutants to surface watercourses. Point source pollution results from discharge of contaminants through discrete conveyances such as pipes. The overarching goal of the Point Source Regulation Program (PSRS) is to protect public health and the environment by assuring that regulated point source discharges to surface waters of the State comply with appropriate State and federal statutes and regulations.

Because New Mexico does not have authority to implement the CWA §402 program for discharges, USEPA develops, issues, and enforces NPDES permits in New Mexico. The PSRS, nonetheless, supports USEPA by conducting compliance inspections on behalf of USEPA and by serving as a local point of contact for providing information to operators and other agencies regarding the federal regulatory program. Figure 4 illustrates the distribution of NPDES permitted facilities by type, number, and distribution. The inspections help to ensure compliance with applicable effluent limitations and permit conditions and are carried out in accordance with the USEPA NPDES Compliance Inspection Manual (USEPA 2004) using current, USEPA-approved forms and checklists. The data collected are used in compliance evaluation and in support of State or federal enforcement and permitting activities. The State conducted 158 NPDES storm water and waste water compliance inspections in state fiscal year 2010 and 176 in state fiscal year 2011. USEPA conducted 40 NPDES enforcement actions in state fiscal year 2010 and 42 in 2011, most of which were based on State inspection reports.

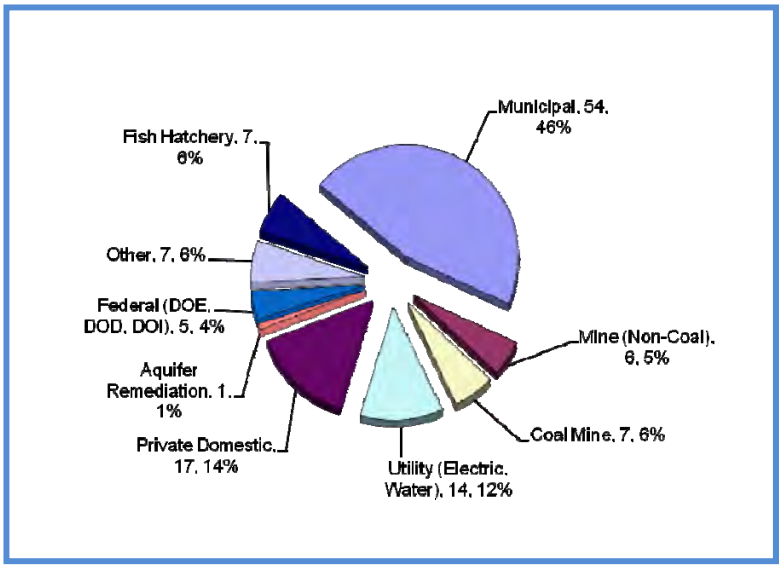


Figure 4 Distribution of NPDES permits in New Mexico

State certification of federal permits is required under CWA §401 and ensures the permits are compatible with state and federal laws, protect the State's WQS and implement the WQMP/CPP. The PSRS fulfills this responsibility for New Mexico, certifying 17 permits in state FY2010 (July 1, 2009 – June 30, 2010) and 23 permits in state FY2011. A significant regulatory change occurred in 2011 when the WQCC adopted regulations addressing certification. The new regulations codified for the first time the procedures to be used by NMED for certification of CWA §402 and §404 permits. Previously, NMED followed procedures developed internally that were not subject to

regulation or scrutiny by the public. The new regulations 20.6.2 NMAC went into effect on May 18, 2011.

Enforcement of NPDES is based in large part upon meeting the applicability requirement of NMAC 20.6.2.2100 of the regulations, on the discharge resulting in a violation of a state water quality standard or regulation, or both. The regulatory applicability clause is designed to prevent dual regulation by state and federal government, while still allowing the State to act in cases where the federal program has been unable to gain compliance within a prescribed time. The State may also enforce provisions of the regulations prohibiting disposal of refuse in a watercourse (§2201), which are not subject to the applicability clause. The Department has authority to issue compliance orders, including penalties, for any discharge that results in a violation of a water quality standard or regulation.

The PSRS has been successful over the years in improving and protecting water quality, in that today a very small percentage of New Mexico's surface water quality impairments are attributed to point sources of water pollution. However, poorly operated or maintained treatment plants continue to cause adverse effects on water quality in local areas, in part due to limited funding to implement technological improvements or upgrades to treatment facilities.

For more information on the Point Source Regulation Program, see http://www.nmenv.state.nm.us/swqb/PSR/.

Utility Operators Certification Program

The NMED administers the Utility Operators Certification (UOC) Program pursuant to the New Mexico Utility Operators Certification Act [NMSA §§ 61-33-1 to 101]. This program is responsible for training, testing, and certification of public water and wastewater system operators.


Las Cruces' Wastewater Treatment Facility

The UOC Program has developed four study manuals for operators to assist them is studying for certification examinations. They include: Wastewater Study Guide, Water Study Guide, Wastewater Laboratory Study Guide and Water Sampling Study Guide, and comprehensively cover the technical aspects of water and wastewater treatment operations. The Program has made these study manuals available on-line.

Each year UOC Program staff provide approximately 50 hours of instruction at training events for certification or new operators and renewal of certification for existing operators. Approximately 1,250 certificate renewal applications were processed in fiscal year 2010 and approximately 1,450 certification examination applications were processed in fiscal year 2010. The UOC Program also provides technical assistance to operators and treatment facilities throughout New Mexico.

For more information on the Utility Operators Certification program, see http://www.nmenv.state.nm.us/swqb/UOCP/.

Nonpoint Source Management Program

While the focus of regulation of surface water quality pollution is on point sources, the majority of water quality impairments identified in New Mexico's streams and rivers continues to be due to nonpoint sources of water pollution. While nonpoint source (NPS) pollution can be directly related to land use practices on a broad geographic scale, it is generally caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up natural and human-caused pollutants, and deposits them into rivers, lakes, wetlands and ground water. In New Mexico, nonpoint sources of pollution include but are not limited to: malfunctioning septic systems, streamflow modification, construction activities, streambank and riparian habitat modification, roads, recreational activities, urban stormwater run-off, agriculture, grazing, silviculture/forest management, and resource extraction.

NMED's Nonpoint Source Management Program is designed as a cooperative effort among watershed stakeholders and NMED to educate and implement best management practices (BMPs) to reduce the ability of nonpoint pollutants to enter surface and ground waters. An updated plan for the Nonpoint Source Management Program was developed and approved in 2009 (NMED/SWQB 2009). The plan has as an overall goal of meeting and maintaining water quality standards and uses of surface water and ground water resources in New Mexico. Its objectives are directed toward meeting this goal, and are related to planning, restoring and protecting surface and ground water quality, education, and interagency cooperation. The plan also describes long-term management activities as well as with shorter-term milestones to be measured over the course of only a few years.

The Nonpoint Source Management Program emphasizes watershed-based planning, as described in USEPA's *Nonpoint Source Program and Grants Guidelines for States and Territories* (Federal Register, October 23, 2003). Such planning is a tool which NMED encourages to be used by any watershed restoration program whose intent is to benefit water quality. NMED underscored its encouragement by making watershed-based planning a requirement for significant restoration activities to be funded with CWA §319(h) funds. The focus of planning and implementation is on impaired waters with approved TMDLs, and on a limited group of impaired waters for which TMDL development is not required because the impairment is thought to be caused by insufficient flow (*i.e.,* Category 4C streams). Watershed-based plans are used by local watershed groups to build on the TMDL process with more detailed characterization of pollutant sources, management measures, information and education programs, and monitoring. The approach fosters coordinated watershed restoration efforts, development of effective watershed associations, engagement with and of stakeholders, and implementation of effective BMPs to reduce NPS pollution. Through a combination of incentive programs, partnerships, education and outreach activities, New Mexico is able to get responsible parties to implement BMPs to control or reduce the degree of water quality impairments. Table 3 provides some examples of best management practices encouraged by the Program.

Since 1998, the Nonpoint Source Management Program has implemented over 100 watershed restoration projects, developed 34 Watershed Restoration Action Strategies, and formed 28 focused watershed groups in communities throughout New Mexico. The state currently has approximately 22 §319-funded planning or restoration projects in progress. Typically restoration projects take at least several years to complete and several more years to see the full benefits. Of the ongoing projects, two projects began in state fiscal year 2008, two projects began in fiscal year 2009, seven projects began in fiscal year 2010, eight projects began in 2011, and

three new projects began in fiscal year 2012. See Figure 5 for examples of projects completed in calendar year 2011 in priority watersheds.

The Program includes other activities that protect water quality. One such activity is the Program's coordination with the United States Army Corps of Engineers to implement the State's CWA §401 certification responsibilities for §404 permits. These federal permits are required for persons conducting "dredge or fill" activities in a water of the United States, and are designed to protect the waters from degradation due to NPS pollution associated with such activities. As discussed above, in 2011 the WQCC adopted regulations addressing the certification of federal permits pursuant to CWA §401. One-hundred, forty-two CWA §401 water quality certifications or actions were completed in 2010 and 138 in 2011. The Program also coordinates with the New Mexico Energy, Minerals, and Natural Resources Department to implement portions of the New Mexico Mining Act pertaining to water quality. Finally, the Program supports or implements several outreach activities throughout the year, including the biennial New Mexico Watershed Forum, publication of the quarterly newsletter *Clearing the Waters*, development and maintenance of SWQB web pages devoted to NPS pollution, and presentations for school and community groups.

The Program also relies on established resource protection programs, national and state NPS pollution prevention programs, and activities of other land management and resource protection agencies to address NPS pollution. New Mexico identifies programs and activities that will facilitate the achievement of surface water quality criteria, using a voluntary approach to implement water quality improvements. For example, coordination between the U.S. Forest Service and the SWQB's Watershed Protection Section continues to be an integral part of the NPS Management Program and has facilitated cooperation on many successful NPS pollution reduction projects.

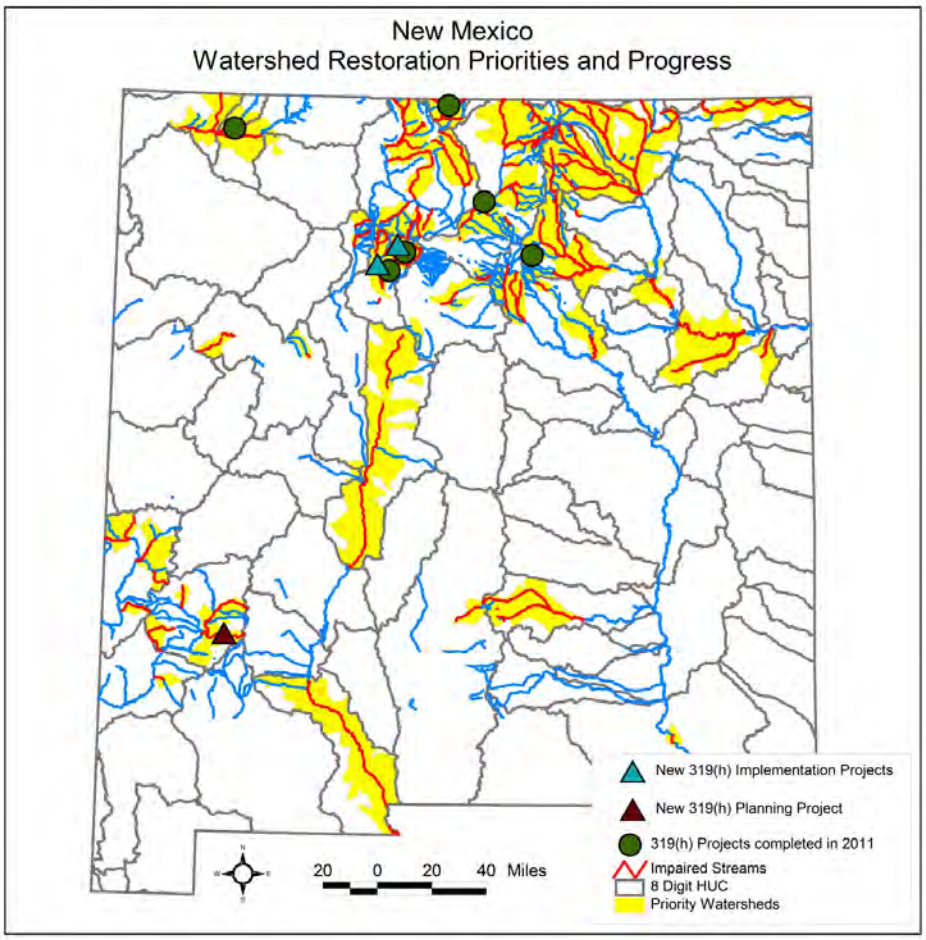


Figure 5. Watershed Restoration Priorities and Progress

Table 3. Example BMPs implemented throughout New Mexico

NPS Pollution Category	Examples of BMPs implemented in New Mexico to address Specified Type of NPS Pollution
Grazing	• Alternate watering sources (trick tanks, upland dirt tanks, and upland wells) • Planned/rotational grazing • Fencing (pasture cross fencing and creation of additional pastures for improved stock rotation methods and riparian exclosure fencing) • Development of springs • Cattle guards • Herding • Creating ponds • Forest thinning/brush clearing
Fire Suppression/Fuels Management	• Forest thinning / fuels reduction • Post wildfire watershed rehabilitation • Meadow rehabilitation
Streambank Modification/ Hydromodification	• Streambank Stabilization - Revetment (e.g. vanes, j-hooks) - Grade control (e.g. cross vanes) - Grazing exclosures or planned grazing - Terracing / revegetation of slopes - Installing vortex weirs - Replacing culverts - Brush control
Loss of Riparian Habitat	• Habitat restoration and rehabilitation - Removal of non-native plant species - Planting native vegetation • Grazing exclosures or planned grazing
Urban Stormwater	• Education/Outreach activities • Develop stormwater management plan at local level • Propose new ordinance and/or development codes • Propose new construction standards • Install swales, French drains, detention ponds • Collect and treat runoff
Construction	• Sediment Control Structures (silt fences, hay bales, sediment retention ponds) • Heavy equipment cleaning and spill kits • Conduct construction activities during no-flow or low-flow conditions • Composted mulch berms and socks
Agriculture	• Residue Management (Contour strip cropping, stubble munching, conservation tillage) • Improved irrigation practices (low output sprinklers, tailwater recovery, vegetation control) • Agricultural Chemical Handling Facilities • Nutrient Management (split fertilizer applications, nutrient balancing, crop rotation) • Minimize pesticide impacts (biological control mechanisms, using least toxic substances, apply in accordance with label instructions and legal requirements)
Resource Extraction	• Sediment Control Structures (silt fences, hay bales, sediment retention ponds) • Treatment of acid mine drainage • Stabilizing, relocating, and channeling runoff around mine and mill tailings
Silviculture	• Road management (closures, reducing new road construction, reclaiming old roads, properly maintaining existing roads to reduce or prevent erosion, reseeding trails and landings) • Manage timber harvesting activities to protect steep slopes • Prescribing size, location, time of year, and size of harvesting activities • Erosion control structures
Septic Systems	• Identify and replace malfunctioning systems • Outreach to encourage preventative maintenance • Connect to centralized wastewater treatment system
Recreational Activities	• Revegetation of impacted areas • Trail maintenance/reconstruction • Provide and maintain waste and sanitation facilities • Limit off road vehicle use • Restrict vehicular access to riparian areas • Recreational area closure or relocation • Education/Outreach

While New Mexico had received approximately $2,300,000 per year to administer and implement the Nonpoint Source Management Program through the CWA §319(h) program, these federal grants have significantly decreases in recent years. Nevertheless, these funds are enhanced through the 40 percent non-federal match required for all recipients of CWA §319(h) grants. While "on-the-ground" project continue to be a focus of the program, watershed based planning and education projects are a significant component (see Figure 6). The "Planning and Education" category in Figure 6 includes approximately $110,000 for the New Mexico Watershed Forum to convene two statewide conferences; the remainder is for watershed-based planning projects. The dollar amounts for 2012 are lower than in previous years because the enacted CWA §319 budget for New Mexico for fiscal year 2012 was reduced to $2,042,000, and because of the withdrawal by an applicant of one project proposal during the project development process. Figure 7 depicts the funding distribution for projects completed in calendar year 2011. Other funding for implementation of the Program is obtained from a combination of federal, state (including RERI; *see* below), local, and private sources. Table 4 describes CWA §319 projects that began in state fiscal year 2012.

