WATER QUALITY SURVEY SUMMARY

FOR THE

LOWER PECOS and SOUTHERN HIGH PLAINS WATERSHEDS

2021-2022

Pecos River near Carlsbad, NM

Prepared by
Surface Water Quality Bureau
New Mexico Environment Department

August 2023

Water quality surveys and assessments conducted by the New Mexico Environment Department Surface Water Quality Bureau are completed to fulfill Section 106 of the Clean Water Act [33 USC 1251 et seq.], Work Program for Water Quality Management. This project was funded, in part, by a grant from the U.S. Environmental Protection Agency.

Table of Contents

ACRONYMS

AU	Assessment Unit
BLM	Bureau of Land Management
CALM	Comprehensive Assessment and Listing Methodology
CWA	Clean Water Act
IR	State of New Mexico Clean Water Act §303(d)/305(b) Integrated Report
MASS	Monitoring, Assessment, and Standards Section
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NPS	Non-point Source
PCB	Polychlorinated biphenyl
PSRS	Point Source Regulation Section
QAPP	Quality Assurance Project Plan
SLD	Scientific Laboratory Division
SOP	Standard Operating Procedure
SWQB	Surface Water Quality Bureau
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UAA	Use Attainability Analysis
USEPA	United States Environmental Protection Agency
USFWS	United States Forest Service
WPS	Watershed Protection Section
WQ	Water Quality
WQCC	Water Quality Control Commission
WQS	Water Quality Standards
WTU	Work Time Unit
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

The SWQB conducts concentrated watershed-based water quality surveys to fulfill work plan requirements of the Clean Water Act (CWA) Section 106 grant. This grant provides federal funding to ensure that high quality, defensible data are collected and available to make informed resource management decisions. Data are publicly available to interested parties by making a formal request to the SWQB Monitoring, Assessment, and Standards Section or by downloading from the Environmental Protection Agency's Water Quality Data Portal[1]. The purpose of water quality sampling is to assess the quality of surface waters in the state, determine where water quality standards are not being met (i.e., where water quality is impaired), and to inform development of Total Maximum Daily Loads (TMDLs) for impaired waters, which lay the foundation for restoring these waters. Assessment conclusions are published in the State of New Mexico 303(d)/305(b) Integrated Report, available from the SWQB website[2].

The project area includes two survey areas (**Figure 1**): the Lower Pecos River watershed and the Southern High plains watershed. Perennial tributaries and associated lakes with the watershed are included. Lake sampling was conducted at Brantley Reservoir, Figure Eight Lake, Jal Lake, Lake Carlsbad, Lake Van and Lea Lake.

Historic and current land uses in the watersheds include irrigation, livestock, agriculture (range, pasture, and croplands), mining, oil and gas, forest, grassland, residential, shrubland, water, and wetlands. Land ownership in the watershed includes the Bureau of Land Management (BLM), U.S. Forest Service, Bureau of Reclamation (USFS BOR), National Park Service, New Mexico State Parks, and state and private parcels. The study area encompasses approximately 19,809 square miles (51,305 square kilometers) in New Mexico, located in De Baca, Chaves, Eddy, Curry, and Roosevelt counties. The watersheds are in Omernik Level III Ecoregions 24 (Chihuahuan Desert) and 26 (Southwestern Tablelands)) (USEPA 2006).

Rivers are divided into assessment units (AUs) based on differing geological and hydrological properties, and each AU is assessed individually using data from one or more monitoring sites located within the AU. Selected monitoring locations were sampled for water quality constituents 4-8 times over two years. The total number of samples for each location was determined through a priority ranking of Integrated Report (IR) classification, presence of point source discharge, and TMDL status, among other considerations. The framework for monitoring prioritization is discussed in the SWQB 10-Year Monitoring and Assessment Strategy (NMED/SWQB 2016). Monitoring activities conducted at each site are summarized in **Tables 6** and **7**.

1.1 Principal Investigators

Table 1 details the responsibilities for this project. Each team member was responsible for implementing the assigned responsibilities. Questions or comments regarding this survey report should be directed to the MASS project coordinators.

[1] https://www.waterqualitydata.us/portal/

[2] https://www.env.nm.gov/surface-water-quality/303d-305b/

Table 1. Personnel Roles and Responsibilities

Team Member	Position/Role	Responsibilities
Kris Barrios Monitoring, Assessment, Standards Kristopher.Barrios@state.nm.us 505- 946-8713	Program Manager	Program Manager responsibilities are completed in coordination with the Project Manager. Approve FSP, directs staff to publish the FSP according to program and/or grant requirements. Manage project personnel and resources throughout the project in coordination with Project Supervisor and Project Manager(s). Provide oversight and coordinate with QAO and Project Manager(s) on data collection activities not conducted in accordance with the FSP, QAPP, or current SOPs. Conduct environmental data collection activities in accordance with the developed FSP, QAPP, and current SWQB SOPs.

Team Member	Position/Role	Responsibilities
Eliza Martinez Monitoring Team Scientist Eliza.Martinez @env.nm.gov 505-819-8099	Project Manager	Manage project resources throughout the project in coordination with Program Manager and Project Supervisor. Conduct environmental data collection activities in accordance with the developed FSP, QAPP, and current SWQB SOPs. Data collection activities not conducted in accordance with the FSP, QAPP, or current SOPs will be documented and reported to the Program Manager and QAO. Conduct mid-survey meeting with team to discuss any changes to the project plan. Coordinate and conduct post-survey meeting with team to discuss differences between planned and actual sampling and what data gaps, if any, exist. Write, coordinate, and assemble report and/or other grant deliverables required of the project.
David Atencio Monitoring Team Scientist David.Atencio@env.nm.gov 505-365-3396 Elizabeth Stuffings Monitoring Team Scientist Elizabeth.Stuffings@env.nm.gov 505-819-9926 Diane Van Hoy Monitoring Team Scientist Diane.Van-Hoy@env.nm.gov 505-469-7658	Project Team	Conduct environmental data collection activities in accordance with the developed FSP, QAPP, and current SWQB SOPs. Data collection activities not conducted in accordance with the FSP, QAPP, or current SOPs will be documented and reported to the Project Manager. Maintain project files in dedicated survey folder. Calibration worksheets and field forms utilized for data collections will be maintained according to SOPs. Write assigned sections of reports and/or other grant deliverables required throughout the project.
Miguel Montoya Miguel.Montoya@env.nm.gov 505-819-9882	Quality Assurance Officer (QAO)	Approve and ensure FSP is retained in accordance with 1.21.2 NMAC, Retention and Disposition of Public Records. Conduct audits as needed to ensure compliance with FSP, QAPP and SOPs.

2.0 PROJECT DESCRIPTION

2.1 Background

Section 303(d) of the Federal Water Pollution Control Act, known as the Clean Water Act (CWA), requires that each state submit to the U.S. Environmental Protection Agency (EPA) a list of water quality limited segments that require load allocations, waste load allocations, and TMDLs. The current CWA §303(d) Program in New Mexico consists of three major steps: monitoring of surface waters, assessing monitoring data against the WQS, and developing TMDLs for those waters not meeting water quality standards (i.e., impaired).

CWA §305(b) requires that each state also submit a biennial report to the U.S. Congress through the EPA. The two requirements are combined into *The State of New Mexico §303(d)/§305(b) Integrated List and Report* (NMED/SWQB 2022a) (IR). The IR also serves as a source of basic information on water quality and water pollution control programs in New Mexico.

In accordance with the above stated statutory requirements, the IR report contains the following information:

- An assessment of surface water quality;
- An analysis of the extent to which the CWA §101(a) goal of surface water quality to provide for 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 of programs for nonpoint source control.

The activities described in this Report are focused toward meeting the goals of the most recent, EPA-approved IR (NMED/SWQB 2022a). The impairments for AUs in this survey area listed in **Table 2** were identified during the SWQB's most recent survey of this watershed, conducted 2012, and may include data from a variety of other investigations. The "IR Category" column provides the current AU's status in the IR (see **Appendix A** for definitions). "WQS Reference" provides the applicable Water Quality Standard reference as assigned to each AU and described in 20.6.4 New Mexico Administrative Code (NMAC) as governed by the New Mexico Water Quality Control Commission (WQCC) (NMAC 2022). The purpose of 20.6.4 NMAC is to establish WQS that consist of applicable designated uses of surface waters of the state, the water quality criteria necessary to protect those uses, and an antidegradation policy. The "TMDL Completed" column lists the EPA-approved TMDLs for the AU.

Monitoring of surface waters across the State occurs on a ten-year watershed rotation, meaning a given waterbody is generally surveyed intensively, on average, every ten years. Monitoring occurs during the non-winter months (March through November); focuses on physical, chemical, and biological conditions in perennial waters; and includes sampling for most pollutants that have numeric and/or narrative criteria in the WQS. Each AU is represented by a small number of monitoring stations (often only one), each of which receives 4-8 site visits during the survey.