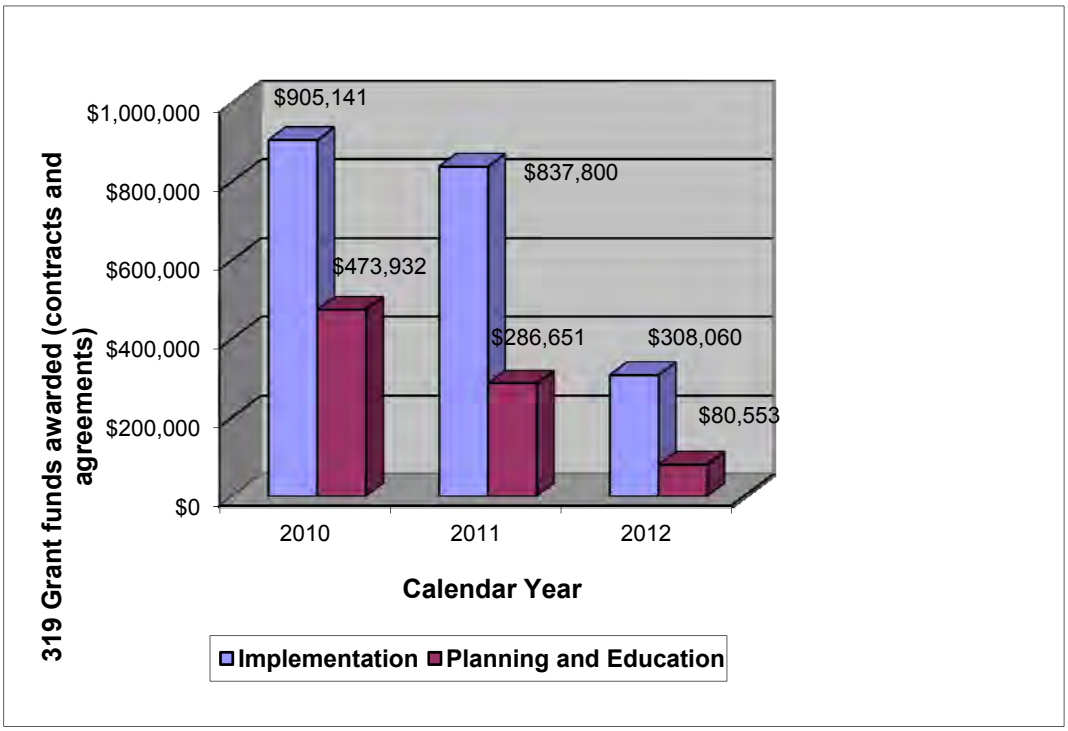


Figure 6. CWA §319(h) Funding Distribution by NPS Pollution Category

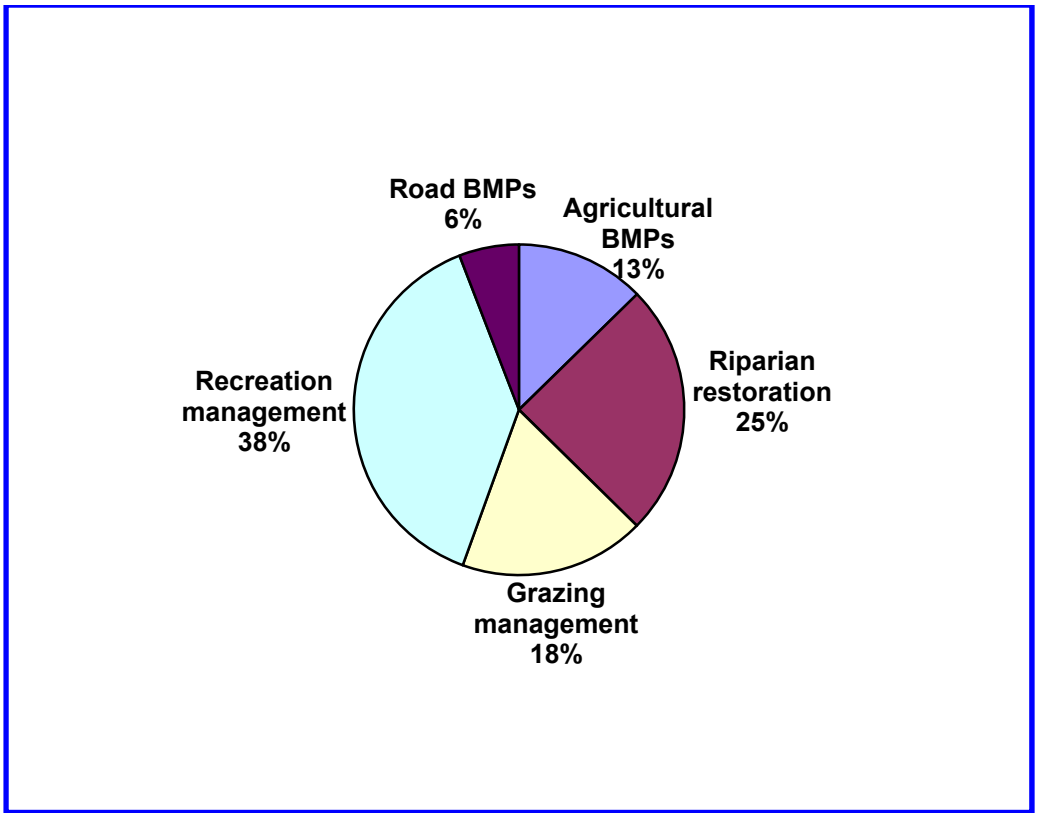


Figure 7. CWA §319(h) Funding Allocation (based on calendar year 2011)

By implementing the Nonpoint Source Management Program, New Mexico is working to achieve measurable results of reduced NPS pollutant loadings and reduced number of NPS impaired waterbodies, successful implementation of TMDLs and watershed-based plans, and protected ground water resources for municipal, domestic and agricultural uses. Due to the widespread distribution and dynamic nature of nonpoint source pollution, reducing pollution sources requires the concerted effort of all people who spend time in the watershed. Individuals and communities must understand how human activities affect water quality and learn how to actively participate in reducing sources of pollution to protect water resources. Additional information about how the NPS Management Program is coordinated and implemented throughout the state can be found in the *New Mexico Nonpoint Source Management Program Plan* (NMED/SWQB 2009).

Table 4. CWA §319 Projects Beginning in State FY 2012

Project Name	Project Description	Combined Cost
Black Canyon Watershed-Based Plan	This project will supplement an existing watershed plan for the greater Gila region, by adding significant detail for Black Canyon Creek. The project will address the nine planning elements in EPA's NPS Program and Grants Guidelines for States and Territories, and determine how best to implement an established temperature TMDL.	The project will be implemented by the Upper Gila Watershed Alliance, for a combined cost of $52,677 (§ 319 and non-federal match).
Riparian Restoration along the Rio de las Vacas, NM: Addressing Non-Point Source Impairments	This project will partially address nutrient and temperature impairments within the Rio de las Vacas, in the Jemez watershed, using a combination of fencing, planting of native woody vegetation, and bank stabilization structures. Barbed wire and buck and pole fences will be installed to reduce grazing pressure and limit access by off-road vehicles to the riparian area and adjacent meadows. The project will be implemented along approximately 2.2 miles of the lower Rio de las Vacas on land managed by the Santa Fe National Forest.	Rocky Mountain Ecology, LLC will implement the project for a combined cost of $240,558.
Reducing Temperature and Turbidity on San Antonio Creek by Restoring Slope Wetlands on Six Tributaries	This project will employ plug-and-pond techniques and utilize low-tech, volunteer-built structures to arrest gully formation and re-wet adjacent wetlands in six small watersheds tributary to San Antonio Creek, in the Valles Caldera National Preserve. The project will address temperature and turbidity impairments in San Antonio Creek.	Los Amigos de Valles Caldera will implement the project for a combined cost of $276,480.

Additional information describing the Nonpoint Source Management Program can be found in the *New Mexico Nonpoint Source Management Program* (2009).
http://www.nmenv.state.nm.us/swqb/wps/Plan/index.html

Information on work completed in specific years can be found in *State of New Mexico Nonpoint Source Management Program Annual Reports*.
http://www.nmenv.state.nm.us/swqb/wps/AnnualReports/index.html

Information on projects funded through Section 319 is available on USEPA's Grants Reporting and Tracking System. Current projects appear under grants awarded in federal fiscal years 2008, 2010, 2011, and 2012.
http://iaspub.epa.gov/grts/projects

Effectiveness Monitoring Program

The SWQB established an Effectiveness Monitoring Program to measure the success of the Nonpoint Source Management Program in 2008, with the goal of documenting water quality changes resulting from projects implemented with CWA §319 funds. The Effectiveness Monitoring Program is being conducted in accordance with each project-specific quality assurance project plan for CWA §319 projects. Each project area is monitored for changes in water quality both upstream and downstream, and before and after implementation.

Effectiveness monitoring will be carried out within selected project areas every year for at least five years. In many cases, a series of projects will result in a longer-term monitoring effort. In these cases, when the SWQB's Monitoring and Assessment Section (MAS) conducts a water quality survey in the area, the survey will be tailored to supplement the effectiveness monitoring dataset in compliance with the Quality Management Plan (NMED/SWQB 2011a). The Effectiveness Monitoring Program is already documenting real improvements. In July 2011, USEPA formally recognized the restoration of the Santa Fe River downstream of the City of Santa Fe wastewater treatment plant as a "Clean Water Act Success Story" (*see* below).

Clean Water Act Success Story: The Lower Santa Fe River Restoration Efforts Revive Riparian Vegetation and Improve Water Quality

The Lower Santa Fe River below the Santa Fe wastewater treatment plant before (1997) and after (2004) restoration.

USEPA has recognized the Lower Santa Fe River as a Success Story for the CWA Section 319 Nonpoint Source Pollution Control Program. This portion of the river is downstream of the city of Santa Fe, and flows perennially as a result of the wastewater treatment plant (WWTP) outfall, which provides the primary source of flow. Restoration activities conducted by the WildEarth Guardians in cooperation with the NMED have been successful in converting a mostly barren impaired stream to a thriving riparian corridor with improved water quality.

In 1998, the Lower Santa Fe River was noted as not supporting the designated uses of marginal coldwater fishery, warmwater fishery and livestock watering. The water quality parameters of concern were pH, sedimentation, dissolved oxygen (DO), chlorine, and total ammonia. The probable sources of pollution were listed as municipal point sources and livestock with access to streams. Upgrades to the WWTP led to the removal of ammonia and chlorine as pollutants of concern, but cattle grazing and eroding riparian areas continued to contribute nonpoint source pollution to this reach of the Santa Fe River. Poor riparian condition exacerbated effects of nutrients present in the WWTP discharge.

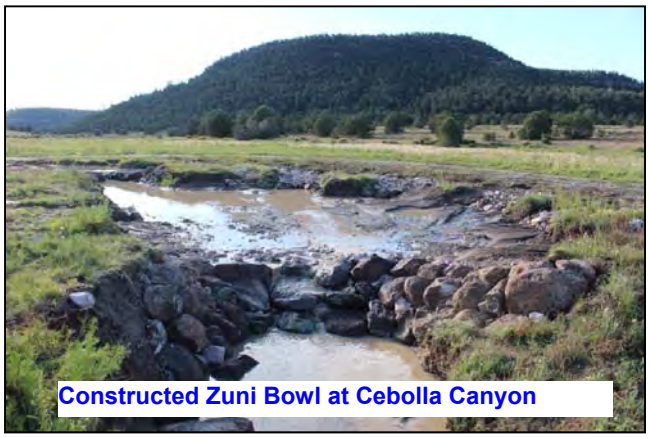
Starting in 2000, restoration efforts funded by CWA Section 319 funds transformed the impaired reach of the Santa Fe River from an erosion-prone, barren area into a lush preserve with abundant riparian vegetation and wildlife (see above photos). The project partners replaced exotic vegetation with native vegetation by removing Salt Cedar and Russian Olive trees and planting more than 5,000 cottonwood and 15,000 willow trees. Additional work included fencing, levee removal to allow high flows to reach the floodplain, wetland creation, and outreach and education activities. SWQB removed the pH listing in 2008 and the sedimentation listing in 2010. Recent data shows an improvement in dissolved oxygen as well.

Primary partners include WildEarth Guardians (formerly Forest Guardians), the City of Santa Fe, the County of Santa Fe, private landowners, the Santa Fe Soil and Water Conservation District (SWCD), and SWQB. Approximately 70 volunteers planted native vegetation and learned about riparian systems during a Santa Fe River Stream Team event. Other planting programs were carried out by about a dozen Santa Fe area schools, another dozen volunteer groups, and the state's inmate work program.

For more information on this EPA Success Story, visit http://water.epa.gov/polwaste/nps/success319/nm_santafe.cfm.

River Ecosystem Restoration Initiative

The River Ecosystem Restoration Initiative (RERI) is a multi-agency state effort to restore instream ecosystem function and watershed health to major New Mexico river basins. Through RERI, approximately 95 river miles and 3,345 acres of riparian area in 48 projects throughout New Mexico are being restored. Projects have been implemented along the Rio Puerco, Rio Chama, the upper, middle and lower Rio Grande, and the San Juan, Gila, Canadian, Pecos, and Santa Fe Rivers, as well as numerous tributaries (Figure 8). A total of $8.2 million in state capital outlay funding was appropriated for RERI by the state legislature over a four year period from 2007-2010. The first twelve projects were completed in 2011.


Constructed Zuni Bowl at Cebolla Canyon

RERI complements NMED's CWA §319(h) and Wetlands Programs. RERI aligns directly with NMED's performance goal to improve surface water quality by addressing impaired stream miles through watershed restoration projects. Many RERI projects address primary causes of non-point source pollution in New Mexico: sediment and temperature. River restoration projects such as those on the Rio Puerco and the Santa Fe River address stream temperature and erosion by shading and stabilizing the river banks with native vegetation. Other projects such as those on the middle Rio Grande and lower Pecos River increase the connection between river and its floodplain, and provide habitat for specific threatened and endangered fish species. Wetland restoration projects such as in Cebolla Canyon in the El Malpais National Conservation Area, and along San Antonio Creek in Valle Caldera National Preserve are directed at reducing erosion and increasing ground water recharge which increase baseflow and reduce temperature. These restored wetlands will also filter a wide variety of pollutants and provide critical habitat for both terrestrial and aquatic species. Most RERI projects are co-located with or adjacent to CWA §319(h) or a wetlands (§104(b)(3)) restoration project. In these cases, RERI can serve to leverage additional funds and increase project success. RERI has engaged a diverse group of more than 100 project partners, including; Tribes and Pueblos; federal and state agencies; local government; soil and water conservation districts; elementary and secondary schools; universities; community groups and conservation organizations; private entities, and citizen volunteers. The projects have provided employment for more than 70 private sector contractor companies or individuals. These stakeholders bring to these projects not only a diverse set of skills, but diverse sources of funding as well.


Volunteers planting willows at Redondo Creek in the Valles Caldera

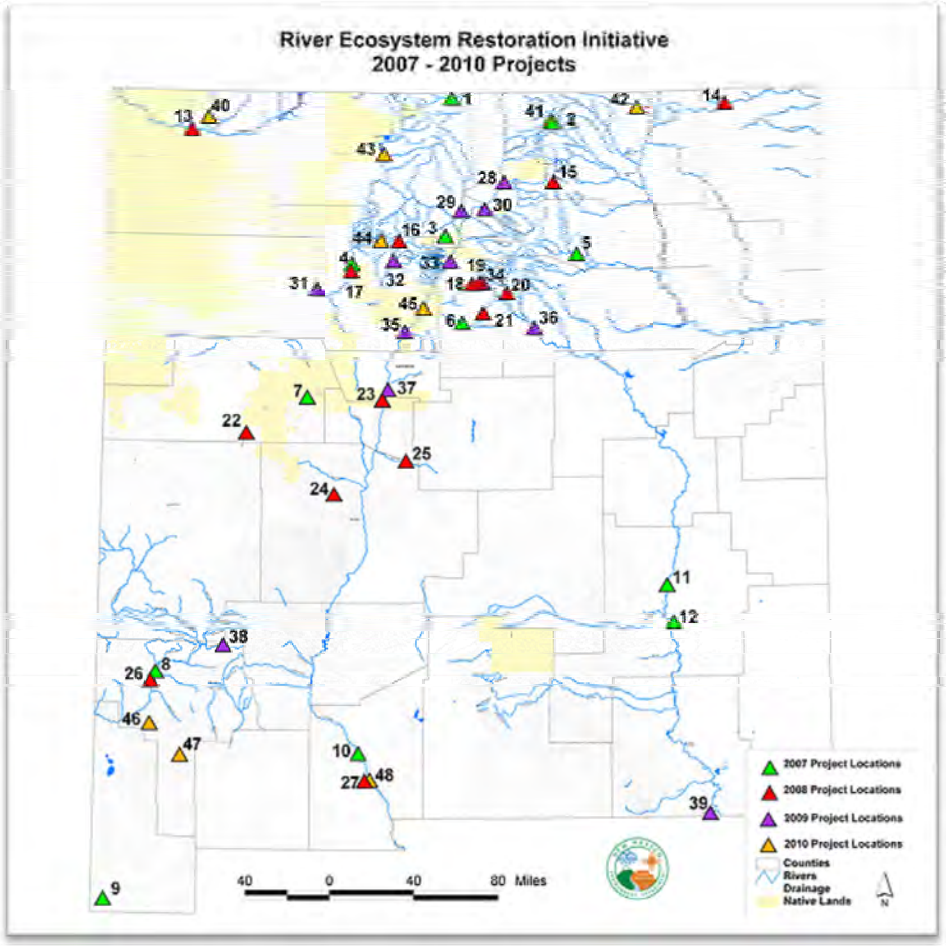


Figure 8. RERI 2007 – 2010 Project Locations

For more information on RERI, refer to SWQB's webpage at:
http://www.nmenv.state.nm.us/swqb/RERI/

Total Maximum Daily Load Program

As discussed earlier, CWA §303(d)(1) requires that states develop a list of waters within the state that are not supporting their designated uses established in the WQS and to establish a total maximum daily load (TMDL) for each pollutant for those "impaired waters." To accomplish this latter requirement, New Mexico develops a TMDL planning document -- a comprehensive plan for a given pollutant and waterbody starting from the relevant WQS, discussing existing water quality data and developing plan to ensure that WQS are achieved and maintained for that waterbody. At the core of a TMDL is the allocation of pollutant loads to existing and reasonably foreseeable increases from point sources and nonpoint sources in the watershed. As such, TMDLs are an integral part of New Mexico's WQMP/CPP. They also inform the USEPA in developing effluent limits for NPDES permits, and help guide NMED in prioritizing watershed protection and restoration projects funded under the CWA §319.

Outside groups also recognize the importance of TMDL development in protecting New Mexico's surface waters. In 1996, the USEPA was sued by two citizen groups to force the development of TMDLs in New Mexico. A settlement agreement and consent decree were negotiated in 1997 to settle the litigation, and established a 20-year timeline for developing TMDLs for waters identified as impaired on the 1996-1998 *List of Impaired Waterbodies*. NMED received USEPA approval of the final TMDL under the Consent Decree in 2007 and the Consent Decree was officially dismissed on April 21, 2009. New Mexico has nevertheless continued to develop TMDLs. Since the previous listing cycle, New Mexico has completed TMDLs for the Cimarron River (31), Rio Chama (19), Canadian River (12), and Valle Vidal management area (6) watersheds. The existing Mora River specific conductance and sedimentation TMDLs were also updated to allow for an additional NPDES permit.

All of New Mexico's TMDLs are incorporated into the state's WQMP/CPP and available on the SWQB web site: http://www.nmenv.state.nm.us/swqb/TMDL/List/.

Lower Rio Grande Program

Water quality and water quantity issues are closely linked in western states link New Mexico. Nowhere is this more apparent than in the State's work addressing the quality of the water delivered to the State of Texas under the Interstate Compact. The NMED and the Interstate Stream Commission (ISC) are working cooperatively with all stakeholders to develop solutions to this complex problem, while supporting New Mexico's interests in potential litigation regarding water resources in this region.

Elevated salinity in the Rio Grande Project area, which extends from above Elephant Butte Reservoir, New Mexico, to Fort Quitman, Texas, has long been recognized. The problems associated with elevated salinity are increasing due to rapid urban growth in the El Paso/Ciudad Juárez area, and the concomitant increasing demand for potable water that competes with demands for irrigation. Utilization of water resources in the Rio Grande Project area is restricted where highly saline water results in reduced potable water supplies, smaller crop yields, and soil and ground water deterioration.