The monitoring described in this report was planned and documented in a Field Sampling Plan (NMED/SWQB 2022b) prepared in accordance with SWQB Standard Operating Procedure 2.1: Field Sampling Plan Development and Execution (NMED/SWQB 2019). The Plan describes project objectives and decision criteria, and it includes the sampling schedule with locations, constituents, and frequencies

for physical, chemical, and biological data collection. Through public outreach, inter-agency coordination, and a scoring system which considers a variety of factors, a three-tier monitoring system – primary, secondary, and tertiary – was developed to prioritize AUs. High ranking priority waters (primary AUs) received the greatest amount of monitoring, whereas low ranking waters (*i.e.*, tertiary AUs) received the least. The two-year monitoring allows more data to be collected from the highest priority waters to better capture inter-annual variability due to hydrologic conditions during sampling events, and year-2 monitoring may be adjusted dependent on year-1 analytical results.

Assessment of surface waters against the WQS occurs after monitoring data have been verified and validated, using the most recent assessment protocols. Assessment protocols are updated every odd year (e.g., 2023) and are opened for EPA and public review and comment. Waterbodies determined to be impaired are reported as such every even year (e.g., 2024, 2026) on New Mexico's IR List. TMDLs or TMDL alternatives are typically developed for impaired AUs.

Table 2. Impairment and TMDL Status of Survey Assessment Units

Assessment Unit Name	WQS Reference	IR Category	Impairments	TMDL Completed
Berrendo Creek (Rio Hondo to headwaters)	20.6.4.206	3/3A		
Black River (Perennial prt Blue Spring to Double Canyon)	20.6.4.202	2		
Black River (Perennial prt Pecos River to Blue Spring)	20.6.4.202	2		
Blue Spring (Black River to headwaters)	20.6.4.202	2		
Brantley Reservoir	20.6.4.205	5	Fish Consumption Advisory - DDE, DDT|Mercury - Fish Consumption Advisory	
Delaware River (Pecos River to TX border)	20.6.4.202	2		
Figure Eight Lake	20.6.4.99	5	Nutrients	
Jal Lake	20.6.4.99	3/3A		
Lake Van	20.6.4.99	5	Temperature	
Lea Lake	20.6.4.227	1		
Lower Tansil Lake/Lake Carlsbad (Carlsbad Municipal Lake)	20.6.4.218	5	Fish Consumption Advisory - DDE, DDT|PCBs - Fish Consumption Advisory	
North Spring River (Rio Hondo to headwaters)	20.6.4.206	2		
Pecos River (Avalon Reservoir to Brantley Reservoir)	20.6.4.204	5/5C	DDT - Fish Consumption Advisory|Mercury - Fish Consumption Advisory	
Pecos River (Black River to Six Mile Dam)	20.6.4.202	5/5A	DDT - Fish Consumption Advisory|E. *coli*|PCBs - Fish Consumption Advisory	E. *coli*
Pecos River (Brantley Reservoir to Rio Penasco)	20.6.4.206	1		

Assessment Unit Name	WQS Reference	IR Category	Impairments	TMDL Completed
Pecos River (Crockett Draw to Yeso Creek)	20.6.4.207	1		
Pecos River (Eagle Creek to Rio Felix)	20.6.4.206	5/5A	Temperature	
Pecos River (Lake Carlsbad to Avalon Reservoir)	20.6.4.203	4C	Flow Regime Modification	
Pecos River (Rio Felix to Rio Hondo)	20.6.4.206	5/5A	Temperature	
Pecos River (Rio Hondo to Salt Creek)	20.6.4.206	1		
Pecos River (Rio Penasco to Eagle Creek)	20.6.4.206	1		
Pecos River (Salt Creek to Crockett Draw)	20.6.4.207	5/5A	Temperature	
Pecos River (Six Mile Dam to Lower Tansil Lake)	20.6.4.202	5/5C	DDT - Fish Consumption Advisory|PCBs - Fish Consumption Advisory	
Pecos River (Truchas Creek to Sumner Reservoir)	20.6.4.207	1		
Pecos River (TX border to Black River)	20.6.4.201	5/5C	DDT - Fish Consumption Advisory|Dissolved oxygen|E. *coli*|PCBs - Fish Consumption Advisory	E. *coli*
Pecos River (Yeso Creek to Truchas Creek)	20.6.4.207	1		
Rio Hondo (Perennial prt Pecos R to HWY 285)	20.6.4.206	1		
Sitting Bull Creek (Last Chance Canyon to Sitting Bull Spr)	20.6.4.99	2		

2.2 Objectives

Table 3 outlines the project objectives identified to meet the various SWQB needs. Data needs have been determined based on core parameters needed to complete assessments, impairments from previous studies, identified data gaps, and consultation with the SWQB MASS, PSRS, and WPS staff as well as other state agencies, federal agencies, tribes, local watershed groups, and interested parties.

Table 3. Project Objectives

Purpose for Water Quality Data Collection	Question to be answered	Decision Criteria	Products/ Outcomes
Assess designated use attainment for the *Integrated Report* and provide information to the public on the condition of surface waters	Are sampled waterbodies meeting WQS criteria?	WQS criteria interpreted through the CALM	Integrated Report
Develop load and waste load allocations for TMDLs	What is the maximum pollutant load a waterbody can receive and meet the requirements of the WQS?	WQS criteria and critical flow volume	TMDL loading calculations and NPDES permit limits
Evaluate restoration and mitigation measures implemented to control NPS pollution	Have watershed restoration activities and mitigation measures improved water quality?	WQS criteria and historic data	Project Summary Reports, NPS Annual Report, *Integrated Report (De-Listing)*
Develop or refine the WQS	Are the existing uses appropriate for the waterbody?	Data sufficient to support a petition to the WQCC to revise WQS	Use Attainability Analyses (UAA); Site Specific Criteria; Amendments to WQS
Obtain data for ambient/baseline water quality upstream of NPDES outfall	What is the water quality above the NPDES outfall?	Survey chemical, physical and biological data	NPDES Permits / Certifications

2.3 Schedule

As part of the survey planning process, the NMED SWQB held a 30-day public comment period to solicit input on any areas of concern within the AUs surveyed and to inform interested parties about the SWQB water quality survey process, the specific sampling plans in the watershed, and the assessment and TMDL processes.

The NMED SWQB documented the progress of this project and tracked it from inception through implementation to ensure all sampling and analytical activities were performed in accordance with all applicable requirements and in a cost-effective manner. **Table 4** provides the project timeline.

Water chemistry results typically take several months to return from the analytical laboratory, the New Mexico Scientific Laboratory Division (SLD). The NMED SWQB has incorporated the lag time to receive results into the schedule. When sample results are received, they undergo verification and validation according to SWQB SOPs. The final step of the project is the publication of a survey report on the SWQB

website that summarizes the data collection effort and documents changes to the original and revised FSP. The final survey report will be made available at: https://www.env.nm.gov/surface-water-quality/water-quality-monitoring/.

Following project completion, the data will be assessed for the 2024-2026 IR List. Once the assessments are complete, the TMDL development process will begin for any identified impairments.

Table 4. Project Schedule

Activity	Winter 2020-2021	Spring 2021	Summer 2021	Fall 2021	Winter 2021-2022	Spring 2022	Summer 2022	Fall 2022	Winter 2022-2023	Spring 2023	Summer /Fall 2023
Survey Planning, Site Reconnaissance, and Public Input Period	==========▶										
Data Collection & Submittal of WQ Samples to SLD		==========▶				==========▶					
Data Verification & Validation Procedures, Assessment of data		==========▶									
Publication of Survey Report									==========▶		

2.4 Project Location

The project area includes the Lower Pecos River watershed and the Southern High Plains watershed. The Lower Pecos River sampling area includes the Pecos River and tributaries from below Sumner Reservoir to the Texas border. **Table 5.** shows a complete list of stations illustrated in **Figure 2.**