The Lower Río Grande (LRG) Program focuses efforts in this critical border region by providing the technical basis for an effective salinity control program that identifies salinity sources and control solutions. The LRG Program has implemented a salinity monitoring network in the LRG since 2005. The network is designed to improve our understanding of salinity and the processes affecting changes in salinity in the Rio Grande. LRG's water quality studies support recent university research that identified natural sources as the principal salinity contributor in the area, offering interception of saline ground water before it impacts surface water supplies as a potential mitigation strategy. Such efforts have the potential to lower salinity levels in ground water and surface water, thus increasing available potable water supplies in the critical Texas-New Mexico border region. In response to these findings, NMED and ISC facilitated the formation of Río Grande Salinity Management Coalition, a multi-state effort to create a salinity management program patterned after the successful Colorado River Salinity Control Forum. The Coalition consists of water managers, the Rio Grande Compact Commission, and water user groups from Colorado, New Mexico, and Texas who are actively working together to reduce and manage salinity in the Rio Grande Project area.

In 2009, the Coalition completed the first phase of a Water Resources Development Act (WRDA) §729 Rio Grande Salinity Management Program which included a geospatial salinity database, a USGS Rio Grande Salinity Assessment Study, and Rio Grande Economic Impact Assessment study. Building on these efforts, in 2010 the Coalition funded a second phase designed to evaluate which of six specific locations/sources of salinity to the Río Grande would be most promising for a pilot project. This evaluation, which considered a number of factors including the size of the contribution, the concentration of the salinity source, the hydrogeologic uncertainty of capture, and treatment costs, identified the southern end of the Mesilla Basin near Sunland Park, New Mexico, as the most promising location for further investigation.

For more information on Lower Rio Grande salinity issues, refer to SWQB's webpage at: http://www.nmenv.state.nm.us/swqb/LowerRioGrande/

Clean Water State Revolving Fund Program

Through the Clean Water State Revolving Fund (CWSRF) program, NMED maintains a revolving loan fund to provide a source of low-cost financing for a wide range of wastewater and storm drainage projects that protect surface and ground water. Funds may also be used for projects that control NPS water pollution, such as those associated with landfills and septic tank installations.

The CWSRF program was established in 1986 pursuant to the Wastewater Facility Construction Loan Act and the CWA, and provides very attractive low-interest loans that spread project costs over a repayment period of up to twenty years. Repayments are cycled back into the Fund and used to pay for additional clean water projects.

The American Recovery and Reinvestment Act of 2009 (ARRA) appropriated funds to the CWSRF program in addition to annual capitalization funds. This is the first time in the program's history that program funds could be provided as grants to subsidize loans. From 2010-2012, $23,019,536 in grant funds were provided to seventeen communities throughout

New Mexico to help subsidize $74.5 million in clean water projects. The remainder of the funds was provided by CWSRF loans, New Mexico Legislature Capital Outlay, U.S. Department of Agriculture Rural Development, federal appropriations, Community Development Block Grants, and New Mexico Water Trust Board and community bonds. Eleven of the communities receiving CWSRF ARRA funds had never received a loan from the low interest program before, thus increasing the program's outreach. The other six communities had previous projects funded by the CWSRF program, therefore increasing the benefits they have received from the program.

USEPA capitalization funds appropriated since ARRA have allowed NMED to continue to subsidize CWSRF loans, although on a smaller scale. This has enabled NMED to fund three more communities that have been operating under enforcement actions for many years, but whose projects had languished due to the lack of funds.

Other NMED Programs Addressing Surface Water Concerns

The WQA governs most of the programs that address water pollution control in New Mexico. However, because surface water quality is affected in so many diverse ways by so many different activities, New Mexico has numerous other programs not under the WQA that deal with water quality protection, including:

- Department of Energy (DOE) Environmental Oversight and Monitoring Program implemented by the NMED DOE Oversight Bureau,
- Clean Water State Revolving Fund (CWSRF) Program (see Section B.3 for details),
- Ground Water Management Program (see Part D below for details) ,
- Underground Injection Control and Public Water Supply Programs of the Safe Drinking Water Act (SDWA) (see Section C.7 below for details), and
- Hazardous Waste Management, Petroleum Storage Tank and Solid Waste Management programs of the federal Resource Conservation and Recovery Act (RCRA).

Coordination with Other State, Tribal and Local Agencies

Successful surface water quality management and protection is founded on cooperative interaction between the federal, state, local, and tribal levels of government, and between the public and private sectors. In addition to NMED, numerous other New Mexico agencies conduct activities that impact surface water quality, including but not limited to:

- Office of the State Engineer;
- Interstate Stream Commission;
- Department of Game and Fish;
- Energy, Minerals, and Natural Resources Department;
- Oil Conservation Commission;
- Soil and Water Conservation Districts (SWCDs); and
- Department of Agriculture.

What is a Stakeholder?
For the purposes of this report, stakeholder is defined as any organization, governmental entity, or individual that has a vested interest in or may be impacted by a given approach to environmental regulation, pollution prevention, energy conservation, etc.

These and other agencies work with stakeholders during development and implementation of water quality management activities. Coordination is crucial, and focuses on informing and

including stakeholders on water quality management related activities, seeking input, soliciting data and information, and working with stakeholders to implement solutions to water quality problems and concerns. Additionally, numerous stakeholder focus groups have been developed for specific issues and meet on a regular basis to foster coordination efforts. NMED participates in many of these groups to address a variety of water quality issues. Examples of such groups include the New Mexico Municipal League, Environmental Quality Association, the New Mexico Forest and Watershed Health Coordinating Group, and individual watershed groups' regular meetings. An example of such a group is the Middle Rio Grande Water Quality Workgroup.

B.3 Cost/Benefit Assessment of New Mexico's Surface Water Quality Management Programs

Protecting and preserving water quality to ensure adequate, safe, and reliable water resources for the long term is a top priority for New Mexico. Each year New Mexico makes significant investments in water quality management programs and water quality improvements. These investments are an expression of the value we put on New Mexico's precious water resources, as the quality of the state's water resources has an impact on every citizen and is crucial to the potential economic vitality and quality of life New Mexicans cherish.

Like most states, New Mexico is faced with the challenge of addressing a vast array of complex surface water quality issues with limited financial resources. As federal and state funding to address water quality issues becomes even more limited, and as the complexity of environmental needs continues to increase, there is still an expectation that NMED will continue to meet the mandates of state and federal legislative and regulatory requirements with fewer resources to do so. This pressure makes it essential that New Mexico evaluate information regarding the fiscal implications and potential benefits of its water quality programs. While most are implemented by NMED, they are largely funded by the federal government. However, and as referenced throughout this report, there are also significant local, state, and even private resources that directly or indirectly affect the state's water quality.

Resources Applied to Surface Water Quality Management

Water quality management programs enable New Mexico to better understand the quality of our waters, identify water quality problems, implement measures to address those problems, and improve water quality in a systematic, organized, and economically efficient manner. Table 5 summarizes the estimated amount of funds expended annually to implement NMED's comprehensive water quality management program. This table is based on actual expenditures for state fiscal year 2011 (July 1, 2010 through June 30, 2011), and despite the inherent variability of costs from year to year, shows a significant decrease in both federal and state funding compared to the date presented in the last Integrated Report. Match of state or federal funding provided locally as in-kind support for nonpoint source and wetland projects, and by the Scientific Laboratory Division for analysis of water quality samples, are not included in this table.

Table 5. Estimated Annual Expenditures on New Mexico's Surface Water Quality Management implemented through NMED SWQB

Water Quality Management Program	Federal	State	Total
Monitoring & Assessment Section (Includes TMDL Development, Water Quality Management Program & State Fish Advisories,)	$419,600	$576,000	$995,600
Point Source Regulation Section (includes NPDES and Utility Operators Certification Program)	$609,600	$351,100	$960,700
Nonpoint Source Management Section*	$1,992,700	$128,700	$2,121,400
Wetlands Program*	$399,100	--	$399,100
Water Quality Standards Program (includes planning and reporting activities)	$116,500	$193,800	$310,300
NMED-Lower Rio Grande Project**	--	$28,200	$28,200
River Ecosystem Restoration Initiative (RERI)**	--	$814,100	$814,100
Total	$3,537,500	$2,091,900	$5,629,400

NOTES: The above numbers are based on NMED FY11 actual expenditures.
* = The grant programs under which these federal funds were allocated require a 40% non-federal match which is not included in this analysis
* *= These projects are state-funded special initiatives whose continued funding is in doubt.

Capital Investments in Municipal Facilities

Table 6 summarizes the estimated annual costs for operating and maintaining various sizes of wastewater treatment facilities in New Mexico. Most of these operation and maintenance costs are funded through fees included in monthly water/sewer rates. Many entities do not include replacement cost in their rate structure; therefore, New Mexico is encouraging communities to utilize the Asset

Table 6. Estimated Annual Operation and Maintenance Costs for Wastewater Treatment Facilities in New Mexico

Wastewater Treatment Plant Facility Size	Estimated Annual Operation and Maintenance Costs
Small WWTP < 1 MGD	$300,000 per year
Med WWTP 1-4 MGD	$780,000 per year
Large WWTP > 5 MGD	$1,500,000 per year

Source: Utility Operator Certification Program

Management approach to rate setting. Asset Management helps wastewater treatment systems prepare for both anticipated and unexpected problems by evaluating the system's current physical, financial, and managerial situation. It requires entities to make fundamental decisions about the water system's purpose, structure, and functions. For more information refer to the *Asset Management: A Handbook for Small Water Systems* (USEPA 2003a).

To address funding of construction and improvement for treatment facilities owned by municipalities, New Mexico has established a comprehensive program to provide funds through both loan and grant mechanisms to local governments. The program is administered through the Construction Programs Bureau of NMED, and is responsible for managing the timely construction and administrative completion of publicly funded water, wastewater, and solid waste projects, and ensuring that projects are environmentally sound, of high quality, and free of waste, fraud, and abuse. Investments in infrastructure to improve the quality of waste streams are a critical component of the State's water quality management program. Table 7 summarizes the programs and shows the amounts distributed in fiscal years 2010 and 2011.

Table 7. Summary of Improvement and Construction Costs for New Mexico Water, Wastewater, and Solid Waste Facilities

Program	Description	Funds Disbursed in FY 2010	Funds Disbursed in FY 2011
State Appropriations Program	State Legislature special appropriations for construction of community water supplies and wastewater facilities projects	(water) $22,326,493 (wastewater) $11,502,827	(water) $13,010,514 (wastewater) $7,456,794
Clean Water State Revolving Fund (CWSRF) Program	Revolving loan fund to provide a source of low-cost financing for a wide range of wastewater or storm drainage projects that protect surface and ground water quality and public health. Funds may also be used for nonpoint source water pollution control projects, such as solid waste projects and septic tank installations	$10,429,080	$19,492,090
Rural Infrastructure Program	Revolving loan fund to provide financial assistance to local authorities for the planning, design, and construction or modification of water supply, wastewater, and solid waste facilities.	$1,275,427	$1,632,821
	Water Related Projects TOTAL	**$45,533,827**	**$41,592,219**

Benefits of these expenditures can be seen in direct and indirect improvements in the quality of life in New Mexico communities. The state's water quality programs, including expenditures for pollutant-reducing infrastructure, result in prevention of water quality degradation from point and NPS sources of pollution, protection of aquatic life and habitat in receiving streams, reduction of pollutant loads that could have financial and public health impacts in areas where surface water is a source of drinking water, increased public awareness regarding the need for water quality protection, and sustainable resource management practices.

For more information on water and wastewater construction programs, refer to the Construction Programs Bureau webpage at http://www.nmenv.state.nm.us/cpb

B.4 Significant Issues

Agencies and other stakeholders that implement New Mexico's water management programs work tirelessly to protect our water resources. However, there are still many challenges in meeting the objectives of the CWA and the WQA that remain, and some issues that seem intractable. These are but a sampling of some of the more significant.

Pending EPA-approval for Water Quality Standards Amendments

New Mexico's water quality standards now include the amendments adopted during the triennial review held in December 2009 as well as the Outstanding National Resource Waters designated in December 2010. In April 2011 USEPA approved the majority of WQS amendments adopted during the triennial. USEPA has yet to take final action of the following provisions:

- 20.6.4.8.A(3) NMAC: antidegradation for ONRWs;
- 20.6.4.9.D(3) NMAC: new ONRWs in wilderness areas;
- 20.6.4.10.D(1)(e) NMAC: a sentence in the new site-specific criteria provision allowing "other factors or combination of factors that upon review of the commission may warrant modification of the default criteria"
- 20.6.4.13.J NMAC: the amendment to the narrative turbidity standard clarifying its implementation for activities or discharges
- 20.6.4.900.I and J NMAC: new/revised hardness-based criteria for aluminum, cadmium and zinc; and
- 20.6.4.52 NMAC: salinity benchmarks for lower Pecos River (EPA approval was not requested).

Although NMED had hoped for quicker action on these provisions, USEPA has not done so creating uncertainty regarding the WQS that apply. This is most notable for the WQCC-adopted hardness-dependent total aluminum aquatic life use criteria that replaced the dissolved aluminum criteria during the most recent triennial review. The delay in has created uncertainty in the impairment determinations contained within this document and for NPDES permittees with aluminum effluent limits.

Clarifying Application of the Clean Water Act

States throughout the nation are concerned about CWA authority. Very few of the waters in the arid southwest are navigable in the traditional sense of the word, but these waters are valuable as resources nonetheless and are vital to the health, welfare, and economy of the state. New Mexico is no exception. Here, closed basins cover approximately 20 percent of the land area, and as much as 90 percent of the State's surface waters are non-perennial. These closed basins and non-perennial waters are important resources, providing water for domestic, municipal and industrial supply, recreation, irrigation, livestock, aquatic life, and wildlife. These resources are important not only locally, but contribute significantly to interstate commerce by supporting the production and sale of goods (e.g., agricultural products) or through providing recreational (tourism) opportunities. Many also are important sources of ground water recharge.

Given uncertainty currently surrounding CWA authority, Congress should pass legislation to clarify authority for waters of the United States.

Monitoring Effects of Nonpoint Source Improvements

Congress and USEPA have been seeking more effective ways of measuring the success of nonpoint source pollution programs based on full attainment of all designated uses. In the West, the majority of nonpoint source concerns are associated with runoff from vast areas of mountains, rangelands, irrigated farmlands, and extensive road networks in rural areas. Additionally, establishment or reestablishment of adequate groundcover to prevent overland flows of sediment-laden waters is dependent upon adequate precipitation, proper land management, and other factors that may be beyond the control of water quality agencies. Depending on the specific sources of impairment, it can take decades to realize the effects of BMPs designed to control nonpoint source pollution.

Effectiveness of nonpoint source pollution prevention and restoration programs should be measured based on incremental improvements in the health of the watershed and the quality of receiving waters. Appropriate reporting tools should allow photo documentation and other qualitative assessments in addition to analytical data. Congress and USEPA should allocate sufficient funding for effectiveness monitoring.

Adequate Funding of Water Quality Programs

State and federal funding for water quality programs has decreased to a point where some basic services can no longer be sustained. Even funding cuts in other agencies that are often thought of a peripheral to water quality management have an adverse effect on water quality programs. For example, budget cuts in the Department of Health have resulted in cuts in services provided by the Department's Scientific Laboratory Division (SLD). These cuts have reduced analytical services provided to NMED by SLD by 45 percent. Other areas where budget cuts or flat funding levels that have not kept up with inflation have reduced water quality services include ambient water quality monitoring and assessment (especially for lakes), ground water quality protection permits, field inspections, and watershed project implementation. In addition, as the Southwest continues to experience drought conditions, water quality management programs become all the more important. Elected officials, land managers, and other stakeholders have higher expectations of water quality agencies. These pressures run contrary to the funding profiles these agencies are experiencing.

Adoption of Nutrient Criteria

The USEPA has indicated in its National Water Program Guidance that it places a high priority on states addressing excess nutrients through adoption of numeric water quality criteria for nitrogen and phosphorous in lakes, reservoirs, rivers, and streams. USEPA's priority on numeric criteria is not appropriate for New Mexico, as New Mexico has undertaken an alternative but effective approach to address nutrient impairments through assessment of our narrative nutrient standard and development of nitrogen and phosphorous TMDLs for impaired water bodies. Moreover, without additional federal funds NMED would be obligated to shift all of its resources currently allocated to its successful nutrient assessment and TMDL programs to begin development of numeric nutrient criteria. States should therefore be provided considerable flexibility by allowing nutrient impairments to be addressed through effective programs that are within the state's financial and resource capabilities. This is especially true for

states such as New Mexico that receive the minimum allocation of CWA §106 funding for such activities.

PART C - SURFACE WATER MONITORING AND ASSESSMENT

C.1 Monitoring and Assessment

The purpose of SWQB's Monitoring and Assessment Section (MAS) is to ensure relevant water quality data for all of New Mexico's surface waters are collected and assessed with the most robust scientific methods, and in a way that is transparent to water quality agencies and the public. The Program serves all surface water quality management needs to the extent possible given available resources, NMED priorities, and strategic goals. The primary waterbody types monitored by the program include streams, rivers, lakes, reservoirs, and wetlands.

New Mexico has adopted a strategy to maintain up-to-date evaluations of the State's surface waters with fewer resources than were available a decade ago. This strategy is summarized in *State of New Mexico Surface Water Quality 10-Year Monitoring and Assessment Strategy* (NMED/SWQB 2010). Surface water quality data collected during rotational water quality surveys are integral to implementing this framework for identifying and restoring impaired surface waters, and protecting unimpaired surface waters.

Monitoring Goals and Objectives

Clear goals and objectives are required to implement an effective monitoring program. In order to meet federal (USEPA 2003b) and state requirements and expectations, the goal of MAS is to answer five questions:

1. What is the overall quality of waters?
2. To what extent is water quality changing over time?
3. What are the problem areas, and which areas need protection?
4. What level of protection is needed?
5. How effective are CWA projects and programs?

The first step in developing a monitoring strategy to achieve the stated goals is defining a clear set of water quality data objectives. These objectives must be met to address the five questions identified above, and can be placed into the following broad monitoring categories:

- Determination of designated use attainment;
- Status and trend monitoring;
- Monitoring for TMDL development;
- Monitoring for standards refinement;
- Effectiveness monitoring and NPDES compliance monitoring; and
- Wetlands monitoring.

A detailed discussion of these objectives is provided in SWQB's Monitoring Strategy (2010).

Monitoring Design

MAS integrates targeted and fixed-station sampling designs to address the goals and the monitoring objectives. This creates the most efficient combination of monitoring designs, given current funding, while still meeting the required objectives.

Like most states, New Mexico utilizes a targeted, rotational watershed approach to ambient water quality monitoring. This integrative watershed approach enhances program efficiency by providing:

- A systematic, detailed review of water quality data
- More efficient use of human and budget resources;
- Information at a scale where implementation of corrective actions is feasible; and
- An established order of rotation and predicted sampling year for each watershed, which allows easier coordination efforts with other programs and other entities interested in water quality.