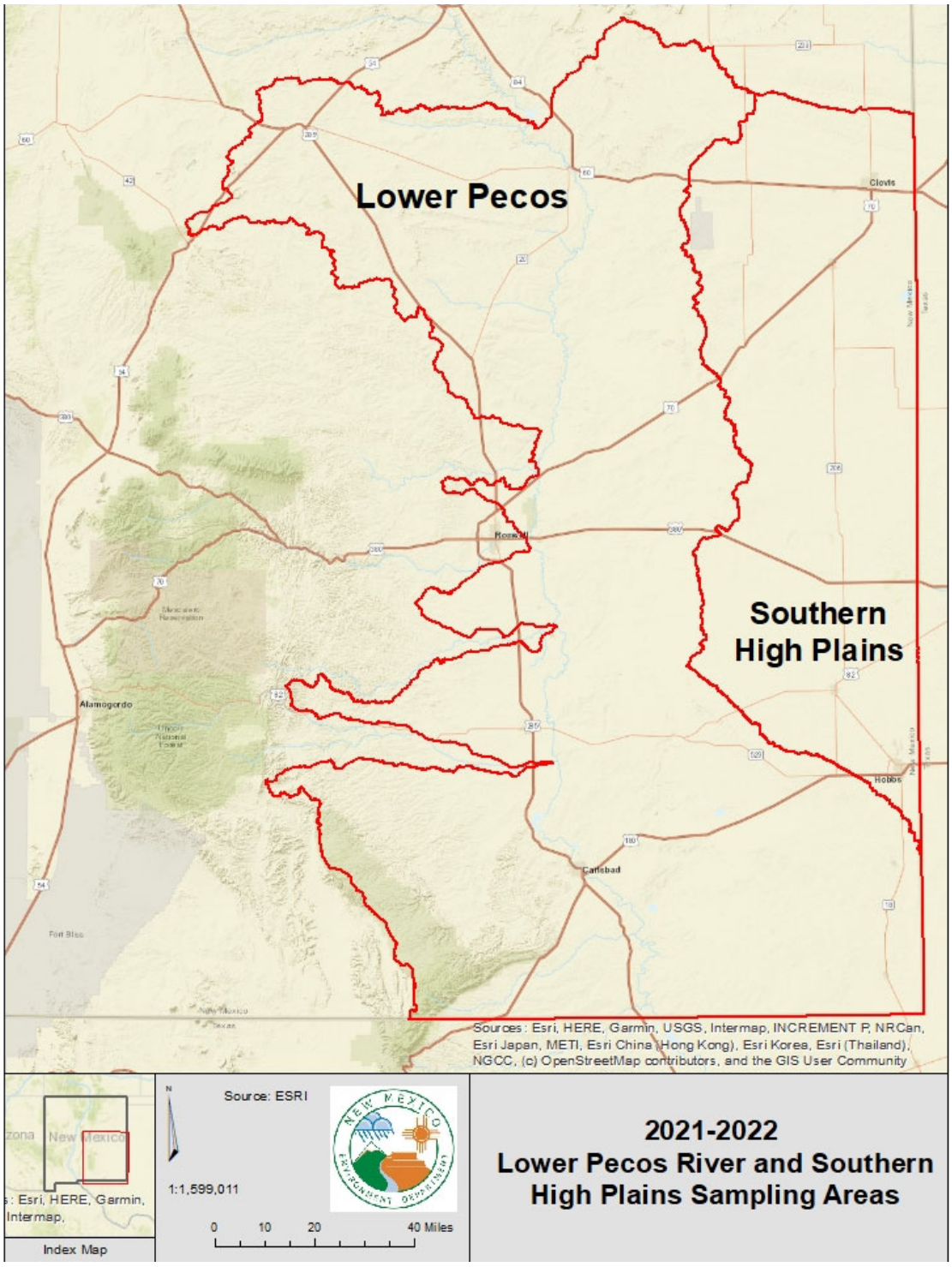

Figure 1. 2021-2022 Survey Area

Table 5. Water Quality Stations

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
1	Berrendo Creek at N Red Bridge Road - 57Berrendo001.7	57Berrendo001.7	Berrendo Creek (Rio Hondo to headwaters	Bottom of AU
2	Black River above Blue Spring- 60BlackR027.6	60BlackR027.6	Black River (Perennial prt Blue Spring to Double Canyon)	Bottom of AU
3	Black River blw RR Xing - 60BlackR002.8	60BlackR002.8	Black River (Perennial prt Pecos River to Blue Spring)	Bottom of AU
4	Blue Springs @ Bounds Property - 60BlueSp000.1	60BlueSP000.1	Blue Spring (Black River to headwaters)	Bottom of AU
5	BRANTLEY RESERVOIR DEEP NEAR DAM - 60BrantleyDam	60BrantleyDam	Brantley Reservoir	Fish Consumption Advisory - DDE, DDT|PCBs - Fish Consumption Advisory
6	BRANTLEY RESERVOIR SHALLOW - 60BrantleySha	60BrantleySha	Brantley Reservoir	Lake shallow station
7	Brantley Reservoir Shallow @ 7 Rivers- 60BrantleySha7Riv	60BrantleySha7Riv	Brantley Reservoir	Lake shallow station
8	DELAWARE RIVER AT HIGHWAY 285 BRIDGE - 62Delawa006.0	62Delawa006.0	Delaware River (Pecos River to TX border)	Bottom of AU
9	Figure Eight Lake (sink hole) - 56FigEightLkD	56FigEightLkD	Figure Eight Lake	Nutrient Impairment
10	Jal Lake - 99JalLakeDeep	99JalLake Deep	Jal Lake	Fish kill occurred in 2020 which also resulted in duck mortalities
11	Lake Carlsbad deep station (near railroad bridge) - 60LCarlsbdDpRR	60LCarlsbdDpRR	Lower Tansil Lake/Lake Carlsbad (Carlsbad Municipal Lake)	Fish Consumption Advisory - DDE, DDT|PCBs - Fish Consumption Advisory
12	Lake Van - 56LakeVanDeep	56LakeVanDeep	Lake Van	Temperature impairment
13	LEA LAKE DEEP 1/3 LAKELENGTH FROM VIS. CENTER.	56LeaLakeDeep	Lea Lake	High recreation area
14	Lea Lake overflow abv NM409	56LeaLakeOve	Lea Lake	Lea lake outfall
15	North Spring River at Loveless Park - 57NSprin002.0	57NSprin002.0	North Spring River (Rio Hondo to headwaters)	Bottom of AU
16	Pecos R abv Lake Carlsbad 60PecosR099.8	60PecosR099.8	Pecos River (Lake Carlsbad to Avalon Reservoir)	Bottom of AU
17	PECOS R AT TATUM BR NR ROSWELL, NMEX - 56PecosR273.0	56PecosR273.0	Pecos River (Rio Hondo to Salt Creek)	Bottom of AU
18	Pecos R blw Cottonwood Creek 56PecosR177.0	56PecosR177.0	Pecos River (Eagle Creek to Rio Felix)	Above WWTP
19	Pecos River @ Wichita Rd. near Dexter - 56PecosR239.9	56PecosR239.9	Pecos River (Rio Felix to Rio Hondo)	AU impaired for temperature| Bottom of AU
20	Pecos River above Black River - 60PecosR056.1	60PecosR056.1	Pecos River (Black River to Six Mile Dam)	AU impaired for E. *coli*| DDT and PCBs (fish consumption advisory) | Bottom of AU

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
21	Pecos River above Fort Sumner WWTP outfall - 52PecosR447.8	52PecosR447.8	Pecos River (Yeso Creek to Truchas Creek)	Above WWTP
22	Pecos River above Rio Penasco - 56PecosR160.2	56PecosR160.2	Pecos River (Rio Penasco to Eagle Creek)	Bottom of AU
23	Pecos River abv Brantley Reservoir near Lakewood - 60PecosR138.4	60PecosR138.4	Pecos River (Brantley Reservoir to Rio Penasco)	Bottom of AU| Lake Inlet
24	Pecos River at pipeline upstream of Salt Creek – 52PecosR311.7	52PecosR311.7	Pecos River (Salt Creek to Crockett Draw)	AU is listed as impaired for temperature| Bottom of AU
25	PECOS RIVER AT FORT SUMNER, U.S. 60 BRIDGE - 52PecosR453.4	52PecosR453.4	Pecos River (Truchas Creek to Sumner Reservoir)	Bottom of AU
26	PECOS RIVER AT GRAVEL PIT DOWNSTREAM FROM WWTF - 52PecosR445.5	52PecosR445.5	Pecos River (Yeso Creek to Truchas Creek)	Below WWTP
27	PECOS RIVER AT PIERCE CANYON CROSSING, NM - 60PecosR033.2	60PecosR033.2	Pecos River (TX border to Black River)	PSRS Request
28	Pecos River at north end of Huey Waterfowl Mgmt Area – 56PecosR179.1	56PecosR179.1	Pecos River (Eagle Creek to Rio Felix)	Thermograph Location
29	PECOS RIVER AT U.S. 82 BRIDGE NEAR ARTESIA - 56PecosR169.0	56PecosR169.0	Pecos River (Rio Penasco to Eagle Creek)	AU impaired for temperature| Bottom of AU
30	Pecos River below 6 Mile Dam	60PecosR085.0	Pecos River (Black River to Six Mile Dam)	Bottom of AU
31	Pecos River above Taiban Creek – 52PecosR434.0	52PecosR434.0	Pecos River (Yeso Creek to Truchas Creek)	Bottom of AU
32	PECOS RIVER BELOW BRANTLEY DAM AT THE USGS GAGE - 60PecosR123.1	60PecosR123.1	Pecos River (Black River to Six Mile Dam)	Below WWTP| Bottom of AU
33	PECOS RIVER BELOW LOWER TANSIL DAM - 60PecosR093.2	60PecosR093.2	Pecos River (Six Mile Dam to Lower Tansil Lake)	Lake Outlet. Above WWTP.
34	Pecos River below Six Mile Draw - 52PecosR343.0	52PecosR343.0	Pecos River (Crockett Draw to Yeso Creek)	Bottom of AU.
35	Pecos River near Red Bluff at County Road 725 - 60PecosR011.6	60PecosR011.6	Pecos River (TX border to Black River)	AU impaired for E. *coli*, dissolved oxygen, DDT and PCBS (fish consumption advisory) | Bottom of AU
36	Rio Hondo abv Roswell WWTP - 57RHondo011.5	57RHondo011.5	Rio Hondo (Perennial prt Pecos R to HWY 285)	Bottom of AU
37	Rio Hondo at Roswell blw effluent discharge at gage 08393610 - 57RHondo010.6	57RHondo010.6	Rio Hondo (Perennial prt Pecos R to HWY 285)	Below WWTP
38	Rio Hondo at US 380 Bridge - 57RHondo004.3	57RHondo004.3	Rio Hondo (Perennial prt Pecos R to HWY 285)	Above WWTP
39	Roswell WWTP effluent - NM0020311	NM0020311	Rio Hondo (Perennial prt Pecos R to HWY 285)	WWTP

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
40	Sitting Bull Creek below recreation area - 60Sittin000.8	60Sittin000.8	Sitting Bull Creek (Last Chance Canyon to Sitting Bull Spr)	Bottom of AU

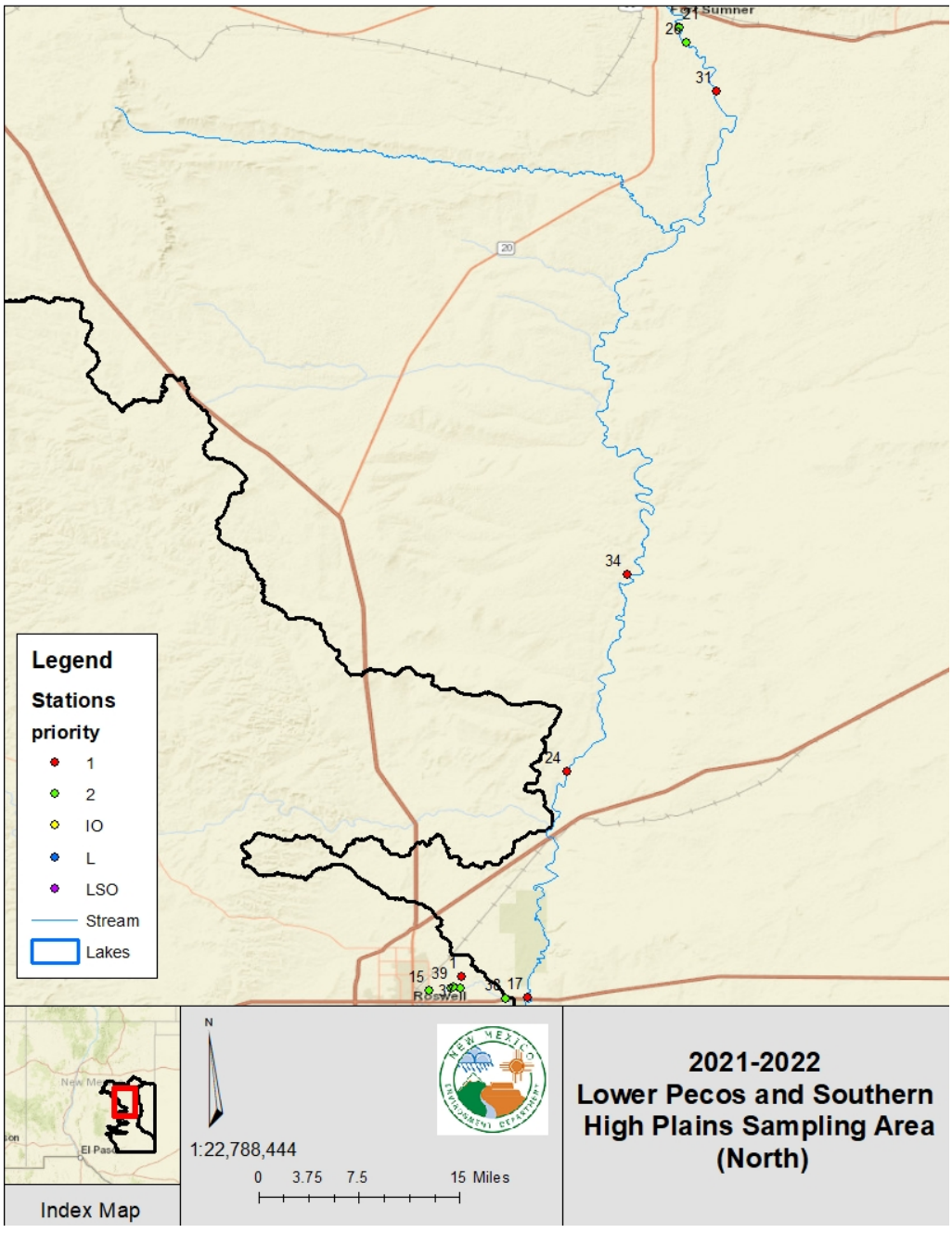

Figure 2. Sampling area and monitoring locations: North

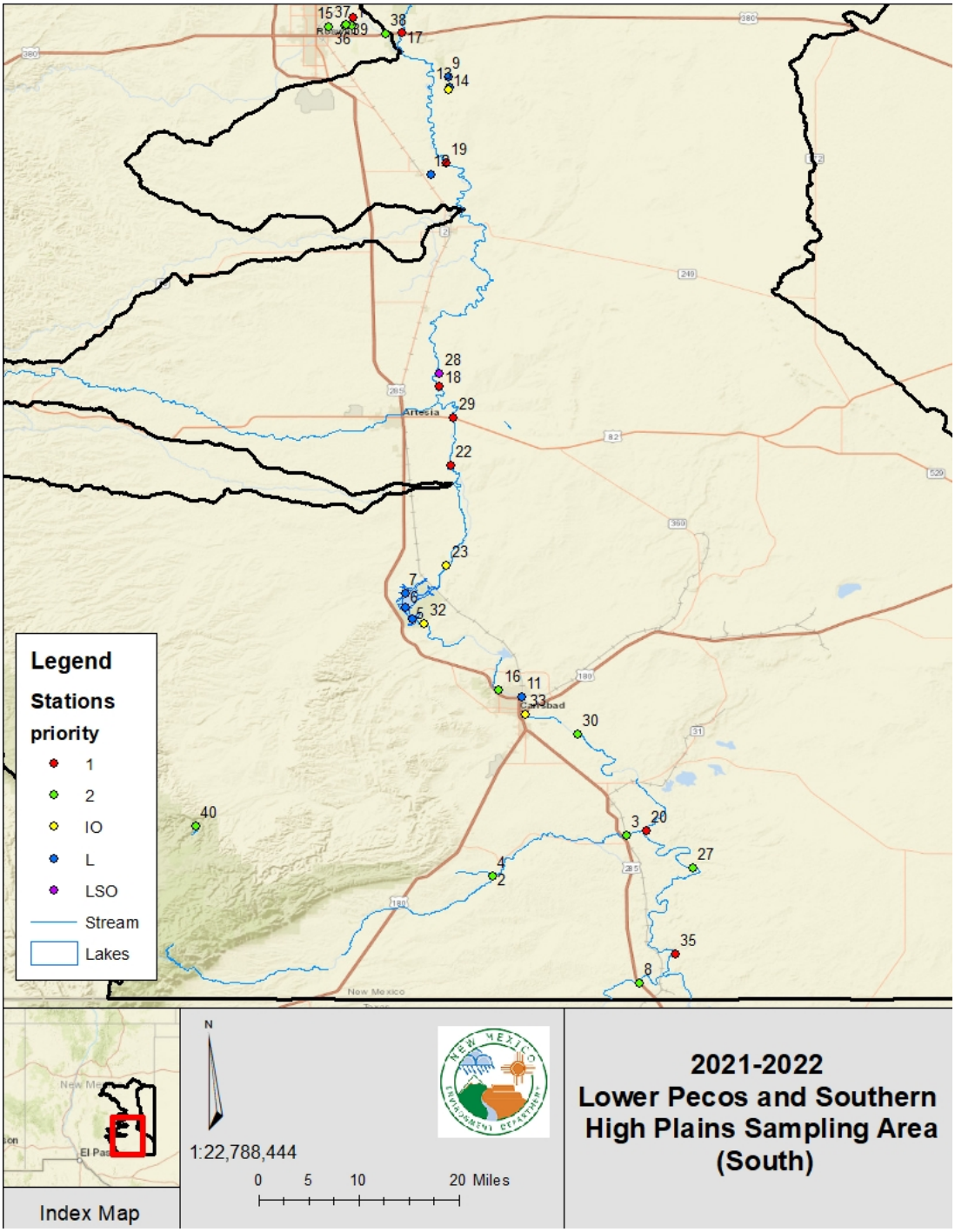

Figure 3. Sampling area and monitoring locations: South

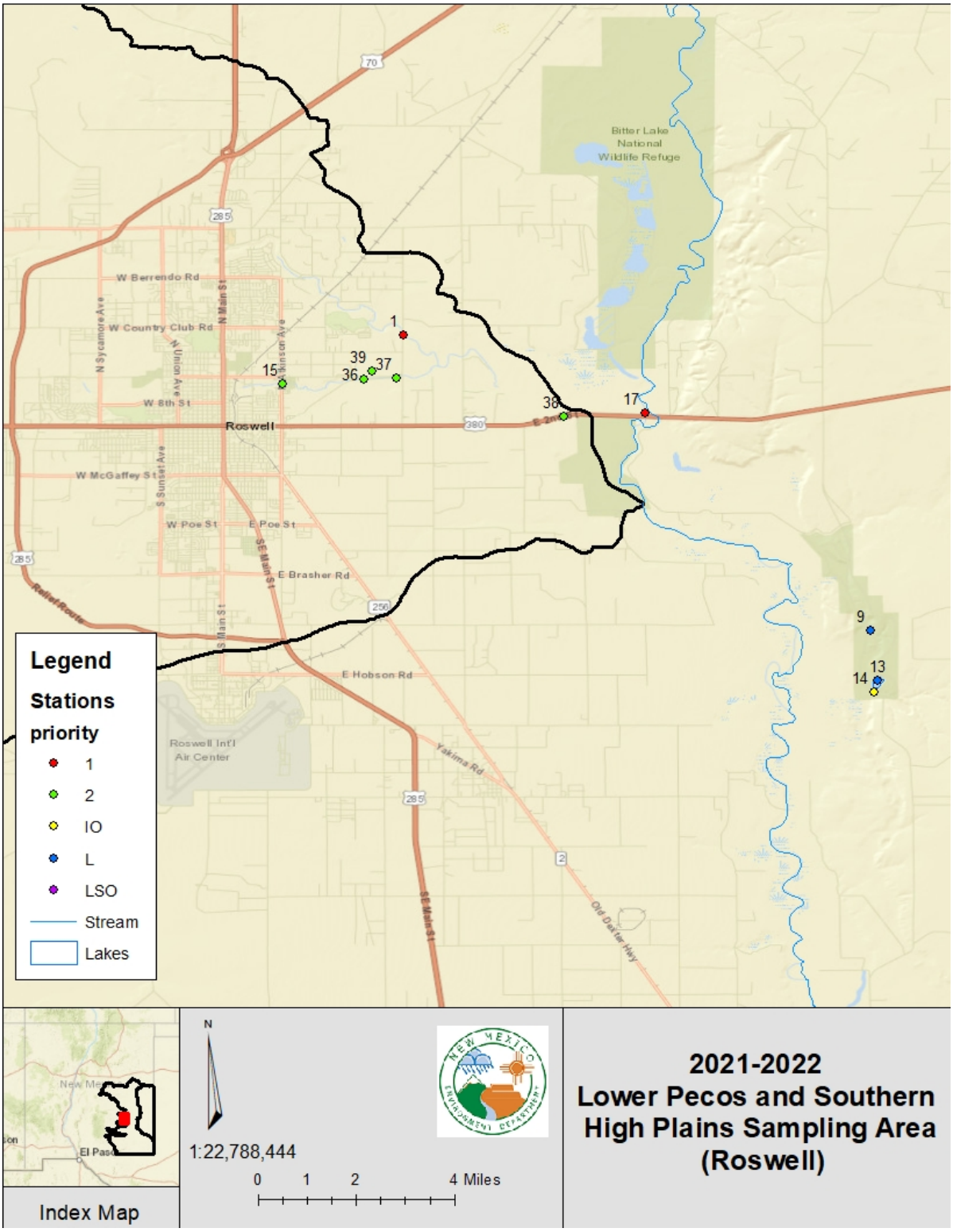

Figure 4. Sampling area and monitoring locations: Roswell Area

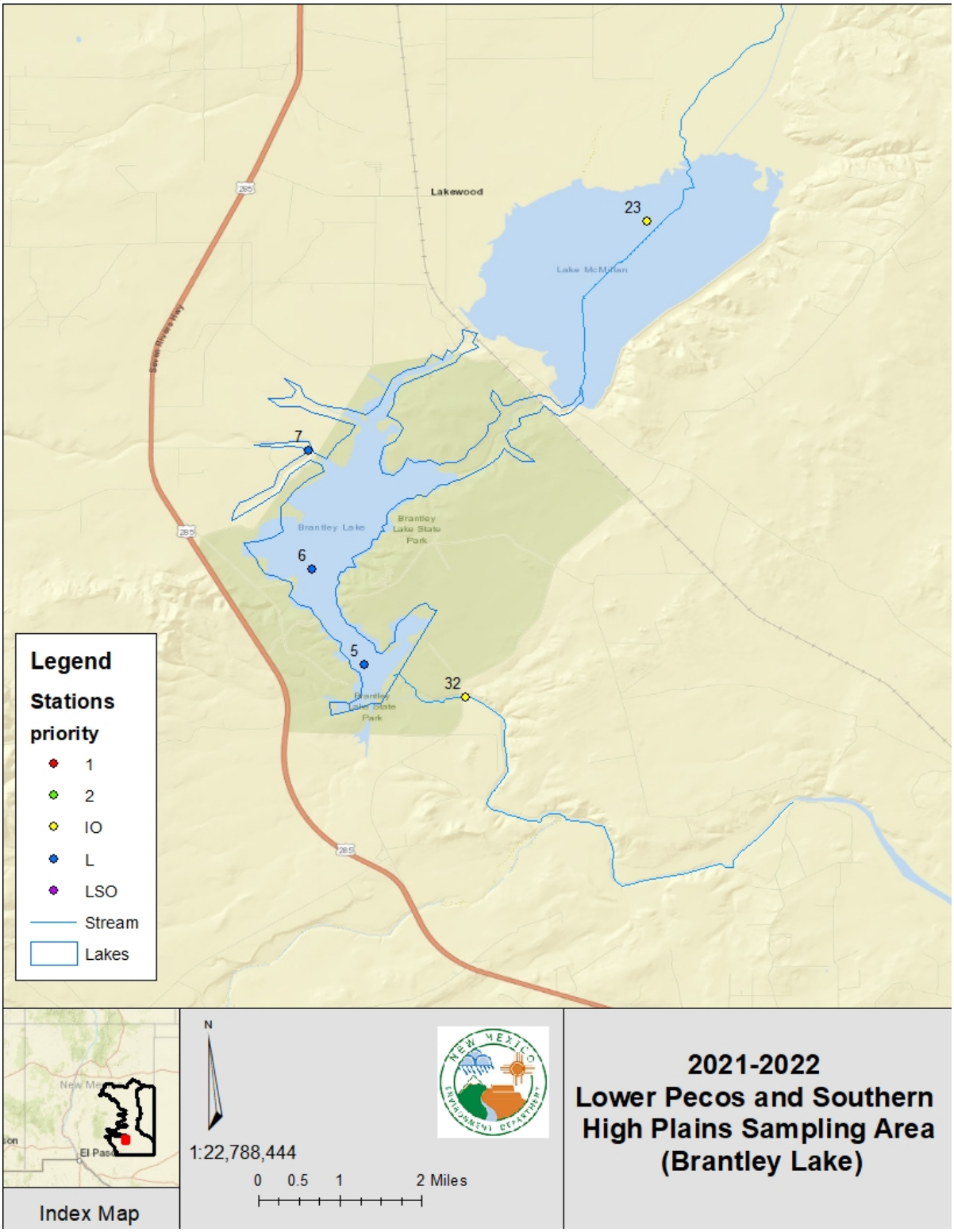

Figure 5. Sampling area and monitoring locations: Brantley Lake

3.0 DOCUMENTATION

Project documents include the field sampling plan, probable source sheets, calibration records, field sheets (including sonde and thermograph deployment/retrieval sheets), electronic data logger downloads, data validation and verification records, sample collection data, lab submittal forms, and records of analytical data in hard copy or in electronic form. Documents are maintained in accordance with the requirements of the SWQB Quality Assurance Project Plan (QAPP; NMED/SWQB 2021).

Project documentation will include narrative descriptions of progress throughout the life of the project relating to planning and implementation efforts, including deviations from the original plan and issues that arise along with any associated corrective actions.

Project activities will be documented in SWQB Monitoring Field Sheets. Information from field sheets is entered in the SWQB database or maintained in the Project Coordinator's survey files at the conclusion of the project. Analytical results are electronically transferred into the Bureau's database and eventually moved to US EPA'S Water Quality Exchange database. The project is completed with the finalization of this Survey Report.