Watershed surveys are developed through establishment of targeted sampling sites throughout a watershed of interest. Program personnel serve as survey leads and co-leads, and ensure all necessary chemical, biological, and physical data are collected during the survey year. Pre- and post-survey planning meetings are held with other SWQB personnel working on point source and nonpoint source issues and TMDL development in the watershed. The SWQB strives to establish at least one sampling station in each assessment unit (i.e., identified stream reach or lakes/reservoir on the Integrated List). Exact sample site location, sampling frequency, and type of data collected are established so as to allow determination of compliance with New Mexico surface water quality standards. This information is detailed in the *Quality Assurance Project Plan for Water Quality Management Programs* (QAPP) and standard operating procedures (NMED/SWQB 2011b, 2011c), and is an adaptive, on-going management approach; watersheds will not be ignored between survey years. The current 8-year rotational monitoring schedule is shown in Figure 9.

Because New Mexico is a large state with relatively little perennial water compared to total land area, and given the level of and recent trends in financial and staff resources, SWQB considers the targeted approach is the best to meet New Mexico's monitoring objectives. SWQB has sampled nearly all of New Mexico's perennial waters during its watershed surveys. Approximately 89 percent of all identified stream miles have been assessed and 77 percent of public lake acres have been assessed to date, including all of New Mexico's large mainstem reservoirs. The targeted approach supplemented with fixed stations and SWQB's long-term monitoring sites (e.g., reference sites representing the best available conditions for different ecoregions) has proven effective at fulfilling monitoring objectives and allowing for general conclusions to be drawn about the status of the State's waters.

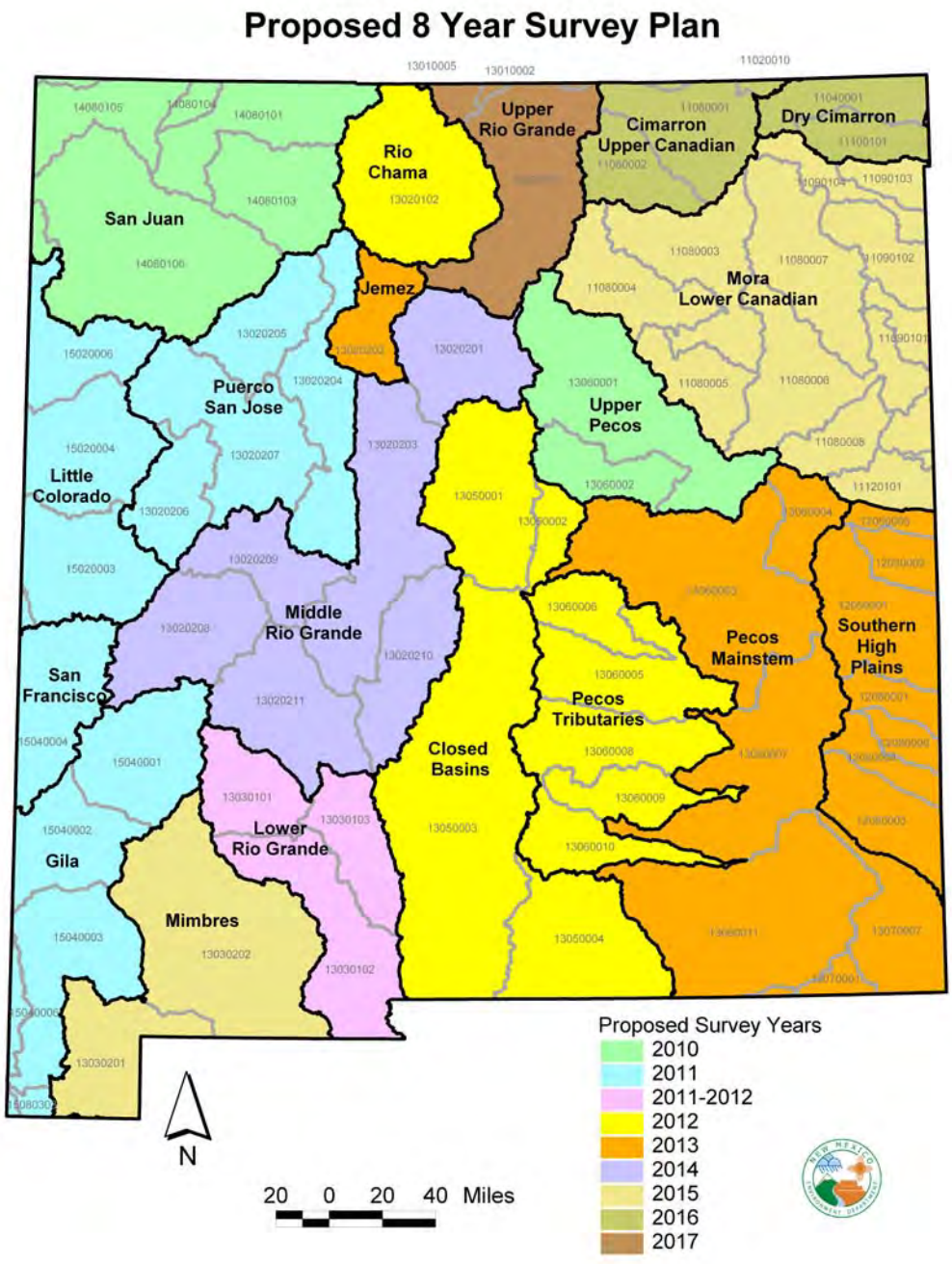


Figure 9. New Mexico's Surface Water Quality Monitoring Schedule

The SWQB, USGS, and other cooperators such as the OSE, U.S. Bureau of Reclamation, and City of Albuquerque fund approximately twenty ambient monitoring stations that comprise the State's long-term surface water quality surveillance network. These USGS stations are located on the major stream systems of New Mexico, and support a variety of projects across the state.

Unfortunately due to cuts to NMED's operating budget, USGS sampling was discontinued starting in FY2012.

USEPA has encouraged states to incorporate probabilistic sampling designs into their monitoring programs to enable them to generate statistically-sound conclusions regarding the overall state of water quality. However, successful sampling of random stations in the semiarid west is challenging due to the large percentage of private land, lack of hydrologic maps that accurately indicate perennial vs. non-perennial waters, and access logistics. Although probabilistic-based monitoring can allow states to reach conclusions about surface water quality status as a whole, this type of monitoring cannot tell a state or tribal jurisdiction which specific water bodies are impaired or where to target CWA §319 watershed restoration funds, and do not provide the targeted data necessary for TMDL development. Accordingly, some states have begun to incorporate probabilistic monitoring into their core monitoring strategies. Nevertheless, many states -- including New Mexico -- continue to rely primarily on targeted sampling to answer these specific questions. See Section C.5 for additional details.

Core Water Quality Indicators

Water quality trends and impairments are generally determined based on four broad types of monitoring data: biological, chemical, physical, and habitat. Each type of data yields an assessment that may then be integrated with other data types for an overall assessment. Depending on the designated use, one data type may be more informative than others for making an assessment. See inset box for details on the core indicators used by New Mexico to determine designated use impairments.

New Mexico's Core Water Quality Indicators

Chemical data include measurements of key chemical constituents in water, sediments, and fish tissue. Examples of these measurements include metals, oils, pesticides, and nutrients such as nitrogen and phosphorus. Monitoring for specific chemicals helps states identify the causes for impairment and helps trace the source of the impairment.

Physical data include characteristics of water such as temperature, flow, dissolved oxygen, and pH. Physical attributes are useful screening indicators of potential problems, often because they can have an impact on the effects of chemicals.

Habitat assessments include descriptions of sites and surrounding land uses, condition of streamside vegetation, and measurement of features such as stream width, depth, flow and substrate. These data are used to supplement and interpret other kinds of data.

Biological integrity data are objective measurements of aquatic biological communities (usually aquatic insects, fish, or algae) used to evaluate the condition of an aquatic ecosystem. Biological data are most useful in deciding whether waters support aquatic life uses.

New Mexico's Lake Monitoring

Lake and reservoir monitoring in New Mexico is conducted to: (1) collect information for standards development and to determine the trophic status for lakes or reservoirs where little or no physical, chemical, or biological information exits; (2) update information with regard to trophic status of previously studied lakes or reservoirs; and (3) assess for attainment of applicable water quality standards. Lake surveys generally consist of three-season sampling efforts from one or two stations following the same rotation shown in Figure 9. Surveys for small lakes are usually conducted during the period of maximum stress to the aquatic ecosystem.

There are 197 publically-owned lakes, reservoirs, and playas that cover approximately 108,900 acres. These waterbodies consist of large mainstem reservoirs, high-altitude natural lakes, and

small fishing impoundments ranging in size from less than one acre to up to 40,000 acres (Elephant Butte Reservoir at maximum storage pool). Regardless of size, all lakes are used extensively in water-scarce New Mexico. Even the smaller lakes provide drinking water for livestock watering and habitat for wildlife, are used by migratory waterfowl, or provide important recreational opportunities for boating, swimming, fishing, and aesthetic pleasure in municipal, rural, and wilderness settings.

Although all surface waters are considered important, New Mexico has prioritized the following lakes, reservoirs, and playas as significant for monitoring purposes as funding resources allow:

- Lakes over twenty acres due to their many and varied uses,
- Lakes smaller than twenty acres where fish kills or pollutants threaten designated use attainment,
- Various playa lakes in New Mexico due to their unique ecological character and location in some of the most arid portions of the State, and
- High-altitude natural lakes that serve as sensitive indicators of potential acidic precipitation as well as nonpoint sources of pollution. Difficult access restricts sampling efforts at these lakes.

Quality Assurance

The SWQB is committed to maintaining a system that provides confidence in the environmental data produced by its various water quality programs. Water quality management programs are implemented in accordance with the most current and USEPA approved version of the WQMP/CPP. The WQMP/CPP documents the quality system for planning, implementing, documenting, and assessing the effectiveness of activities supporting water quality management programs. All data collected by the SWQB are collected and handled in accordance with the most current version of the USEPA-approved QAPP (NMED/SWQB 2011b). This plan describes the quality assurance procedures, quality control specifications, and other technical activities that must be implemented to ensure that the results of the project or task to be performed will meet project specifications. By establishing a quality system, New Mexico ensures that water quality management decisions are based on a systematic process and on data of known and acceptable quality. This also ensures that the public funds expended in these efforts are soundly invested.

Data Management

Numerous data management tools are utilized by the different water quality management programs in New Mexico. The tools consist primarily of varying brands of database, geographic information systems (GIS), spreadsheet, statistical, and word processing computer software packages. To facilitate the integration of all of these tools, waterbodies are georeferenced (i.e., categorized) based on geographic location. Additional categories such as assessment unit (AU), watershed size/area, designated uses, ecoregion, elevation, and habitat type are applied to waterbodies to facilitate data comparability and communication within and among the data management tools used by various water quality management programs. Once a surface

waterbody has been sufficiently georeferenced and categorized, all available data and pertinent information can be integrated and used for all programs to guide water quality monitoring priorities, assessment activities, and management decisions. Databases currently utilized by SWQB include:

- Assessment Database (ADB) - A relational database application for tracking water quality assessment data, including use attainment, and causes and sources of impairment. The ADB provides user-friendly data entry forms and automates the production of reports that New Mexico submits to USEPA through the CWA §303(d)/305(b) reporting process. The ADB supports three principal functions:
    - Improve the quality and consistency of water quality reporting;
    - Reduce the burden of preparing reports under CWA §305(b), §303(d), §314, and §319; and
    - Improve water quality data analysis.

- New Mexico Ecological Data Application System (NMEDAS) - A data management and analysis tool used to facilitate monitoring of water surface quality. This Oracle® database based on EDAS2 (developed by TetraTech) houses all chemical and biological water quality data collected by the MAS. It incorporates a range of functions including relational storage of data, calculation of metrics, and creation of export files and summary reports.

- The SWQB's Water Quality Database (retired) – Microsoft Access®-based database application used by the SWQB to house water quality data (primarily chemical, physical and flow data) collected by the MAS. This database was replaced with NMEDAS in 2010.

- STORET (short for STOrage and RETreival) and WQX (Water Quality Exchange) - The USEPA data management system that contains water quality information for the nation's waters, populated with biological, chemical, and physical data on surface and ground water collected by federal, state and local agencies, Indian Tribes, volunteer groups, academics and others. All 50 States, territories, and jurisdictions of the U.S. are represented in the system. SWQB uploads all validated and verified chemical/physical data to STORET/WQX on an annual basis.

- Grants Reporting and Tracking System (GRTS) - The Nonpoint Source Program's main reporting vehicle for the CWA §319 program. GRTS is a data management system that enables USEPA and states to describe the progress they have made in implementing the national Nonpoint Source Pollution program. GRTS electronically tracks projects and activities funded with CWA §319(h) funds.

- Enforcement and Compliance History Online (ECHO) - USEPA's database that provides integrated compliance and enforcement information for approximately 800,000 regulated facilities nationwide. Information available through this database includes, but is not limited to: status of compliance inspections; detected violations; information regarding enforcement actions.

- SWQB's NPDES database - Microsoft Access®-based database that helps the PSRS track the status of NPDES permits and certifications. The database contains information

about individual permits in relation to waterbody assessment units for integration into Bureau projects such as TMDL development and watershed assessment/planning activities. This database does not contain all of the data available through USEPA's NPDES data management systems.

- The CERTMAN (CERTification MANagement System) - Web-based application and database containing information pertaining to the Utility Operator Certification Program. Users can access operator contact information, certification status, and exam results.

Data Analysis/Assessment

Data are analyzed in a variety of manners depending on the objectives. Computer database and spreadsheet programs are used to examine water quality trends, relationships, and results. Data are assessed against the most current version of the *State of New Mexico Standards for Interstate and Intrastate Surface Waters* [20.6.4 NMAC]. All data available that are considered to be of acceptable quality are assessed to determine designated use attainment status by using the protocols described in the *State of New Mexico Procedures for Assessing Standards Attainment for the Integrated 303(d)/305(b) Water Quality Monitoring and Assessment Report* [Assessment Protocol] (NMED/SWQB 2011d). See Section C.2 below for additional details.

Reporting

Data analysis and assessment results are reported in numerous documents. The most comprehensive and inclusive reporting mechanism is this biennial Integrated Report, the *State of New Mexico CWA §303(d)/§305(b) Integrated Report*. Other documents that report results include, but are not limited to the following:

- Survey summaries (present results of rotational watershed surveys);
- TMDL planning documents (present wasteload and load allocations);
- Special project summaries (present results from special projects);
- Nonpoint Source Annual Report and project summary reports (present results pertaining to the impacts of NPS Implementation Projects);
- Watershed Restoration Action Strategies (WRAS) and watershed-based plans; and
- Use attainability analyses (present information regarding attainable designated uses).

General Support and Infrastructure Planning

Currently New Mexico receives resources to support a basic monitoring effort that enables all watersheds to be intensively monitored approximately once every eight years. Occasionally limited supplemental funding is received for special monitoring projects or emergency situations. Each year, the SWQB strives to monitor two to three watersheds.

Additional resources would allow SWQB to:

- Incorporate probabilistic sampling design components into the statewide monitoring strategy;
- Collect more data to update and maintain the fish consumption advisory program;
- Restore NPDES compliance monitoring activities;
- Expand lake and reservoir monitoring efforts;

- Refine and expand numeric translators for nutrients, bottom deposits, and benthic macroinvertebrate bioassessments;
- Refine monitoring methods and assessment protocols for non-wadeable rivers;
- Shorten the assessment return interval to a 5-year rotational cycle; and
- Contract with non-government analytical laboratories to increase the scope of analyses conducted and to replace services that had previously been provided by SLD.

C.2 Assessment Methodology

The assessment methodology described in the Assessment Protocol (NMED/SWQB 2011d) constitutes the decision process that New Mexico employs to determine which attainment category a segment belongs. The Assessment Protocol describes how all readily available data and information are identified and considered, the basic quality assurance and quality control criteria used to evaluate outside sources of data, and the analytical approaches used to infer segment condition. The assessment methodologies described in the Assessment Protocol are reviewed each reporting cycle to ensure the methods are consistent with applicable water quality standards, incorporate new guidance provided by USEPA, and clarify assessment protocols. For the 2012-2014 reporting cycle, enhancements included major revisions to the turbidity and the sedimentation/siltation assessment protocols.

Prior to development of the draft Integrated List for each listing cycle, the public has an opportunity to provide comments to the Assessment Protocols through a public participation process that includes a minimum 30-day public comment period with public notification as defined in the WQMP/CPP (NMWQCC 2011). The Assessment Protocol used to develop the 2012-2014 Integrated List (Appendix A) was released for public comment in this manner.

All readily available data less than five years old are used to determine whether the applicable water quality standards are attained. Data more than five years old may also be considered on a case-by-case basis. Outside sources of data are solicited via a public notice process prior to developing the CWA §303(d) *List of Impaired Waterbodies*. All data submitted from outside sources must meet the State's QA/QC requirements to be used in the water quality standards attainment decision process.

The types of data considered in the water quality standards attainment decision process include, but are not limited to, the following and must meet the State's QA/QC requirements:

- SWQB chemical, physical, biological, habitat, or toxicological monitoring data collected during rotational watershed surveys using approved or otherwise accepted quantitative methods;
- Chemical/physical data from recent studies by NMED or other organizations, contractors, or individuals;
- USGS water quality data that have met USGS QA/QC requirements (i.e., provisional data will not be used to make use determinations);
- Benthic macroinvertebrate, fish community, and/or fish tissue data collected by NMED or other organizations, contractors, or individuals;
- EPA-recognized protocols such as Environmental Monitoring and Assessment Program (EMAP), Rapid Bioassessment Protocols (RBP), or other biological/habitat data collected by NMED and other organizations, contractors, tribes, or individuals;
- In-stream (i.e., receiving water) data collected during NMED effluent monitoring efforts;
- NPDES storm water permit compliance monitoring data for receiving waters;
- In-stream water quality data from other NMED bureaus such as the Drinking Water, Ground Water Quality, and/or Department of Energy Oversight; and
- Citizen or volunteer monitoring data.

Sedimentation/Siltation Threshold Development

Excessive deposition of sediment on the bottom substrate of streams and rivers can negatively impact aquatic life. Bottom substrate without excessive fine sediment filling the interstitial spaces provides optimum habitat for many fish and aquatic insect communities. Sediment loads that exceed a stream's sediment transport capacity can also trigger changes in stream morphology. Streams that become overwhelmed with sediment often experience a period of accelerated channel widening and streambank erosion. These morphological changes can reduce habitat diversity by reducing the number of alternating pools and riffles, and place additional stress on the aquatic life.

A workgroup was formed to review the SWQB's previous sedimentation/siltation assessment protocol and recommend an approach for revision. As a result, SWQB and USEPA Region 6 contracted with Tetra Tech, Inc., to develop sediment translators or thresholds. This effort included the identification of sediment characteristics that are expected under the range of environmental settings in New Mexico, especially in undisturbed or best available reference streams. The goal of this characterization was to enable SWQB to identify situations where sedimentation/siltation expectations are not met, using sediment indicators that show responsiveness to disturbance. Examining the relationships between biological measures and sediment indicators helped to identify where disturbance caused sediment imbalance and biologically-relevant habitat degradation. The results of these analyses led to quantitative sedimentation indicator threshold recommendations for New Mexico perennial streams. The SWQB used these recommendations to substantially revise the sedimentation/siltation assessment protocol for the 2012 listing cycle.

For additional information, visit http://www.nmenv.state.nm.us/swqb/Sedimentation/ and http://www.nmenv.state.nm.us/swqb/protocols/.

C.3 Water Quality Assessment Results

New Mexico maintains assessment information in the USEPA-developed ADB for the last several listing cycles. Use of this database allows SWQB to automatically generate the complete Integrated List and the Category 5 *CWA §303(d) List of Impaired Waters*, as well as a variety of cause, source, and impairment category summary reports. The results are organized by water body type (Rivers/Streams followed by Lakes/Reservoirs) and presented in the following sections.

Rivers and Streams

Water Quality Attainment Status and Categorization of New Mexico's Rivers and Streams

Table 8. Integrated Report Categories for New Mexico's Rivers and Streams

Category	Total Size (miles)	Number of River/Stream Assessment Units
1	739.85	44
2	1,597.28	149
3	770.42	73
4A	1,375.7	73
4B	0	0
4C	133.01	10
5	2,494.91	177

NOTE: This information was generated using New Mexico's version of USEPA's ADB database. Category 5 above is a composite of New Mexico Categories 5A, 5B, and 5C.

New Mexico's surface waters assigned to one of the five integrated reporting categories (defined in Table 1) are summarized in Table 8. Individual IR categories for every assessment unit on the Integrated List are presented in Appendix A.

The largest grouping of assessed lotic (i.e., flowing) waters are Category 5. These 177 assessment units cover approximately 2,495 stream miles, and along with the Category 5 lake/reservoir water bodies, comprise New Mexico's CWA §303(d) waters. A list of Category 5-only waters was generated from ADB and is included in the beginning Appendix A.

The second largest grouping of assessed lotic assessment units are Category 2. These 149 assessment units cover approximately 1,597stream miles. Assessment units 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 are no reliable monitored data with

which to make a determination.

The third largest group is Category 4A which represents stream reaches where TMDL planning documents have been developed. These 73 stream reaches, covering approximately 1,376 stream miles, are still noted as impaired. Several of these stream reaches have TMDLs for more than one parameter.

There are 73 stream reaches (covering approximately 770 miles) identified as Category 3. Assessment units are listed in this category when data to support an attainment determination for any designated use are not available according to the requirements of the State's assessment and listing methodology. Reasons include access, monitoring and/or analytical logistics (such as the need for automated sampling equipment), and staff and financial resource constraints.

New Mexico's Summary of Designated Use Support for Rivers and Streams

A summary of the river/stream attainment status for each designated use, as found in New Mexico's WQS, is presented in Table 9. These summaries are primarily based on water quality monitoring conducted by the SWQB as part of intensive watershed surveys, fixed station monitoring, and targeted monitoring. These data are supplemented by outside sources of data shown to be of sufficient quality.

In New Mexico, the CWA goal of "fishable" is now reported under the various aquatic life uses currently in New Mexico's WQS (20.6.4. NMAC), and the "swimmable" goal is reported under primary and secondary contact uses. USEPA developed this method to reduce inconsistencies in states' reports. Overall, 11 of the State's 16 assessed designated uses in streams and rivers have been identified as impaired by point and/or nonpoint sources of pollutants.

Table 9. Designated Use Support for New Mexico's Rivers and Streams

Designated Use	Total Size (mi)	Size Assessed (mi)	Size Fully Supporting (mi)	Size Not Supporting (mi)	Size Not Assessed (mi)
Coldwater Aquatic Life	982.81	783.07	294.08	488.99	199.74
Coolwater Aquatic Life	13.93	2.43	2.43	0	11.5
Domestic Water Supply	2,591.6	2,235.3	2,183.11	52.19	356.3
Fish Culture*	1,221.15	0	0	0	1,221.15
High Quality Coldwater Aquatic Life	2,537.59	2,266.89	815.52	1,451.37	270.7
Industrial Water Supply*	413.57	0	0	0	413.57
Irrigation	6,331.07	5,638.94	5,561.4	77.54	692.13
Limited Aquatic Life	81.74	72.13	2.52	69.61	9.61
Livestock Watering	7,111.17	5,248.22	5,144.37	103.85	1,862.95
Marginal Coldwater Aquatic Life	1,013.7	983.96	455.67	528.29	29.74
Marginal Warmwater Aquatic Life	2,037.79	1,647.64	973.09	674.55	390.15
Primary Contact	6,266.36	3,605.92	2,582.36	1,023.56	2,660.44
Public Water Supply*	893.97	0	0	0	893.97
Secondary Contact	844.81	379.94	379.94	0	464.87
Warmwater Aquatic Life	1,535.06	1,377.08	834.98	542.1	157.98
Wildlife Habitat	7,111.17	6,099.06	5,864.65	234.41	1,012.11

* = All Fish Culture, Public Water Supply, and Industrial Water Supply designated uses were defaulted to “Not Assessed” because no numeric criteria apply uniquely to these uses per 20.6.4.900 Subsection A NMAC.

Causes of Surface Water Impairment for Rivers and Streams

A summary of the impairment causes for New Mexico’s rivers and streams is presented in Figure 10. The conclusions are primarily based on water quality monitoring conducted by the NMED as part of intensive watershed surveys, fixed station monitoring, and targeted monitoring. These data are supplemented by outside sources of data shown to be of sufficient quality. The

ADB-generated summary report is provided in Appendix B. Standard USEPA cause categories included in ADB were used to label the graphic. See Appendix B for subcategory information.

Excessive temperature, nutrient/eutrophication, and *E. coli* are identified as the top three causes of impairment of designated uses in New Mexico's streams and rivers based on current WQS, available data, and assessment procedures. Dissolved oxygen (DO) and nutrient/eutrophication impairments may be redundant in some cases as one of the potential results of excessive nutrients is DO impairment. The SWQB is implementing several nutrient criteria development projects that will address some of this redundancy through improved monitoring and assessment methodologies (see http://www.nmenv.state.nm.us/swqb/Nutrients/ for additional details). The SWQB also revised the sedimentation/siltation assessment protocol for the 2012 listing cycle to improve impairment determinations due to sedimentation.

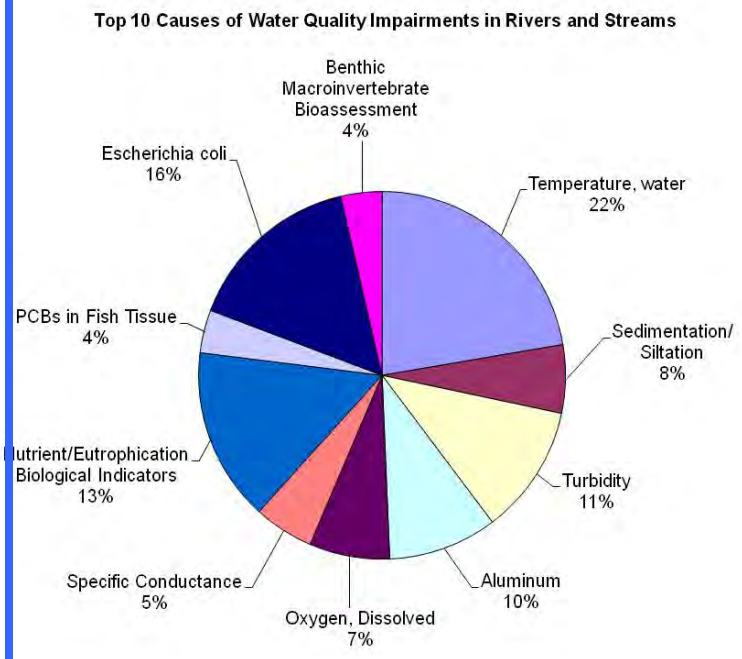


Figure 10. Causes of Surface Water Impairment for Rivers and Streams

Cause of Impairment (from ADB)	Stream Miles Impaired
Temperature, water	1,406.61
Sedimentation/Siltation	378.16
Turbidity	718.85
Aluminum	605.81
Oxygen, Dissolved	446.65
Specific Conductance	332.57
Nutrient/Eutrophication Biological Indicators	962.22
PCBs in Fish Tissue	238.28
Escherichia coli	984.96
Benthic Macroinvertebrate Bioassessment	228.11

NOTE: See Appendix B for complete list of categories and subcategories generated from ADB.

E. coli sampling during watershed surveys has been a SWQB priority since the 2006 listing cycle, using a mobile *E. coli* sampling unit that resolved a chronic issue with meeting the 6-hour holding time. Implementation of this sampling method continues to result in the identification of additional contact use impairments, due to exceedence of the *E. coli* criteria, each listing cycle.

Sources of Surface Water Impairment for Rivers and Streams

A summary of the impairment source for New Mexico's for rivers and streams is presented in Figure 11. The ADB-generated report that was used to generate the below figure is included in

Appendix B. Standard USEPA cause categories included in ADB were used to label the graphic. See Appendix B for subcategory information.

"Sources" are defined as activities that may contribute pollutants or stressors to a water body (USEPA 1997). The probable source list included with any cause of impairment includes any and all activities that could be contributing to the identified impairment. It 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 possible items. Probable sources listed for any particular water body have not been proven to be a source or the only sources of the identified impairment. It is based on qualitative field observations made by field staff for assessment units sampled during rotational watershed surveys and watershed restoration projects. This is combined with knowledge of known land management activities that have the potential to contribute to the identified impairment.

The approach for identifying “Probable Sources of Impairment” was modified by the SWQB starting with the 2010 listing cycle. Any new impairment listing will be assigned a Probable Source of “Source Unknown.” Probable Source Sheets will continue to be completed during rotational watershed surveys and watershed restoration activities by SWQB staff. Information gathered from the Probable Source Sheets will be used to generate a draft Probable Source list in consequent TMDL planning documents. These draft Probable Source lists will be finalized with watershed group/stakeholder input received during any one of the following: pre-survey public meeting, TMDL public meeting, watershed-based planning activities, and various public comment periods. The SWQB has also created a web site to further solicit input on Probable Sources (http://www.nmenv.state.nm.us/swqb/PS/), and has developed a standard operating procedure for this topic (available at: http://www.nmenv.state.nm.us/swqb/SOP/). The final Probable Source list in the approved TMDL process will be incorporated into the next Integrated List.

For development of the Integrated List, identified probable sources are incorporated into the Assessment Database (ADB) which allows the stream miles for each particular probable source of impairment to be totaled. ADB generates summary reports that break down sources of impairment into major categories and subcategories. The complete report is contained in Appendix B. In most instances, more than a single source contributes to water quality impairment.

Rangeland grazing, source unknown (determined using the revised approach to documenting Probable Sources noted above), natural sources, and loss of riparian habitat are the leading probable sources of impairment in New Mexico’s rivers and streams. Natural sources could include contributions from the surrounding geology, wildlife grazing, impacts from waterfowl, temporary or prolonged drought. These occurrences are believed to contribute to localized water quality problems in certain areas of the state.

On-site treatment systems (e.g., septic tanks) are also noted as a source of impairment. These primarily domestic liquid waste disposal systems (under state regulations, treat 2000 gallons per day or less) can lead to water quality impairments if they are installed in close proximity to other systems or water bodies, improperly installed, or poorly maintained. To help address these problems, the regulations applicable to these systems were significantly revised in 2005. Additional information is available at: http://www.nmenv.state.nm.us/fod/LiquidWaste/.

Like other western states, point source discharges play a quantitatively minor role with respect to pollutant loading compared to nonpoint sources in the impairment of New Mexico’s streams

and rivers. While poorly operated or maintained wastewater treatment plants may have significant adverse localized effects on water quality, the available data indicate that New Mexico, working with USEPA and NPDES permittees, has been largely successful in reducing point source impacts on the state's surface waters.

Sources of Impairment (from ADB)	Stream Miles Impaired
Rangeland Grazing	1,898.87
Loss of Riparian Habitat	822.1
Natural Sources	1,606.94
Streambank Modifications/Destablization	708.03
Highway/Road/Bridge Runoff (Non-construction Related)	538.3
Flow Alterations from Water Diversions	610.4
Source Unknown	1,999.8
On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	676.8
Municipal Point Source Discharges	599.44
Recreation Related (Incl. Off-Road Vehicles)	517.07

NOTE: See Appendix B for complete list of categories and subcategories generated from ADB.

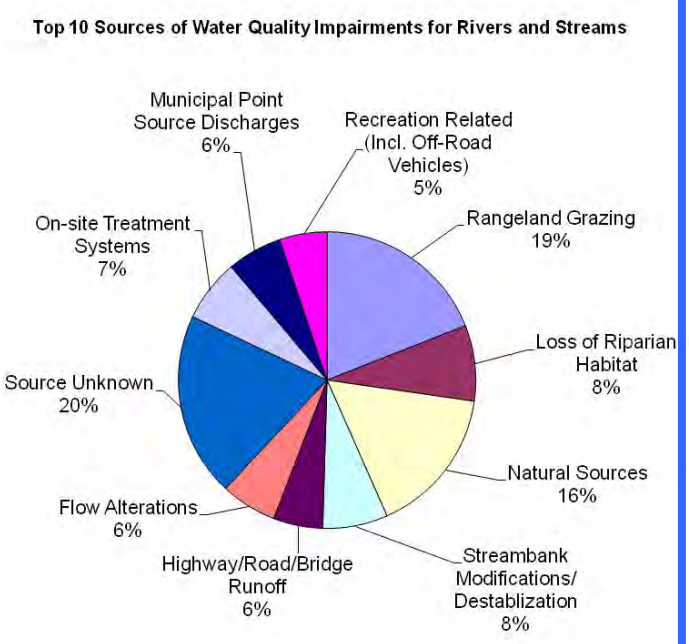


Figure11. Sources of Surface Water Impairment for Rivers and Streams

Lakes and Reservoirs

Water Quality Attainment Status and Categorization of New Mexico's Lakes and Reservoirs

The development of an adequate monitoring and assessment program for lakes still lags behind that for New Mexico's rivers and streams. One major challenge regarding both lake monitoring and lake TMDL development has been the loss of specific CWA §314 funds to address this need. In the past, states received this funding specifically targeted for lake monitoring. States must now carve out their own funding for lake monitoring from core CWA §106 funds. New revenue sources must be identified to increase lake and reservoir monitoring in order to support TMDL development and provide water quality information to the public who utilize these lakes and reservoirs. A more robust program could confirm the current cause and source impairment information regarding lakes and reservoirs with more scientifically rigorous data and information.

Table 10. Summary of Impairment Report Categories for New Mexico's Lakes and Reservoirs

Category	Total Size (acres)	Number of Assessment Units
1	1,035.85	11
2	10,714.29	20
3	21,727.2	132
4A	0	0
4B	0	0
4C	0	0
5	60,832.84	32

NOTE: This information was generated using New Mexico's version of USEPA's ADB database. Category 5 above is a composite of New Mexico Categories 5A, 5B, and 5C.

Table 10 shows the number of New Mexico's lakes and reservoirs assigned to each IR categories as defined in Table 1. Individual IR categories are presented for every assessment unit on the Integrated List in Appendix A.

By acreage, the majority of assessed lentic (i.e., not flowing) assessment units in New Mexico fall under Category 5. These 32 waterbodies comprise approximately 60,800 acres. Over 90 percent of these acres are freshwater reservoirs (as opposed to natural lakes). New Mexico has very few natural lakes compared to on-line and off-line reservoirs. These assessment units, along with the Category 5 river/stream water bodies, comprise New Mexico's CWA §303(d) waters. A list of Category 5-only waters was generated from ADB and is included in Appendix A. New Mexico has yet to develop lake TMDLs, as noted by the absence of lakes or reservoirs in Category 4A.

Over 21,700 acres (132 lakes or reservoirs) are grouped under Category 3. Assessment units are listed in this category when current data are not available to support an attainment determination. Reasons for this generally include access issues, monitoring and/or analytical

logistics, and staff and financial resource constraints. Many of these lakes that are "Not Assessed" are very small in size, such as high elevation natural lakes. These lakes are logistically difficult to sample because they require long, steep hikes. SWQB sampled a representative subset of these lakes during 2007 as part of a nutrient criteria development grant. Also included in this category are a large portion of the over 23,000 acres of playa lakes that were part of a SWQB special study in the late 1980s and early 1990s when the USEPA provided specific CWA §314 monitoring funding. Attainment status for playas or lakes where adequate resources have not been available to re-monitor in more recent years changed to "Not Assessed" during the 2008 listing cycle because these data were over 15 years old. Playas or lakes where data from only one sampling event were previously used to make Full Support determinations were changed to "Not Assessed" during the 2012 listing cycle because this is considered to be insufficient data to make attainment determinations under current assessment protocols (NMED/SWQB 2011d).

New Mexico's Summary of Designated Use Support for Lakes and Reservoirs

A summary of the lake/reservoir attainment status for each designated use, as found in New Mexico's WQS, is presented in Table 11. These results are primarily based on fixed station water quality monitoring conducted by the SWQB as part of rotational watershed surveys, best professional judgment, and qualitative assessments. These data are supplemented by outside sources of data shown to be of sufficient quality. Overall, 6 of the State's 17 assessed designated uses in lakes and reservoirs have been identified as impaired by point or nonpoint sources of pollutants.