4.0 SAMPLING PLAN

4.1 Methods

All data were collected in accordance with procedures documented in the SWQB QAPP (NMED/SWQB 2021) and the applicable SWQB Standard Operating Procedures for Data Collection available at https://www.env.nm.gov/surface-water-quality/protocols-and-planning/. Water quality samples were submitted to the SLD or processed in the SWQB laboratory in accordance with procedures as outlined in the SWQB SOPs.

4.2 Chemistry Sampling

For the survey, one chemical sampling station was planned near the lower end of each AU, access permitting, and at actively discharging NPDES permit locations in the watershed. Additional stations were located to document the conditions downstream of potential pollution sources and where AU or water quality standards revisions are recommended. Stations from previous surveys were used whenever possible to evaluate trends. Water samples for chemical analyses were submitted to the New Mexico Scientific Laboratory Division (SLD). E. coli samples were processed in the SWQB laboratory or with mobile equipment. **Table 6** outlines the water quality analytes measured and the sampling conducted for each analyte during the two-year survey. In addition to the analytes listed, field parameters (temperature, specific conductance, salinity, dissolved oxygen concentration, dissolved oxygen saturation, pH, and turbidity) were measured at each site using a multi-parameter sonde.

Table 6. Water Chemistry Sampling Frequency

Map #	Station Name	PRIORITY[1]	TDS/TSS/SO4-/Cl-		Nutrients[2]		Dissolved Organic Carbon (DOC)		Total Metals[3]		Dissolved Metals[4]		E. *coli*		Volatile Organics		Semi-Volatile Organics[5]		Radionuclides[6]		Microbial Source Tracking	
Planned/ Completed			P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C
1	Berrendo Creek at N Red Bridge Road - 57Berrendo001.7	1	8	6	8	6	3	4	6	6	6	6	8	6								
2	Black River above Blue Spring- 60BlackR027.6	2	4	3	4	3	2	1	4	3	4	3	4	3								
3	Black River blw RR Xing - 60BlackR002.8	2	6	5	6	5	2	2	4	4	4	4	6	5								
4	Blue Springs @ Bounds Property - 60BlueSp000.1	2	6	4	6	4	2	2	4	4	4	4	6	4								
5	BRANTLEY RESERVOIR DEEP NEAR DAM - 60BrantleyDam	L	4	2	4	2	1	1	2	2	2	2	4	2	2	1	2	1	2	1		
6	BRANTLEY RESERVOIR SHALLOW - 60BrantleySha	L	4	2	4	2	1	1	2	2	2	2	4	2								
7	Brantley Reservoir Shallow @ 7 Rivers - 60BrantleySha7Riv	L		1		1				1		1		1		1		1		1		
8	DELAWARE RIVER AT HIGHWAY 285 BRIDGE - 62Delawa006.0	2	6	5	6	5	2	2	2	4	2	4	6	5							2	2
9	Figure Eight Lake (sink hole) - 56FigEightLkD	L	4	3	4	3	1	1	2	2	2	2	4	3	2	1	2	1	2	1		
10	Jal Lake - 99JalLakeDeep	L	4	3	4	3	1	1	2	2	2	2	4	3	2	1	2	1	2	1		

Map #	Station Name	PRIORITY[1]	TDS/TSS/SO4-/Cl-		Nutrients[2]		Dissolved Organic Carbon (DOC)		Total Metals[3]		Dissolved Metals[4]		*E. coli*		Volatile Organics		Semi-Volatile Organics[5]		Radionuclides[6]		Microbial Source Tracking	
11	Lake Carlsbad deep station (near railroad bridge) - 60LCarlsbdDpRR	L	4	2	4	2	1	1	2	2	2	2	4	2	2	1	2	1	2	1		
12	Lake Van - 56LakeVanDeep	L	4	2	4	2	1	1	2	2	2	2	4	2	2	1	2	1	2	1		
13	LEA LAKE DEEP 1/3 LAKELENGTH FROM VIS. CENTER.	L	4	3	4	3	1	1	2	2	2	2	4	3	2	1	2	1	2	1		
14	Lea Lake overflow abv NM409	2/IO	4	3	4	3	1	1	4	3	4	3	4	3		1		1		1		
15	North Spring River at Loveless Park - 57NSprin002.0	2	6	6	6	6	2	3	4	4	4	4	6	6								
16	Pecos R abv Lake Carlsbad 60PecosR099.8	2	4		4		2		4		4		4		2		2		2			
17	PECOS R AT TATUM BR NR ROSWELL, NMEX - 56PecosR273.0	1	8	8	8	8	3	3	6	6	6	6	8	8								
18	Pecos R blw Cottonwood Creek 56PecosR177.0	1	8	8	8	8	3	3	6	6	6	6	8	8	2	3	2	3	2	4		
19	Pecos River @ Wichita Rd. near Dexter - 56PecosR239.9	1	8	8	8	8	3	3	6	6	6	6	8	8							2	2
20	Pecos River above Black River - 60PecosR056.1	1	8	7	8	7	3	3	6	6	6	6	8	7	4	3	4	3	4	3		
21	Pecos River above Fort Sumner WWTP outfall - 52PecosR447.8	2	4	4	4	4	2	2	4	4	4	4	4	4	2	2	2	2	2	2		

Map #	Station Name	PRIORITY[1]	TDS/TSS/SO4-/Cl-		Nutrients[2]		Dissolved Organic Carbon (DOC)		Total Metals[3]		Dissolved Metals[4]		*E. coli*		Volatile Organics		Semi-Volatile Organics[5]		Radionuclides[6]		Microbial Source Tracking	
22	Pecos River above Rio Penasco - 56PecosR160.2	1	8	8	8	8	3	3	6	6	6	6	8	8	4	4	4	4	4	4		
23	Pecos River abv Brantley Reservoir near Lakewood - 60PecosR138.4	1/IO	8	5	8	5	3	2	6	4	6	5	8	5	4	3	4	3	4	3		
24	Pecos River at pipeline upstream of Salt Creek - 52PecosR311.7	1	8	7	8	7	3	3	6	6	6	6	8	7								
25	PECOS RIVER AT FORT SUMNER, U.S. 60 BRIDGE - 52PecosR453.4	1	8	7	8	7	3	3	6	6	6	6	8	7							2	2
26	PECOS RIVER AT GRAVEL PIT DOWNSTREAM FROM WWTF - 52PecosR445.5	2	4	2	4	3	2	1	4	3	4	3	4	3	2	2	2	2	2	2		
27	PECOS RIVER AT PIERCE CANYON CROSSING, NM - 60PecosR033.2	2	4	3	4	3	2	1	4	3	4	3	4	3	2	2	2	2	2	2		
28	Pecos River at north end of Huey Waterfowl Mgmt Area - 56PecosR179.1	LSO																				
29	PECOS RIVER AT U.S. 82 BRIDGE NEAR ARTESIA - 56PecosR169.0	1	8	7	8	7	3	3	6	6	6	6	8	7	2	3	2	3	2	4		
30	Pecos River below 6 mile dam	1	8	3	8	3	3	3	6	3	6	3	8	3	4	3	4	3	4	3		

Map #	Station Name	PRIORITY[1]	TDS/TSS/SO4-/Cl-		Nutrients[2]		Dissolved Organic Carbon (DOC)		Total Metals[3]		Dissolved Metals[4]		*E. coli*		Volatile Organics		Semi-Volatile Organics[5]		Radionuclides[6]		Microbial Source Tracking	
31	Pecos River above Taiban Creek - 52PecosR434.0	1	8	3	8	3	3	2	6	3	6	3	8	3								
32	PECOS RIVER BELOW BRANTLEY DAM AT THE USGS GAGE - 60PecosR123.1	1/IO	8	6	8	6	3	3	6	6	6	6	8	6	4	4	4	4	4	4		
33	PECOS RIVER BELOW LOWER TANSIL DAM - 60PecosR093.2	2/IO	4	4	4	4	2	3	4	4	4	4	4	4	2	3	2	3	2	3		
34	Pecos River below Six Mile Draw - 52PecosR343.0	1	8	7	8	7	3	3	6	6	6	6	8	7								
35	Pecos River near Red Bluff at County Road 725 - 60PecosR011.6	1	8	7	8	7	3	3	6	6*	6	6	8	7	4	3	4	3	4	3		
36	Rio Hondo abv Roswell WWTP - 57RHondo011.5	2	4	2	4	2	2		4	2	4	2	4	2	2	2	2	2	2	2		
37	Rio Hondo at Roswell blw effluent discharge at gage 08393610 - 57RHondo010.6	2	4	1	4	1	2		4	1	4	1	4	1	2	1	2	1	2	1		
38	Rio Hondo at US 380 Bridge - 57RHondo004.3	2	4	5	4	5	2	3	4	4	4	4	4	5								
39	Roswell WWTP effluent - NM0020311	2		1		1				1		1		1								
40	Sitting Bull Creek below recreation	2	4	3	4	3	2	1	4	3	4	3	4	3								

Map #	Station Name	PRIORITY[1]	TDS/TSS/SO4-/Cl-		Nutrients[2]		Dissolved Organic Carbon (DOC)		Total Metals[3]		Dissolved Metals[4]		E. *coli*		Volatile Organics		Semi-Volatile Organics[5]		Radionuclides[6]		Microbial Source Tracking	
	area - 60Sittin000.8																					
	Sampling Totals		216	166	216	167	81	73	162	###	162	145	216	167	54	46	54	46	54	48	6	6
	Percent Completed		76.9		77.3		90.1		88.9		89.5		77.3		85.2		85.2		88.9		100	

* Does not have mercury/selenium for one sample

[1]Priority rankings: 1 are highest priorities, and 2 the lowest. "L" are lake stations; "IO" are lake inlets or outlets.

[2]Suite includes total Kjeldahl nitrogen, nitrate+nitrite, ammonia and total phosphorus. QC blanks are collected with the "Nutrients (low P)" suite.

[3] Suite includes aluminum, mercury, selenium

[4]Suite includes aluminum, antimony, arsenic, barium, boron, beryllium, calcium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, mercury, magnesium, nickel, selenium, silicon, silver, thallium, tin, uranium, vanadium and zinc.

[5]A complete list of analytes are listed in Appendix B.

[6]A radionuclide sample will include gross alpha and gross beta. If alpha and/or beta particles are detected, Uranium mass and Radium 226 + 228 will also be analyzed.

4.3 Long-term Dataset, Biological, and Physical Habitat Sampling

Temperature data loggers (thermographs) were deployed at strategic locations within the study area to record maximum and maximum-duration temperature data. Multi-parameter data loggers (sondes) and DO loggers were deployed at stations in selected assessment units primarily to examine diel fluxes in pH, conductivity, or dissolved oxygen (DO) and to record turbidity data for assessment against maximum-duration thresholds. Thermographs sondes, and loggers were programmed to record at 15-minute intervals. Thermographs were deployed season long (approximately May to October). Sondes and DO loggers deployed for a minimum of 14 days. Chlorophyll and phytoplankton data were collected at lake stations for nutrient assessments. Flow was collected for assessment and TMDL calculations. Physical habitat data includes stream morphology, pebble counts, canopy cover, large woody debris, and flow. **Table 7** summarizes the long-term, biological, and physical habitat sampling conducted during the survey.

Table 7. Summary of Long-Term Deployment, Biological and Physical Habitat Sampling

Map #	Station Name	Priority	DO logger		Thermograph		Flow		Physical Habitat		Chlorophyll & Phytoplankton		Microsystins		Fish	
Planned/Completed			P	C	P	C	P	C	P	C	P	C	P	C	P	C
1	Berrendo Creek at N Red Bridge Road - 57Berrendo001.7	1	1	1			4	6								
2	Black River above Blue Spring- 60BlackR027.6	2					4	3								
3	Black River blw RR Xing - 60BlackR002.8	2	1	1			4	5								
4	Blue Springs @ Bounds Property - 60BlueSp000.1	2	1	1			4	4								
5	BRANTLEY RESERVOIR DEEP NEAR DAM - 60BrantleyDam	L									2	2	1			
6	BRANTLEY RESERVOIR SHALLOW - 60BrantleySha	L									2	2	1			
7	Brantley Reservoir Shallow @ 7 Rivers - 60BrantleySha7Riv	L									1	1	1			
8	DELAWARE RIVER AT HIGHWAY 285 BRIDGE - 62Delawa006.0	2	1	1			4	6								
9	Figure Eight Lake (sink hole) - 56FigEightLkD	L									2	3	1	1		
10	Jal Lake - 99JalLakeDeep	L									2	3	1	1		
11	Lake Carlsbad deep station (near railroad bridge) - 60LCarlsbdDpRR	L									2	2	1		1	1
12	Lake Van - 56LakeVanDeep	L									2	2	1			
13	LEA LAKE DEEP 1/3 LAKELENGTH FROM VIS. CENTER.	L									2	3	1	1		
14	Lea Lake overflow abv NM409	2/IO					4	3								
15	North Spring River at Loveless Park - 57NSprin002.0	2					4	6								
16	Pecos R abv Lake Carlsbad 60PecosR099.8	2					4	3								
17	PECOS R AT TATUM BR NR ROSWELL, NMEX - 56PecosR273.0	1					8	8								
18	Pecos R blw Cottonwood Creek 56PecosR177.0	1			1		8	8	1							
19	Pecos River @ Wichita Rd. near Dexter - 56PecosR239.9	1			1	1	8	8	1							
20	Pecos River above Black River - 60PecosR056.1	1					8	8								
21	Pecos River above Fort Sumner WWTP outfall - 52PecosR447.8	2					4	4								
22	Pecos River above Rio Penasco - 56PecosR160.2	1					8	8								
23	Pecos River abv Brantley Reservoir near Lakewood - 60PecosR138.4	1/IO					8	5								

Map #	Station Name	Priority	DO logger		Thermograph		Flow		Physical Habitat		Chlorophyll & Phytoplankton		Microsystins		Fish	
24	Pecos River at pipeline upstream of Salt Creek - 52PecosR311.7	1			1		8	7								
25	PECOS RIVER AT FORT SUMNER, U.S. 60 BRIDGE - 52PecosR453.4	1					8	7								
26	PECOS RIVER AT GRAVEL PIT DOWNSTREAM FROM WWTF - 52PecosR445.5	2					4	3								
27	PECOS RIVER AT PIERCE CANYON CROSSING, NM - 60PecosR033.2	2					4	3								
28	Pecos River at north end of Huey Waterfowl Mgmt Area-56PecosR179.1					1										
29	PECOS RIVER AT U.S. 82 BRIDGE NEAR ARTESIA - 56PecosR169.0	1					8	7								
30	Pecos River below 6 mile dam							3								
31	Pecos River above Taiban Creek - 52PecosR434.0	1					8	3								
32	PECOS RIVER BELOW BRANTLEY DAM AT THE USGS GAGE - 60PecosR123.1	1/IO					8	6								
33	PECOS RIVER BELOW LOWER TANSIL DAM - 60PecosR093.2	2/IO					4	4								
34	Pecos River below Six Mile Draw - 52PecosR343.0	1					8	7								
35	Pecos River near Red Bluff at County Road 725 - 60PecosR011.6	1	1	1			8	7								
36	Rio Hondo abv Roswell WWTP - 57RHondo011.5	2					4	2								
37	Rio Hondo at Roswell blw effluent discharge at gage 08393610 - 57RHondo010.6	2					4	1								
38	Rio Hondo at US 380 Bridge - 57RHondo004.3	2	1	1			4	2								
39	Roswell WWTP effluent-NM0020311	2						1								
40	Sitting Bull Creek below recreation area - 60Sittin000.8	2					4	3								
Sampling Totals			6	6	3	2	168	151	2		15	18	8	3	1	1
Percent Completed			100		66		90		0		120		37.5		100	

4.4 Deviations from the 2022 Revision of the 2021-2022 Field Sampling Plan

4.4.1 Sampling Station Changes

Pecos River below Carlsbad WWTP near Otis-60PecosR088.1 was visited four times and each time it was inaccessible. This station was replaced by Pecos River below 6-mile dam and is therefore not included in this report. The Roswell Wastewater Treatment Plant is included in this report due to one 2022 visit that was not planned when the FSP was developed. The Rowell WWTP doesn't discharge into the river very

often during the sampling period. Brantley Reservoir Shallow @ 7 Rivers - 60BrantleySha7Riv is included in this report because it was sampled once in 2021 and removed after safety concerns with the sulfur being discharged from the outfalls. Pecos River at north end of Huey Waterfowl Mgmt Area-56PecosR179.1 was added as the location of a thermograph and was never scheduled to have any chemical, flow, or habitat sampling. Pecos River Near Lake Arthur, NM 56PecosR194.6 was never visited because this site was moved lower in the AU to Pecos River below Cottonwood Creek – 56PecosR177.0 and is therefore not included in this report.

4.4.2 Chemical Samples and Flow

Missing chemical samples at sites are due to dry conditions, time limitations from staff shortages and COVID restrictions, and site inaccessibility due to road conditions. For flow the number of visits for stations highlighted in table 7 changed from to 6 to 4 because priority 2 stations are only visited 2x a year for a total of 4 times during a survey area.

4.4.3 Thermographs

The thermograph at Pecos River at pipeline upstream of Salt Creek - 52PecosR311.7 was not recovered in 2021 or 2022 due to being buried or washed away during a high flow event. The thermograph scheduled for Pecos River Near Lake Arthur, NM 56PecosR194.6 was moved to Pecos R blw Cottonwood Creek 56PecosR177.0 because it was lower in the AU. This thermograph was put on cattle guard fence at Pecos River at north end of Huey Waterfowl Mgmt Area-56PecosR179.1 in hopes that it would be more secure in case of a high flow event. The fence washed out, but the thermograph was recovered.