Table 11. Individual Designated Use Support Summary for New Mexico Lakes and Reservoirs

Designated Use	Total Size (acre)	Size Assessed (acre)	Size Fully Supporting (acre)	Size Not Supporting (acre)	Size Not Assessed (acre)
Coldwater Aquatic Life	31,094.43	30,881.13	5,779.05	25,102.08	213.3
Domestic Water Supply	2,362.97	2,092.26	760.26	1,332	270.71
Fish Culture*	41.64	0	0	0	41.64
High Quality Coldwater Aquatic Life	1,754.37	1,507.47	50.85	1,456.62	246.9
Industrial Water Supply*	17,206.58	0	0	0	17,206.58
Irrigation	5,360.54	4,301.94	4,301.94	0	1,058.6
Irrigation Storage	55,804.89	55,804.89	55,804.89	0	0
Livestock Watering	94,310.18	66,402.13	66,402.13	0	27,908.05
Marginal Coldwater Aquatic Life	881.91	752.89	615.05	137.84	129.02
Marginal Warmwater Aquatic Life	24,900.05	1,774.1	0	1,774.1	23,125.95
Primary Contact	93,218.72	64,086.6	64,086.6	0	29,132.12
Public Water Supply*	31,950.87	0	0	0	31,950.87
Secondary Contact	1,091.46	593.76	593.76	0	497.7
Warmwater Aquatic Life	58,449.93	55,566.48	14,945.68	40,620.8	2,883.45
Wildlife Habitat	94,310.18	72,559.17	72,559.17	0	21,751.01

* = All Fish Culture, Public Water Supply, and Industrial Water Supply designated uses are defaulted to "Not Assessed" because no numeric criteria apply uniquely to these uses per 20.6.4.900 Subsection A NMAC.

Causes of Surface Water Impairment for Lakes and Reservoirs

A summary of the impairment causes for New Mexico's lakes and reservoirs is presented in Figure 12. These determinations are primarily based on water quality monitoring conducted by the SWQB as part of rotational watershed surveys, fixed station monitoring, and targeted monitoring. These data are supplemented by outside sources of data shown to be of sufficient quality. The ADB-generated report that was used to generate the below figure is included in Appendix B. Standard USEPA cause categories included in ADB were used to label the graphic. See the Appendix B for subcategory information.

Cause of Impairment (from ADB)	Acres Impaired
Mercury in Fish Tissue	52,386.91
Nutrient/Eutrophication Biological Indicators	4,322.49
Arsenic	1,666.76
Aluminum	3,767.75
DDT in Fish Tissue	3,058.67
Copper	11.16
Oxygen, Dissolved	11,413.87
PCB in Fish Tissue	17,680.33
pH	90.94
Temperature, water	13,646.1

NOTE: See Appendix B for complete list of categories and subcategories generated from ADB.

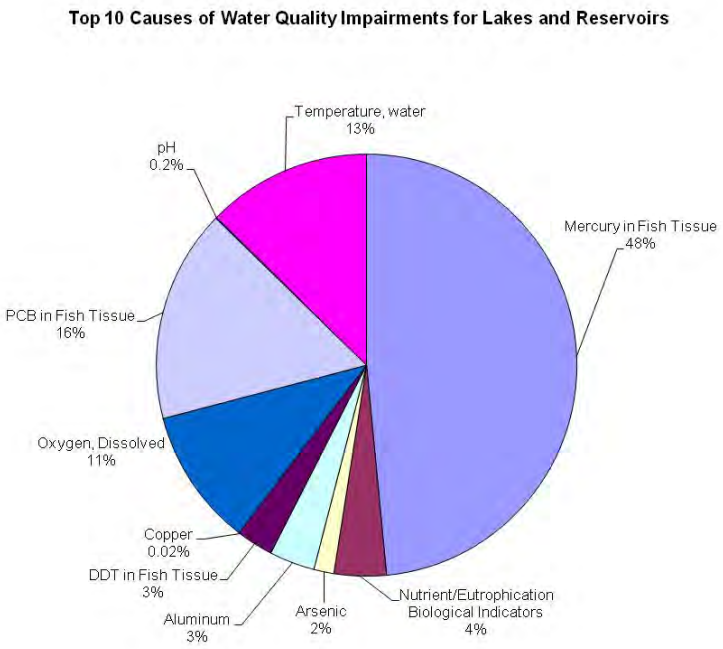


Figure12. Causes of Surface Water Impairment for Lakes and Reservoirs

Mercury and PCBs in fish tissue, and temperature are the top three causes of impairment of designated uses in New Mexico's lakes and reservoirs based on current WQS, available data, and current assessment procedures. USEPA considers fish or shellfish consumption advisories and supporting fish tissue data to be existing and readily available data that demonstrate non-attainment of CWA goals stating that waters should be "fishable" (CWA §101(a), USEPA 2005). New Mexico currently has fish consumption advisories based on mercury, dichlorodiphenyltrichloroethane (DDT), and PCB levels in fish tissue (NMDOH *et al*. 2011). All waterbodies listed in the advisory are listed as impaired except waterbodies where available mercury in fish tissue data are below the New Mexico water quality criterion of 0.3 mg/kg. See Section C.7 for additional information. The total acreage noted as impaired for temperature increased by almost an order of magnitude this listing cycle due to the new temperature listing for Navajo Reservoir (13,151 acres) based on SWQB's 2010 survey data and current assessment protocol. The dissolved oxygen impairment listing may be related to excessive nutrients. SWQB is in the process of developing nutrient assessment protocols for lakes and reservoirs.

Sources of Surface Water Impairment for Lakes and Reservoirs

A summary of the impairment source for New Mexico's for lakes and reservoirs is presented in Figure 13. The probable source list included with any cause of impairment is intended to include any and all activities that could be contributing to the identified impairment. It 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 possible items. Probable sources listed for any particular water body have not been proven to be the only source(s) of the identified impairment. The approach to documenting probable sources have been revised as described in the above sections. The ADB-generated report that was used to generate the below figure is included in Appendix B. Standard USEPA cause categories included in ADB were used to label the graphic. See Appendix B for subcategory information.

Sources of Impairment (from ADB)	Acres Impaired
Atmospheric Deposition - Toxics	44,816.01
Rangeland Grazing	5,632.61
Loss of Riparian Habitat	4,250.61
Streambank Modifications/destablization	4,218.17
Impervious Surface Runoff	3,771.69
Natural Sources	6,184.75
On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	1,355.81
Wildlife Other than Waterfowl	1,332
Subsurface (Hardrock) Mining	1,332
Contaminated Sediments	6,809.60

See Appendix B for complete list of categories and subcategories generated from ADB.

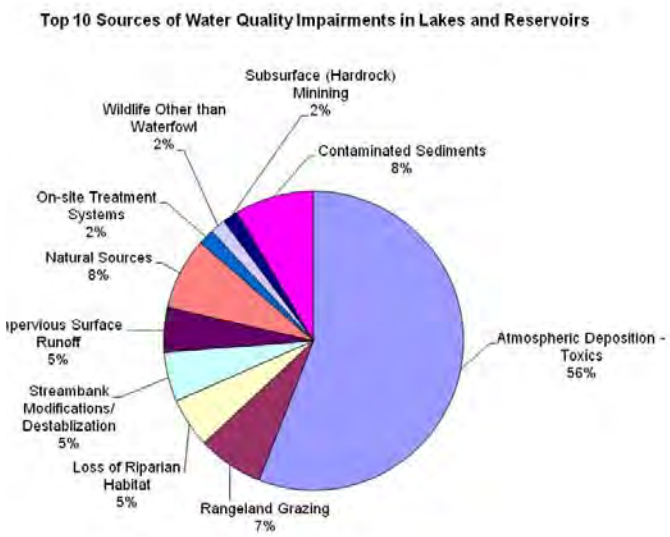


Figure 13. Sources of Surface Water Impairment for Lakes and Reservoirs

Atmospheric deposition, contaminated sediments, natural sources, and rangeland grazing are the leading probable sources of impairment in New Mexico’s lakes and reservoirs. The acres impaired due to the atmospheric deposition of toxics is the largest documented probable source because it is associated with all “Mercury in Fish Tissue” and “PCBs in Fish Tissue” listings in the state.

Natural sources could include contributions from the surrounding geology, wildlife grazing, impacts from waterfowl, or temporary or prolonged drought. These occurrences are believed to contribute to localized water quality problems in certain areas of the state. There is some potential redundancy between probable source categories Natural Sources and Wildlife Other that Waterfowl.

On-site treatment systems (such as septic tanks) are also noted as a source of impairment. These primarily domestic systems can lead to water quality problems if they are improperly

installed or poorly maintained, or do not meet setback requirements from waterbodies or other systems.

Like other western states, point source discharges play a quantitatively minor role in the impairment of the state's lakes and reservoirs. Hence, the vast majority of all water quality impairment identified in New Mexico's lakes and reservoirs is due to nonpoint sources of water pollution.

Trophic Status in New Mexico Lakes and Reservoirs

Trophic status is determined as part of lake water quality monitoring efforts. Although trophic status alone is not used in New Mexico for use attainment determination, it is an important tool which helps relate the relative condition of a lake to its designated use support. It can also lead to a better understanding of what probable cause or causes may be contributing to water quality degradation in a lake. Trophic status was determined for several lakes and reservoirs using the Carlson trophic state indices (TSIs). The lakes were categorized using a continuum from oligotrophic to eutrophic. The univariate Carlson index used to determine trophic state is based on Secchi disk depth, *chlorophyll a*, and total phosphorus concentrations.

Each of the Carlson TSI values for a given lake have been separately evaluated with preferential consideration given to chlorophyll concentrations. Trophic state boundaries are consistent with the USEPA index. For example, trophic state values exceeding 47 indicate a eutrophic lake; values less than 42 indicate oligotrophic lakes (USEPA 1974, 1979).

Classification systems simplify the dynamic concept of trophic state. Among the assumptions of the classification indices are that algae are the most important primary producers and nutrient loading is responsible for the productivity within the lake (USEPA 1974, 1979). The Carlson index is of limited applicability for lakes with significant non-algal turbidity or nitrogen limitation, where aquatic macrophytes are the dominant primary producers, or where zooplankton grazing controls algal abundance. The biological data and total nitrogen/total phosphorus ratios for each lake are also used to help evaluate the utility of the trophic index for classifying lakes in New Mexico. Table 12 displays the number of evaluated lentic waters within each trophic class based on data collected and assessed through 2010.

Lake Acidification

No lakes in New Mexico are known to have pH values consistently less than 5.0 standard units; therefore, there is no current need to develop methods to neutralize or restore buffering capacity in New Mexico lakes. Lakes most likely to be susceptible to acidic precipitation are characterized by alkalinities less than 5-10 mg $CaCO_3$/L, have small watersheds, and are located on granitic bedrock at high elevations. Data from fourteen such lakes indicate that the Truchas Lakes and Santa Fe Lake are the most susceptible to acidification due to low buffering capacity (Lynch *et al*., 1988). Further data for these and other high altitude natural lakes are needed to establish acidification trends that may be present in New Mexico. The high elevation natural lakes in New Mexico are all contained within National Forest boundaries. The United States Forest Service (USFS) has developed a monitoring plan to conduct tracer studies to identify the sources of possible acid precipitation falling in the state's major high-mountain areas.

Table 12. Trophic Status of New Mexico Lentic Waters

Trophic Class	Description	Number of Evaluated Lentic Waters
Oligotrophic	Clear water; low levels of nutrients and high levels of oxygen	5
OligoMesotrophic	Hypolimnia (lower, colder layer of lake) of shallower lakes may become anoxic	19
Mesotrophic	Water moderately clear; increasing probability of hypolimnetic anoxia during summer	30
MesoEutrophic	Capable of producing and supporting moderate levels of plant and animal life	11
Eutrophic	Anoxic hypolimnia, macrophyte problems possible	45
HyperEutrophic	Light-limited productivity; dense algae and macrophytes	2
Dystrophic	Acidic brown water, lacking in oxygen, and unable to support much plant or animal life	1

Blue-Green Algae

Blue-green algae, or cyanobacteria, are aquatic, photosynthetic, microscopic organisms that are naturally-occurring in lakes and streams. Algae forms when conditions include the presence of warm, shallow, stagnant water that receives abundant sunlight. Toxic algae blooms are usually localized, sporadic, short-lived, and occur primarily in the summer.

Though not naturally a toxin, algae can produce toxins which can make animals (except for fish) sick when consumed. Algae toxins have been shown to attack the nervous system of animals which can lead to death if not immediately treated. When swimming near algae blooms, people can develop skin rashes and might experience symptoms similar to that of food poisoning.

The presence of blue-green algae and reported illnesses from persons using these waters prompted the New Mexico State Parks and New Mexico Department of Game and Fish to post swimming advisories for Elephant Butte and Bill Evans Lake, respectively. NMED documented the presence of species of naturally-occurring blue-green algae that can cause toxic effects, although the specific species of toxins were not identified through this qualitative review.

The SWQB recognizes concerns regarding the presence of blue-green algae toxins as a potential impairment to the swimmable goals of the CWA. The SWQB does not presently have assessment protocols regarding the conversion of swimming advisories due to toxic algae into CWA 303(d) impairment listings. The presence of blue-green algae in these two lakes has nevertheless been noted in the AU Comments for these waterbodies, and the SWQB is investigating how to best incorporate the presence of swimming advisories such as these into future integrated lists and reports.

Control Methods

Programs and measures to control potential pollution sources to New Mexico's lakes include NPDES permits for point source discharges, federal permits for dredge-or-fill operations, discharge plans required under the WQA, state review of federal actions under the consistency provisions of CWA §401, and agreements between NMED and other state and federal agencies to implement NPS pollution control measures.

C.4 CWA §303(d) List – Impaired Waters in New Mexico

Assessment units noted as Category 5A, 5B, or 5C on the Integrated List comprise New Mexico's CWA §303(d) list of impaired waters. A listing of Category 5-only waters was generated from ADB and is included in the beginning of Appendix A. To see details on a particular impaired assessment unit, refer to the particular assessment unit entry on the full Integrated List (Appendix A). The causes and sources of these impairments are summarized by waterbody type (rivers/streams vs. lakes/reservoirs) in the section C.3 above. An associated Record of Decision (ROD) document maintained by the SWQB is a historical record of impaired surface waters (i.e., Category 5 waters) provided to reviewers and users of the list -- including USEPA -- to help track listing and de-listing information used in the development of New Mexico's Integrated List. USEPA does not require this document and does not take action to approve or disapprove of its contents.

New Mexico's Integrated List also includes a projected "TMDL Schedule" for all assessment unit–parameter impairment pairs. The schedule indicates the State's priority of TMDL development in the upcoming years. These estimated dates are primarily based on the SWQB's current rotational monitoring schedule, date since the watershed was last intensively surveyed, and upcoming NPDES permit renewals. If listed as Category 5A, this is the proposed year of TMDL completion. If listed as Category 5B or 5C, new data for TMDL development should be collected by this date, or the category changed accordingly. These dates as well as the "Monitoring Schedule" date on the Integrated List are dependent upon personnel and financial resources which change on an annual basis, and in general are decreasing each year.

CWA §303d List of Impaired Water Record of Decision is available at:
http://www.nmenv.state.nm.us/SWQB/303d-305b/2012-2014/index.html

C.5 Evaluation of Statistical Surveys in New Mexico

USEPA has begun to strongly advocate that states use a probabilistic monitoring strategy, whereby locations throughout an entire stream and river network are randomly selected for monitoring. This approach would allow states to make broad statistical inferences about the quality of water across the state with relatively limited monitoring. For reasons already discussed, the SWQB has not adopted such an approach and considers a targeted approach the best approach to meet New Mexico's monitoring objectives.

As stated in section C.1 above, the SWQB has monitored almost all of New Mexico's perennial waters, representing essentially a census of water quality for the state. In 2008, USEPA conducted a national survey of wadeable streams. A total of 31 sites were sampled in New Mexico as part of a statistically-representative probabilistic sampling design. SWQB staff compared these locations to those where SWQB has collected water quality data in the past 10 years. This analysis found that, of the 31 sites, all but 13 sites were within two miles of an existing SWQB station. Only three, all in wilderness or very remote locations, were more than five miles from an existing station. These findings are consistent with a near census of the water quality of perennial streams for the State.

Once all of the water quality data from the national survey are available, the SWQB will work with USEPA Region 6 to evaluate this dataset to determine: a) if the collected dataset can provide statistically-valid conclusions regarding surface water quality in New Mexico's stream and rivers; and b) how the results of this probabilistic survey compare with SWQB's conclusions based on a near census of streams and rivers as reported in New Mexico's Integrated List of Assessed Waters.

C.6 New Mexico's Wetlands Program

The United States Department of Agriculture Natural Resource Conservation Service has identified approximately 740,600 acres of existing wetlands in New Mexico (USDA/NRCS 2000), which represents only a portion of the wetlands thought to be in existence in the early 1800's. Historically, the value of wetland habitats was not fully appreciated, so wetlands were utilized for what were considered more productive uses: agriculture, flood control structures, stockyards and livestock production, residential and industrial development, and oil and gas production. As a result, New Mexico has lost a significant portion of its wetlands in the last 200 years.

Wetlands are important features of the natural landscape, as they function as filters that trap excess sediment and nutrient runoff, thereby improving water quality. They can also mitigate catastrophic weather events common to New Mexico, such as drought and flashfloods by allowing water to slow down and infiltrate, thus augmenting ground water storage. Wetlands also support vegetation that provides a moist green fire break in the event of wildfires. Wildlife also benefit greatly from wetlands, which support a greater diversity of terrestrial and aquatic species as cropped or heavily grazed land. Their presence can also enhance property values in residential areas, as they provide a noise and urbanization barrier as well.

Among the modern threats to New Mexico's wetlands are development, ground water pumping that lowers shallow water tables, the use of wetlands for storm water control, gravel mining, invasive exotic plant and animals, agriculture, and channelization. This latter threat has severely impacted many of New Mexico's wetlands by limiting, and in many cases eliminating, the water/land relationship that would normally have allowed the establishment of wetland vegetation and ecosystems along river corridors. Instead, river banks and floodplains are starved of overbank flooding events, natural river shifting and meandering processes are interrupted, materials transport and deposition processes are accelerated, and vegetation communities are altered. The results include the loss of natural flood attenuation, nutrient cycling, habitat connectivity, particulate retention, dynamic and long-term surface water storage, moderation of ground water flow or discharge, and maintenance of vertebrate and invertebrate communities and habitat structure. Channelization can also result in severe bank erosion and gully formation causing sediment build up in rivers and reservoirs and the loss of habitat for native fisheries, waterfowl, and other wildlife.

Another area of concern relating to the degradation of wetland areas is contamination of New Mexico's playas from the disposal of brine and associated residues of oil and gas production. In the southeastern part of New Mexico, there are many economically and ecologically valuable playas that serve as critical oasis-like over-wintering habitat for migratory birds within the North American Central Flyway. These waters provide habitat for the Northern Pintail which is a highest priority waterfowl species according to the North American Waterfowl Management Plan (USFWS 2004), and for 15 priority species of shorebirds listed in the US Shorebird Conservation Plan for the Central Plains/Playa Lakes (Brown et al. 2001). These playas are

also used by other wildlife such as pronghorn antelope, for irrigation and livestock watering, and provide recreational opportunities such as hunting and bird-watching. Recent research has also suggested that many playas serve as ground water recharge zones, and so serve to sustain local water sources.

The SWQB's Wetlands Program administers wetland restoration and program development grants received from the USEPA under the CWA §104(b)(3). The overall goals of the Wetlands Program are to protect and restore New Mexico's remaining wetlands and riparian areas and to increase self-sustaining and naturally functioning wetlands and riparian areas. The Wetlands Program emphasizes the role of wetlands in prevention and reduction of water quality impairments and providing habitat and life requirements for wildlife. The objectives of the Program include:

- Conducting baseline monitoring and identification of wetlands;
- Implementing and administering wetlands restoration projects;
- Conducting an inventory of wetlands resources through landscape level mapping and classification, and working through a statewide mapping consortium;
- Promoting maintenance of instream flow to support streamside and floodplain wetlands and provide other water quality benefits;
- Promoting agricultural water use management and measurement and supporting wetlands as filtration systems for agricultural runoff;
- Promoting land management techniques to restore wetland-supporting beaver habitat;
- Increasing wetland acreage in New Mexico through the restoration and protection of wetland corridors;
- Determining the ecological condition of wetlands in New Mexico through the development and implementation of wetlands rapid assessment method;
- Ensuring adequate protection of closed basin and isolated wetlands at the state level; and
- Participating in wetland/riparian education and outreach for schools and interest groups.

The monitoring goals of the Wetlands Program include:

- Developing and using monitoring protocols and criteria to verify wetland degradation, impacts, and recovery;
- Documenting wetland gains and losses;
- Documenting results of wetlands creation, restoration, and enhancement projects; and
- Developing an inventory of wetlands resources and prioritization of wetlands projects and protection within specific watersheds.

The results of these monitoring efforts may be used to help refine the State WQS to include narrative and numeric criteria and designated uses that are specific to wetlands. These measures will be used to ensure that the biological, chemical, and physical integrity of all New Mexico wetlands are adequately protected.

Developing a wetlands inventory, collecting baseline monitoring information, identifying permanent monitoring sites, and assessing the status and function of wetlands are parts of an integrated monitoring framework performed on the watershed scale as part of the "Wetlands Action Plan." An inventory of wetlands can be used to collect information to describe the ecological character of wetlands; monitoring of wetlands provides information on the extent of any change; and assessment considers the pressures and associated risks of adverse change

in ecological character. All three are part of an overall integrated framework which, provides for identification of key characteristics of wetlands within a watershed. Taken together, they provide the information needed for establishing strategies, policies, and management interventions to maintain the defined wetland ecosystem character and services.

Key activities currently being implemented by the Program include:

- The implementation of the Wetlands Action Plan Program in which Wetlands Action Plans are developed for and by watershed groups;
- Developing a ten-year monitoring strategy for wetlands;
- Collecting rapid assessment data for select classes of wetlands;
- Developing a Vegetation Index of Biotic Integrity to validate rapid assessment methods; and
- Mapping and classifying wetlands in the Canadian River, Upper Rio Grande, Pecos River, Chama River, and Jemez Mountains drainages, including playas and isolated wetlands;

Wetlands restoration is a crucial component of the Wetlands Program. Several restoration projects are occurring throughout New Mexico which include the assistance and collaboration of a variety of project partners, and are funded by the USEPA Region 6 CWA §104(b)(3) Program Development grants. Project activities include restoration of wet meadows and waterfowl habitat, restoration of wetlands on private land parcels, reestablishment of natural flooding, increasing wetland plant diversity and habitat diversity, removal of exotic vegetation, restoration of springs, planning for open-space and conservation easements to protect wetlands resources, restoring high mountain fen wetlands, development and demonstration of slope wetland restoration techniques, and conservation of playas and closed basin wetlands. Other Wetlands Program projects include mapping beaver habitat on federal lands, and studying the potential effects of ground water withdrawal and aquifer recharge on spring-fed wetlands. The Wetlands Program coordinates and facilitates both the New Mexico Agency Wetlands Roundtable (consisting of state, federal, and tribal agency participants), and the New Mexico Wetlands Roundtable for non-governmental organizations in cooperation with the New Mexico Riparian Council.

In 2010, nearly 5,000 acres of New Mexico wetlands in USFS wilderness areas were nominated as Outstanding National Resource Waters. This nomination applies more stringent antidegradation water quality standards to these wetlands. The Wetlands Program is working with USFS to review and improve current best management practices and ensure the application of these practices to protect wetlands from degradation by human activities that commonly occur in wilderness wetlands.

In 2011, USEPA accepted the New Mexico Wetland Program Plan (WPP) as meeting the four required elements for such plans: monitoring and assessment, regulation, voluntary restoration and protection, and water quality standards for wetlands. New Mexico's is the only accepted WPP in USEPA Region 6 and one of only 21 that meet all four elements in the United States. More information (including New Mexico's WPP) is available at water.epa.gov/type/wetlands/wpp.cfm. Table 13 and Figure 14 depict active wetland projects in New Mexico.

Table 13. Active Wetlands Projects in New Mexico by County

Project	County
Valles Caldera	Sandoval
DOT Implementation	Catron
Santa Fe County	Santa Fe
Wetlands Action Plan Phase 3	Statewide
Rapid Assessment Methods	Statewide, Catron, Grant, Sierra and Dona Ana
Hyperspectral Imagery	Taos, Rio Arriba
Vegetation Indicators	Taos, Rio Arriba
Playas of Curry County	Curry
La Cienega de San Vicente	Grant
Cebolla Canyon	Cibola
Eastern NM Map and Class	Mora, Colfax, San Miguel, Harding
Restoring Slope Wetlands	Statewide, Taos, Colfax, Los Alamos and Sandoval
Assessing Beaver Habitat	Statewide

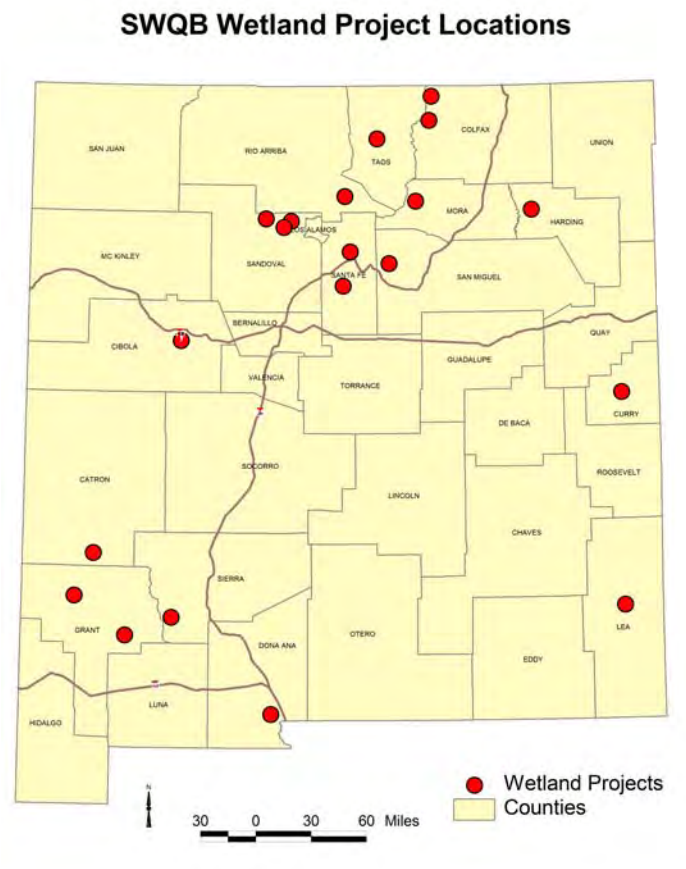


Figure 14. Location of Active Wetland Projects in New Mexico

C.7 Public Health Issues

The relationship between water quality and human health is greatly influenced by environmental conditions. New Mexico faces many water quality challenges related to public health, including: 1) pathogens resistant to standard water treatment methods; 2) chemical and biological contaminants; 3) aging or inadequate water system infrastructure; and 4) emergency- or disaster-related events. To address these challenges, New Mexico implements additional programs.

Drinking Water Program

NMED's Drinking Water Bureau (DWB) is responsible for preserving, protecting, and improving New Mexico's drinking water quality for present and future generations. This is accomplished by implementing the requirements of New Mexico's Drinking Water Regulations (20.7.10 NMAC) and the federal Safe Drinking Water Act (SDWA) which establish the standards for drinking water throughout the state. These standards set limits for harmful contaminants such as pesticides, volatile organics, and radiochemical, chemical, and bacteriological contaminants.

The SDWA originally focused on treatment as the means of providing safe drinking water at the tap. The 1996 amendments greatly enhanced the existing law by recognizing source water protection, operator training, funding for water system improvements, and public information as important components of safe

NEW MEXICO IMPLEMENTS THREE ADDITIONAL DRINKING WATER RULES

On February 9, 2011 the State of New Mexico received authority from the U.S. Environmental Protection Agency to implement three more drinking water rules:

1. Ground Water Rule (GWR): This rule affects most public drinking water systems in New Mexico and requires water systems that use a ground water source to determine the susceptibility of that source to contamination by *E. coli*. Sampling the source for *E. coli* is required when total coliform bacteria are detected in routine samples collected in the distribution system. If *E. coli* is also detected in the source, the water system is required to notify its customers within 24 hours. The water system then takes corrective action or collects more samples before it takes corrective action.
2. Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR): The purpose of this rule is to reduce illness linked with the contaminant *Cryptosporidium* and other pathogenic microorganisms in drinking water. The LT2ESWTR will supplement existing regulations by targeting additional *Cryptosporidium* treatment requirements to higher risk systems. This rule also contains provisions to reduce risks from uncovered finished water reservoirs and provisions to ensure that systems maintain microbial protection when they take steps to decrease the formation of disinfection byproducts that result from chemical water treatment. Current regulations require filtered water systems to reduce source water *Cryptosporidium* levels by 2-log (99 percent). Recent data on Cryptosporidium infectivity and occurrence indicate that this treatment requirement is sufficient for most systems, but additional treatment is necessary for certain higher risk systems. These higher risk systems include filtered water systems with high levels of *Cryptosporidium* in their water sources and all unfiltered water systems, which do not treat for *Cryptosporidium*. This rule impacts approximately 3 systems in NM.
3. Stage 2 Disinfectants/Disinfection Byproducts Rule (DBP): This Rule requires water systems to balance the benefit of disinfection to control microbiological contaminants with the health risk posed by chemical byproducts of the disinfection process. Systems served by surface water sources are more likely to have organic matter that fosters formation of disinfection byproducts.

drinking water. This approach, adopted by the DWB, ensures the quality of drinking water in NM by protecting it from source to tap. See inset box for additional information on recent primacy activities.

New Mexico Rivers and Streams Used for Drinking Water:

Animas River
Bluewater Creek
Cimarron River
Eagle Creek
El Rito Creek
Gallinas River
La Jara Creek
La Luz Creek
Little Tesuque Creek
Los Pinos River
Navajo River
Pecos River
Rayado Creek
Rio Bonito
Rio Brazos
Rio Chama
Rio Grande
Rio Pueblo
Rio Ruidoso
Rio Vallecitos
San Juan River
Santa Fe River
Tularosa Creek
Ute Creek
Vallecito Creek

All public water systems must monitor the water for regulated contaminants and ensure compliance with state drinking water regulations and the SDWA. Water samples are collected at each public water system and analyzed for contaminants according to an established schedule. The DWB provides oversight to all of New Mexico's public water systems and reviews these data, periodically inspects the system according to a rotating schedule depending on the type of system, and takes action whenever a system is out of compliance. These actions typically include providing technical, managerialor financial assistance to help improve the overall capacity of a system and encouraging systems to regionalize and combine resources when possible; however, enforcement action may be taken to return the system to compliance. In addition to providing oversight to systems, DWB's Source Water Assessment and Protection Program works with systems to identify potential sources of contamination that might have adverse effects on the source waters and to develop a plan to protect those source waters.

As drinking water standards become increasingly more stringent, ground water that can meet regulatory requirements with little or no treatment becomes less available. During the last six years, many ground water systems have had particular difficulty complying with new arsenic and uranium maximum contaminant levels (MCLs). While ground water continues to be the source for the majority of public water systems in the state, two of the largest systems (Albuquerque and Santa Fe) have added surface water as a significant source of drinking water in the last three years.

Systems utilizing surface water sources require more sampling of treated water than systems using a ground water source due to the potential for rapid changes in source water quality. While the quality of the source water does not impact the quality of the produced drinking water, the quality of the source water will influence treatment considerations and associated costs.

As of February 2012, approximately 62 public water systems use or purchase water obtained from either surface water or ground water under the direct influence (GWUDI) of surface water. Table 14 provides a

New Mexico Lakes/Reservoirs used for Drinking Water:

Navajo Lake
Conchas Lake
Bonito Lake
Nichols & McClure Reservoir (City of Santa Fe)
El Vado Lake
Lake Maloya
Eagle Nest Lake
Storrie Lake
Cimarroncita Reservoir
Miami Lake
Uracca and Phillips Reservoirs (Philmont Scout Ranch)
Lake Farmington (Beeline Reservoir)
Grindstone Canyon Reservoir

summary of the surface water bodies that have been identified as impaired relative to SDWA compliance status. Seven systems that use surface water or GWUDI waters as a source are out of compliance with the SDWA. Six public water systems exceeded levels for disinfection byproducts and one system failed to remove an adequate amount of total organic carbon. When chlorine is used as part of surface water treatment, disinfection byproducts can form when organic carbon reacts with the chlorine. Typically, systems can adjust treatment and operation to return to compliance relative quickly; however, additional infrastructure is sometimes required to remove organic carbon and return to compliance. The public is required to be notified whenever violations of the SDWA occur. Nine additional systems are currently out of compliance with the SDWA for failure to provide monitoring results to the state or for failure to provide sufficient public notice.

Table 14. Summary of Information on Surface Waterbodies Used as Public Drinking Water Sources

Total number of surface water bodies used as public drinking water source (this includes lakes rivers and streams)	43
Number of surface water bodies used as public drinking water source considered impaired for various contaminants	31
Number of public water systems in NM	1195
Number of public water systems using surface water or ground water under the direct Influence of surface Water	62
Number of public water systems using impaired source water but are in compliance with the SDWA	46
Number of public water systems using impaired source water not in compliance with the SDWA	Chemical/Biological Violations: 7 Other Violations: 9

Note: Numbers are approximate due to the fact that the number of active systems changes on a regular basis.

The large number of systems which are out of compliance because of surface source water conditions demonstrates the importance of protecting surface source waters to prevent violations from occurring in drinking water systems.

The DWB's Source Water Assessment and Protection Program works with public water systems to protect surface water sources as well as ground water sources. The DWB continues to conduct assessments of surface water sources' vulnerability to contamination for all public water systems utilizing surface water sources. The Source Water Assessment and Protection Program evaluates surface water sources on the following criteria: 1) stream flow rate or reservoir size; 2) surface water intake construction and integrity; 3) intake method (direct or indirect); and 4) average daily turbidity of the surface water source. Sources of contamination are also identified within a ten-mile segment upstream of each intake, to a distance of one half mile on either side of the source. The identified sources of contamination are evaluated based on the chemical properties of the associated contaminants, their likelihood of release, the number of contaminants, their proximities to the surface water source, and chemical monitoring history.

Additional information on NMED's Drinking Water Bureau is available at:
http://www.nmenv.state.nm.us/dwb/Index.htm

New Mexico Department of Health

The New Mexico Department of Health (NMDOH) plays a vital role by examining the primary contaminants in drinking water supplies that can cause adverse health effects, primarily excess nitrates and biological contamination. Excess nitrates above the Maximum Contaminant Level (MCL) can cause methemoglobinemia (also known as "blue baby syndrome) which occurs when the ingested nitrate interferes with the ability for blood to carry oxygen to body tissues. A NMDOH analysis of the New Mexico Safe Drinking Water Information System indicated that for 2010-2011, four (12 percent) of the 33 counties in New Mexico had one or more public water system that violated the MCL for nitrate (NM SDWIS 2012). There were no reported cases of methemoglobinemia from 2002 through 2011. Infant methemoglobinemia and other suspected environmentally-induced health conditions were added to the "notifiable conditions" list in 2006, thus enhancing surveillance efforts.

Biological contamination of drinking water systems is monitored by routinely checking for total coliforms. The presence of total coliforms in drinking water could indicate the presence of fecal coliforms, or *E. coli*, one of the fecal coliform organisms. Fecal coliforms are organisms that are present in intestinal systems of all warm-blooded animals. Most are not dangerous to humans, but some may cause adverse health effects such as vomiting and diarrhea. Additionally, fecal contamination may indicate the presence of other disease-causing organisms (e.g., bacteria, parasites, and viruses). Enterohemorrhagic *E. coli* was first identified in 1982 and became a nationally reportable disease in 1993. The most commonly reported serotype is *E. coli* O157:H7. This type of *E. coli* produces a Shiga toxin that can cause severe damage to the lining of the intestine, and complications can result in serious kidney damage (Hemolytic Uremic Syndrome – HUS). Infection with this organism is most commonly associated with the ingestion of undercooked beef and other foods contaminated by cattle feces. However, waterborne transmission has also been documented.

The NMDOH monitors reported diseases and organisms that are potentially water-related in an effort to help ensure the safety of New Mexico's public drinking water. These diseases and organisms include Camplyobacteriosis, Cryptosporidiosis, *E.coli*, Giardiasis, Hepatitis A, Salmonellosis, and Shigellosis. These diseases and organisms can also be transmitted through food or person-to-person contact. There were over 1,000 reports of infectious diseases that could be carried via water in 2006-2007 in New Mexico (Hagan, 2009). However, none of these cases were confirmed as being associated with a contaminated drinking water source, despite drinking water advisories being administered in the same geographical area during the same time period as illness occurred. When a Boil Water Advisory is issued by NMED, the NMDOH provides educational materials for the public and advises district public health officials to be on alert for cases of gastrointestinal illness. New Mexico remains vigilant for any potential incidents, paying particular attention to water systems with a history of problems meeting federal drinking water quality standards.

For more information water related public health concerns, refer to the NMDOH's water quality webpage at http://www.health.state.nm.us/eheb/waterQ.shtml and at https://nmtracking.unm.edu.

Fish Consumption Advisory Program

Fish are a lean, low-calorie source of protein, and an important part of a balanced diet. However, some fish may contain contaminants that when consumed in certain quantities could pose health risks. When contaminant levels may be unsafe, consumption advisories recommend that people limit or avoid eating certain species of fish caught in certain places. The NMDOH, New Mexico Department of Game and Fish (NMDGF), New Mexico State Parks, and NMED work together to implement New Mexico's Fish Consumption Advisory Program.

Data derived from USEPA's National Fish Tissue Study and the Cooperative PCB Study Group (consisting of NMED, Los Alamos County, United States Department of Energy, and Los Alamos National Laboratory) have raised concerns about fish tissue contamination in New Mexico. These data suggest that contaminants such as mercury, PCBs, and DDT and its derivatives may be present in concentrations that could pose an unacceptable health risk for people who eat fish from some New Mexico waters. Partly as a result of these studies, New Mexico has revitalized and expanded the Fish Consumption Advisory Program.

The Program's monitoring strategy involves screening a select number of sites for chemical contamination where sport, subsistence, or commercial fishing is conducted. Site selection is prioritized based on areas where it is known that a large number of fish are harvested or where there are known or suspected contamination issues. This screening helps identify those waters where fish tissue contamination may pose unacceptable health risks to human consumers.

Fish consumption advisories relay fish tissue contamination information to the public. These advisories are only guidelines and do not constitute legal restrictions that prevent people from eating contaminated fish from New Mexico lakes and streams. Fish consumption advisories pertain to consumption of fish only. There are no known contaminant-related health risks associated with activities such as camping, swimming, boating, or handling fish in area where there are fish consumption advisories.

Currently, statewide advisories have been issued for mercury, DDT, and PCBs in fish tissue at several reservoirs, lakes, and rivers (NMDOH *et al*., 2011). In 2006, as a result of the fish tissue contaminant data analysis from Brantley Reservoir, the New Mexico Game Commission restricted fishing in Brantley Reservoir and the Pecos River in the Brantley Wildlife Management Area to "catch and release" only.

All New Mexico fish consumption advisories are available online at:
http://www.nmenv.state.nm.us/swqb/advisories/

PART D - GROUND WATER MONITORING AND ASSESSMENT

D.1 Ground Water in New Mexico

New Mexico's ground water resources are of vital importance in sustaining life, and must be preserved and protected for both present and future generations. Approximately 78 percent of New Mexicans depend on ground water for drinking water. This is a decrease from 90 percent three years ago due to the recent addition of surface water to augment the Cities' of Albuquerque and Santa Fe public water supply. Eighty-one percent of New Mexicans are served by public systems with water derived from ground water sources. Over 170,000 New Mexicans depend on private wells for drinking water. Nearly half of the total water annually withdrawn for all uses in New Mexico, including agriculture and industry, is ground water, the only practicable source of water in many areas of the state. The magnitude of ground water supplies in New Mexico is estimated to be 20 billion acre-feet. Of this amount, it is estimated that three billion acre-feet of fresh water and 1.4 billion acre-feet of slightly saline water are recoverable. Overall, the quality of these waters is assumed to be good, although there are significant pollution problems known to affect certain areas of New Mexico.

New Mexico's hydrogeology is highly variable and complex, and ground water quality and availability is also highly variable. Sedimentary deposits (mainly sandstone, limestone, or unconsolidated sand and gravel) are the most productive and widespread aquifers in New Mexico. Valley-fill aquifers of major importance occur along the Rio Chama, the San Juan River, and the Pecos River. These aquifers are typically less than 200 feet thick and commonly provide water containing less than 1,000 milligrams per liter of total dissolved solids. A major aquifer occurs in the Rio Grande Valley where basin-fill deposits attain thicknesses of up to 20,000 feet, although only the uppermost several thousand feet contain fresh water. This aquifer provides a source of water for Albuquerque, Rio Rancho, and Santa Fe. Significant basin-fill aquifers also occur in the southwestern area of the state. The High Plains aquifer (primarily the Ogallala Formation) is a major water source along the eastern border of New Mexico. Major sandstone aquifers are also located in the San Juan Basin in the northwestern part of the state. Limestone aquifers are of importance in the south-eastern part and locally in the central and western parts.In some areas with significant ground water use, ground water levels have declined due to withdrawals in excess of recharge (BOR 1976).

D.2 Ground Water Monitoring and Protection Programs

New Mexico relies on several programs established under a variety of statutory authorities to protect and maintain ground water quality which are primarily conducted by the NMED Ground Water Quality Bureau (GWQB). The primary statute dealing with ground water quality management is the WQA. This Act created the WQCC and authorized it to adopt ground water quality protection regulations and standards. Key features of the Act and regulations relating to ground water include:

- A requirement for dischargers to obtain a ground water discharge permit to prevent ground water contamination from discharges that have the potential to impact ground water quality;
- requirements for reporting and addressing spills and releases;
- development of ground water quality standards for ground water contaminants (20.6.2.3103 NMAC);
- development of ground water pollution assessment and abatement regulations and underground injection control requirements; and
- provisions for civil and criminal penalties for violation of the regulations and standards.

Programs established under the WQA, as well as under the New Mexico Oil and Gas Act, Hazardous Waste Act, Ground Water Protection Act, Solid Waste Act, Emergency Management Act, Voluntary Remediation Act, and Environmental Improvement Act also contain provisions which are designed to protect ground water quality and which implement the ground water regulations and water quality standards directly or by reference. In addition, the State cooperates with local and federal governments on various programs relevant to ground water pollution control.

Ground water quality monitoring is typically required at permitted facilities and as part of remediation efforts. The GWQB also offers free well water quality screening at water fairs routinely held around New Mexico.

D.3 Ground Water Quality Status

In the late 1970s following promulgation of the WQCC regulations, the NMED began evaluating existing information on vulnerable aquifers and major known and potential contamination sources. This evaluation has become an ongoing process, as the focus has shifted from identification of major potential sources of contamination to specific questions about known or suspected ground water contamination problems.

Approximately 262 facilities with ground water discharge permits have confirmed ground water contamination, based on data from the last quarter of FY2011. These facilities are required to take corrective actions to address the contamination pursuant to permit conditions or abatement plans. Over 200 additional sites with potential or confirmed ground water contamination are being addressed under spill response regulations, the voluntary remediation program, or abatement regulations.

D.4 Ground Water Contamination Sources

More than half of ground water contamination cases in the state have been caused by nonpoint sources. While household septic tanks or cesspools are the predominant source of nonpoint source contamination of ground water in New Mexico, such degradation may also be caused by other diffuse sources such as residual minerals from evapotranspiration, areas disturbed by mineral exploration, urban runoff, or application of agricultural chemicals. Point source categories include publicly and privately owned sewage treatment plants with flows over 2,000 gallons per day, dairy operations, mines, food processing operations, industrial discharges, landfills, above and underground storage tanks, petroleum processing and storage, and accidental spills or leaks.

D.5 Significant Ground Water Issues

Dairy Discharge Permit Regulations

The New Mexico Water Quality Act was amended in 2009 to require the adoption of industry-specific dairy wastewater discharge regulations by the WQCC. NMED has completed development of these regulations pursuant to a schedule adopted by the WQCC. The process included numerous public meetings, meetings of an NMED-created advisory committee, and negotiations with interested stakeholders. A petition for rule change and proposed dairy discharge regulations were filed with the WQCC in December 2009 and a hearing on the proposed regulations was held by the WQCC in April and June 2010. After negotiations between the dairy industry and NMED, the WQCC approved the rules in December 2011 and the rule became effective on December 31, 2011. NMED is now in the process of implementing a rigorous schedule of issuing discharge permits to dairy facilities pursuant to the new rule.

Copper Rule Permit Regulations

Amendments to the WQA in 2009 also included a requirement that the WQCC adopt industry-specific copper mine discharge regulations following the promulgation of the Dairy Rules. NMED has created an advisory and technical group to provide input to these new copper rules. Both groups bring a broad range of expertise in the technical and regulatory aspects of copper mining. The rules are anticipated to be presented to the WQCC in late 2012, to become effective at the beginning of 2013.

Regulation of Discharges from Los Alamos National Laboratory (LANL)

LANL has numerous operations in which discharges of wastewater to the environment occur. Several regulatory agencies oversee activities at LANL including the Ground Water Quality Bureau in collaboration with other Federal and State agencies to ensure appropriate regulatory oversight and reduce dual regulation where applicable. Because of the extent of LANL's operations under the U.S. DOE, there is considerable public interest as it pertains to environmental protection.

Unplanned and unauthorized releases into the environment are reported to NMED for its review. The Bureau responds to any corrective actions taken by LANL. In 2011, NMED responded to 30 reportable releases. NMED responded to three Notices of Intent for proposed planned discharges at the facility during 2011. LANL currently has four discharges which have been deemed to be under the authority of the WQCC regulations and are in various stages of the permitting process: the Radioactive Liquid Waste Treatment Facility (RLWTF); the Sanitary Waste Water System (SWWS); Septic Tank/Leachfield Systems; and on-site treatment of contaminated ground water.

NMED has required LANL to submit a comprehensive and up-to-date discharge permit application for the RLWTF that reflects changes at the RLWTF that have occurred during the lengthy WQA permitting process and LANL's planned future upgrades to the facility,. LANL and DOE have appealed the issuance of their Hazardous Waste Facility Permit, including certain provisions related to the RLWTF. The discharge permit is a critical element of the negotiations to settle the litigation.

NMED received an application for renewal and modification of the Sanitary Waste Water System (SWWS) discharge permit in July 2010. The facility is the central domestic wastewater treatment system for domestic wastewater generated at LANL and discharges to permitted NPDES outfalls or recirculates the treated effluent through other process control systems at the laboratory. NMED staff is working on the draft discharge permit which is anticipated to be sent out for public comment in 2012.

LANL has numerous facilities which are not connected to the central SWWS and still discharge domestic wastewater to multiple treatment and disposal septic tank/leachfield systems throughout LANL. NMED has determined that these discharges are under the authority of the WQCC Regulations and are required to be regulated under a discharge permit. LANL submitted a discharge permit application in April 2006 and NMED has been in ongoing communication with LANL to obtain information on the extent of the systems in order to draft a discharge permit. There have been several updates and modifications from the original application to which NMED required an updated application be submitted. LANL submitted an updated application in 2010 that has formed the basis of NMED's draft discharge permit, which is anticipated to be sent out for public comment in 2012.

Upon review of a Notice of Intent submitted to NMED for the on-site treatment and land application of contaminated ground water, NMED has determined that such processes and discharges are required to be regulated under a discharge permit. LANL submitted its application in December 2011 and NMED is currently in the process of acquiring additional information from LANL in order to develop a draft permit.

Ground Water Program Evaluation

Prevention of ground water contamination is clearly more cost effective and technically achievable than remediation. Consequently, New Mexico continually works to improve the effectiveness of the ground water discharge permit program. Improved permit conditions have been developed to address issues identified as needing additional attention, such as contingency and closure plans, lining dairy lagoons with synthetic liners, septic system maintenance, the use of reclaimed wastewater and financial assurance. The program has created new permit templates for particular types of facilities such as car washes and grease trap waste disposers.

The State continues to work cooperatively with industry groups. Many facilities now view the permitting process as a routine part of their business startup and day-to-day operations. Furthermore, many lending institutions are working closely with the State to ensure that the facilities have obtained necessary permits before business loans are approved or renewed.

Ground water protection program effectiveness is documented through site-specific monitoring at permitted facilities and facilities that are abating ground water contamination. Although there is no overall index to determine the rate at which ground waters are polluted or remediated, state programs that protect the quality of the State's ground water have been successful in ground water quality protection. Based upon ground water monitoring data maintained by NMED, approximately 75% of facilities with ground water discharge permits have not caused exceedences of state ground water quality standards.

Assessment of Grants Mining District

NMED and USEPA, in conjunction with federal, state, and tribal entities have developed a five-year plan to assess uranium mining impacts in the Grants Mining District in northwestern New Mexico, identify future work that may be required, and coordinate, guide and maximize available agency resources of the many federal, state and tribal government entities.

The GWQB and EPA have already begun assessing the public health and environmental impacts resulting from extraction, processing, disposal and releases from legacy uranium mining and milling activities in the Grants Mining District. The Bureau's Superfund Oversight Section has performed screening assessments of 78 of the identified 97 legacy uranium mine sites in the District, sampled approximately 60 existing wells in the San Mateo Creek Basin, and reassessed potential impacts from two uranium mill sites that are currently under the DOE Long Term Stewardship Program.

Based on assessments of the Anaconda Company Bluewater and Ambrosia Lake Phillips former mill sites, DOE has agreed to perform additional site characterization to address concerns identified during the assessments. Similarly, the Bureau of Land Management (BLM) has agreed to review the findings of the screening assessments of mines on BLM-managed lands.

In addition to mining/milling facility assessments, USEPA has assessed 451 exterior structures and has completed radon surveys for 209 interior structures, with an emphasis on residences that may have been affected by legacy mining and milling activities where there may be a threat to human health and the environment. Based on these assessments, initial removal and radon abatement activities are planned for 13 properties in the communities of Bibo, Seboyeta, and San Mateo. The Superfund Oversight Section is developing strategies for assessment and cleanup criteria, as necessary, for sources of sediment, surface and ground water, and air contamination originating from these mines. This plan acknowledges that impacts from uranium mining and milling extend beyond the Grants Mineral Belt. The proposed actions may therefore be extended to areas with similar activities.

PART E – PUBLIC PARTICIPATION

All individuals living and working in the State affect water quality. Public awareness and involvement is therefore crucial to the successful implementation of water quality programs. New Mexico's water quality programs promote a multi-stakeholder, consensus-based public participation process. By actively pursuing and considering public input and involvement, New Mexico can more effectively effect changes in behavior and actively improve decision-making concerning water quality with greater public acceptance and support for those decisions.

The public participation requirements of specific water quality programs are described in the WQMP/CPP (NMWQCC 2011). 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).

The public participation associated with the development of the Integrated List portion of this report (Appendix A) was conducted in accordance with these principles, and included notifying stakeholders of a 45-day public comment period on the draft 2012-2014 Integrated List. Public notice on the Integrated List is also a CWA requirement. Responses to public comments on the Integrated List are included in Appendix C.

The State of New Mexico Statewide Water Quality Management Plan and Continuing Planning Process are available at: http://www.nmenv.state.nm.us/swqb/Planning/WQMP-CPP/

References

Brown, S., C. Hickey, B. Harrington, R. Gill, Ed. 2001. United States Shorebird Conservation Plan. Manomet Center for Conservation Sciences. Manomet, MA.

Bureau of Land Management (BLM). 2005. New Mexico Land Ownership Dataset. New Mexico State Office. Santa Fe, NM.

Bureau of Reclamation (BOR). 1976. New Mexico State Resources Assessment for Planning Purposes. United States Department of the Interior.

Hagan, Jessica. 2009. Waterborne Disease Surveillance in New Mexico. New Mexico Epidemiology. Volume 2009, Number 1, pages 1-4.

Lynch, Thomas R., Popp, Carl J., Jacobi, Gerald Z., and Robertson, James. 1988. *Assessing the Sensitivity of High Altitude New Mexico Wilderness Lakes to Acidic Precipitation and Trace Metal Contamination*. New Mexico Water Resources Research Institute. Project Number 1423697. 177 pp.

New Mexico Department of Health, New Mexico Environment Department, and New Mexico Department of Game and Fish (NMDOH et al.). 2011. Fish Consumption Advisories Due to Mercury Contamination. Santa Fe, NM. www.nmenv.state.nm.us/swqb/advisories

New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2009. New Mexico Nonpoint Source Management Program. Available at: www.nmenv.state.nm.us/swqb/wps/Plan

_____. 2010. *State of New Mexico Surface Water Quality Bureau 10-Year Monitoring and Assessment Strategy*. Available at: www.nmenv.state.nm.us/swqb/MAS/monitoring/10-YearStrategy.pdf.

_____. 2011a. Quality Management Plan for New Mexico Environment Department Surface Water Quality Bureau Environmental Data Operations: 2012. Available at: www.nmenv.state.nm.us/swqb/Planning/QMP/QMP2012.pdf

_____. 2011b. Quality Assurance Project Plan for Water Quality Management Programs. March. Available at: www.nmenv.state.nm.us/swqb/QAPP.

_____. 2011c. Monitoring and Assessment Standard Operating Procedures. Available at: www.nmenv.state.nm.us/swqb/SOP.

_____. 2011d. State of New Mexico Procedures for Assessing Standards Attainment for the Integrated 303(d)/305(b) Water Quality Monitoring and Assessment Report. May 6. Available at: www.nmenv.state.nm.us/swqb/protocols/2011/AssessmentProtocol-Appendices.pdf.

New Mexico Office of the State Engineer/Interstate Stream Commission (NMOSE/ISC). 2006. The Impact of Climate Change on NM's Water Supply and Ability to Manage Water Resources.

New Mexico Safe Drinking Water Information System (NM SDWIS). 2012. Available at: https://eidea.nmenv.state.nm.us/DWW.

New Mexico Water Quality Control Commission (NMWQCC). 2011. State of New Mexico Statewide Water Quality Management Plan and Continuing Planning Process. Santa Fe, New Mexico. Online at www.nmenv.state.nm.us/swqb/Planning/WQMP-CPP

United States Census Bureau. 2010. Resident population data by state. Available at: http://2010.census.gov/2010census/data/apportionment-pop-text.php.

United States Department of Agriculture Natural Resources Conservation Service (USDA/NRCS). 2000. *Summary Report 1997 Natural Resources Inventory*. Revised December, 2000. Washington, D.C.

United States Environmental Protection Agency (USEPA). 1974. An approach to a relative trophic index system for classifying lakes and reservoirs. Working Paper No. 25. Pacific Northwest Environmental Research Laboratory. Corvallis, Oregon.

_____. 1979. Lake and Reservoir Classification Systems. T. E. Maloney, editor. EPA-6003/3-79-074.

_____. 2003a. Asset Management: A Handbook for Small Water Systems 2003. (4606M) USEPA 816-R-03-016. Office of Water. Available at: http://water.epa.gov/type/drink/pws/smallsystems/upload/guide_smallsystems_asset_mgmnt.pdf.

_____. 2003b. Elements of a state water monitoring and assessment program. Assessment and Watershed Protection Division, Office of Wetlands, Oceans, and Watersheds. March. EPA 841-B-03-003. Washington, D.C.

———. 2004. NPDES Compliance Inspection Manual. EPA 305-X-04-001. Office of Enforcement and Compliance Assurance, Washington, DC. July.

_____. 2005. Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act. Office of Water. Washington, D.C.

_____. 2011. Information Concerning 2012 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. Memorandum dated March 21, 2011. Office of Wetlands, Oceans, and Watersheds. Washington, D.C.

United State Fish and Wildlife Service (USFWS). 2004. North American Waterfowl Management Plan 2004. Implementation Framework: Strengthening the Biological Foundation. Canadian Wildlife Service, U.S. Fish and Wildlife Service, Secretaria de Medio Ambiente y Recursos Naturales, 106 pp.

United States Geological Survey (USGS). 2012. National Hydrography Dataset (NHD). Available at: http://nhd.usgs.gov.