4.4.4 Physical Habitat

The physical habitat sampling schedule at Pecos R blw Cottonwood Creek 56PecosR177.0 and Pecos River @ Wichita Rd. near Dexter - 56PecosR239.9 were never completed because SWQB does not have a physical habitat sampling protocol for large rivers.

4.4.5 Chlorophyll and Phytoplankton

The number of planned chlorophyll and phytoplankton samples changed from the FSP due to staff limitations.

4.4.6 Microcystin Sampling

Sample collection was not completed due to lack of visible algae blooms, which produce microcystins. The number of planned samples decreased from the FSP because we were limited in how many samples could be submitted to SLD at one time.

5.0 SUMMARY

The SWQB will assess data from this project to determine the impairment status of the sampled waters. The assessments are conducted in accordance with the Comprehensive Assessment and Listing Methodology which is available on the SWQB website at https://www.env.nm.gov/surface-water-quality/calm/. Assessment conclusions will be incorporated into the 2024-2026 Integrated Report which

will be posted to the SWQB website at https://www.env.nm.gov/surface-water-quality/303d-305b/. In cases where impairments to water and habitat quality are found or confirmed, data from this survey will be used to draft TMDL planning documents.

To supplement data collected for this project, SWQB accepts readily available water quality data submitted from outside sources that meet SWQB QA/QC review and documentation requirements. Data from outside sources will undergo review by the SWQB QA Officer to ensure only data meeting specific requirements are used for assessment purposes.

The data from the 2021-2022 survey have been validated and verified according to SWQB SOP 15.0 (NMED/SWQB 2020) and will be uploaded to USEPA's Water Quality Portal via The Water Quality Exchange (WQX) fall 2023. To download this dataset, visit the Water Quality Portal at https://www.waterqualitydata.us/portal/. For assistance with queries to the portal, please contact the Project Coordinators listed in Table 1. The data collected during this survey are also available by public records request to the SWQB.

6.0 REFERENCES

New Mexico Administrative Code (NMAC). 2022. *State of New Mexico Standards for Interstate and Intrastate Surface Waters; 20.6.4.* New Mexico Water Quality Control Commission. Santa Fe, NM. Available at: https://www.env.nm.gov/surface-water-quality/wqs/

NMED/SWQB. 2022a. *2022-2024 State of New Mexico Clean Water Act Section 303(d)/Section 305(b) Integrated Report*. Santa Fe, NM. Available at: https://www.env.nm.gov/surface-water-quality/303d-305b/.

NMED/SWQB. 2022b. *2021-2022 Watershed Survey Field Sampling Lower Pecos and Southern High Plains Watersheds (2022 Revision)*. Santa Fe, NM.

NMED/SWQB. 2021. *Quality Assurance Project Plan for Water Quality Management Programs*. Santa Fe, NM. Available at: Available at: https://www.env.nm.gov/wp-content/uploads/sites/25/2018/11/QAPP-SWQB-2018-EPA-approved-1.pdf

NMED/SWQB. 2020. *Standard Operating Procedure 15.0: Data Verification and Validation.* Santa Fe, NM.

NMED/SWQB. 2019. *Standard Operating Procedure 2.1: Field Sampling Plan Development and Execution.* Santa Fe, NM.

NMED/SWQB. 2016. Surface Water Quality 10-Year Monitoring and Assessment Strategy. Santa Fe, NM. Available at: https://www.env.nm.gov/surface-water-quality/protocols-and-planning/.

U.S. Environmental Protection Agency (USEPA), 2006, Level III ecoregions of the continental United States (revision of Omernik, 1987): Corvallis, Oregon, USEPA – National Health and Environmental Effects Research Laboratory, Map M-1, various scales.

APPENDIX A: INTEGRATED REPORT CATEGORIES

IR (Integrated Report) Category: Overall water quality standards attainment category for each assessment unit as determined by combining individual designated use support decisions. The unique assessment categories for New Mexico are described as follows:

IR Category 1 Attaining the water quality standards for all designated and existing uses. AUs are listed in this category if there are data and information that meet all requirements of the assessment and listing methodology and support a determination that the water quality criteria are attained.

IR Category 2 Attaining some of the designated or existing uses based on numeric and narrative parameters that were tested, and no reliable monitored data is available to determine if the remaining uses are attained or threatened. AUs are listed in this category if there are data and information that meet requirements of the assessment and listing methodology to support a determination that some, but not all, uses are attained based on numeric and narrative water quality criteria that were tested. Attainment status of the remaining uses is unknown because there is no reliable monitored data with which to make a determination.

IR Category 3 Insufficient or no reliable data and/or information to determine if any designated or existing use is attained. AUs are listed in this category where sufficient data to support an attainment determination for any use are not available, consistent with requirements of the assessment and listing methodology. In order to relay additional information to stakeholders including SWQB staff, Category 3 is further broken down in New Mexico into the following categories:

3A. Limited data available, no exceedances. AUs are listed in this subcategory when there are no exceedances in the limited data set. These are considered low priority for follow up monitoring.

3B. Limited data available, exceedance. AUs are listed in this subcategory when there is an exceedance in the limited data set. These are considered high priority for follow up monitoring.

IR Category 4A Impaired for one or more designated uses but does not require development of a TMDL because a TMDL has been completed. AUs are listed in this subcategory once all TMDL(s) have been developed and approved by USEPA that, when implemented, are expected to result in full attainment of the standard. Where more than one pollutant is associated with the impairment of an AU, the AU remains in Category 5A (see below) until all TMDLs for each pollutant have been completed and approved by USEPA.

IR Category 4B Impaired for one or more designated uses but does not require development of a TMDL because other pollution control requirements are reasonably expected to result in

attainment of the water quality standard in the near future. Consistent with the regulation under 40 CFR 130.7(b)(i),(ii), and (iii), AUs are listed in this subcategory where other pollution control requirements required by local, state, or federal authority are stringent enough to implement any water quality standard (WQS) applicable to such waters.

IR Category 4C Impaired for one or more designated uses but does not require development of a TMDL because impairment is not caused by a pollutant. AUs are listed in this subcategory if a pollutant does not cause the impairment. For example, USEPA considers flow alteration to be "pollution" vs. a "pollutant."

IR Category 5A Impaired for one or more designated or existing uses and a TMDL is underway or scheduled. AUs are listed in this category if the AU is impaired for one or more designated uses by a pollutant. Where more than one pollutant is associated with the impairment of a single AU, the AU remains in Category 5A until TMDLs for all pollutants have been completed and approved by USEPA.

IR Category 5B Impaired for one or more designated or existing uses and a review of the water quality standard will be conducted. AUs are listed in this category when it is possible that water quality standards are not being met because one or more current designated use is inappropriate. After a review of the water quality standard is conducted, a Use Attainability Analysis (UAA) will be developed and submitted to USEPA for consideration, or the AU will be moved to Category 5A and a TMDL will be scheduled.

IR Category 5C Impaired for one or more designated or existing uses and additional data will be collected before a TMDL is scheduled. AUs are listed in this category if there is not enough data to determine the pollutant of concern or there is not adequate data to develop a TMDL. For example, AUs with biological impairment will be listed in this category until further research can determine the pollutant(s) of concern. When the pollutant(s) are determined, the AU will be moved to Category 5A and a TMDL will be scheduled. If it is determined that the current designated uses are inappropriate, it will be moved to Category 5B and a UAA will be developed. If it is determined that "pollution" is causing the impairment (vs. a "pollutant"), the AU will be moved to Category 4C.

APPENDIX B: VOLATILE AND SEMI-VOLATILE ORGANIC ANALYTICAL SUITE

Organics (semi-volatiles)	Organics (volatiles)
1,2,4-Trichlorobenzene	1,1,1,2-Tetrachloroethane
1,2-Dichlorobenzene	1,1,1-Trichloroethane
1,2-Dinitrobenzene	1,1,2,2-Tetrachloroethane
1,3-Dichlorobenzene	1,1,2-Trichloroethane
1,3-Dinitrobenzene	1,1-Dichloroethane
1,4-Dichlorobenzene	1,1-Dichloroethene
1,4-Dinitrobenzene	1,1-Dichloropropene
1-Methylnaphthalene	1,2,3-Trichlorobenzene
2,3,4,6-Tetrachlorophenol	1,2,3-Trichloropropane
2,3,5,6-Tetrachlorophenol	1,2,4-Trichlorobenzene
2,4,5-Trichlorophenol	1,2,4-Trimethylbenzene
2,4,6-Trichlorophenol	1,2-Dibromo-3-chloropropane (DBCP)
2,4-Dichlorophenol	1,2-Dibromoethane (EDB)
2,4-Dimethylphenol	1,2-Dichlorobenzene
2,4-Dinitrophenol	1,2-Dichloroethane
2,4-Dinitrotoluene	1,2-Dichloropropane
2,6-Dinitrotoluene	1,3,5-Trimethylbenzene
2-Chloronaphthalene	1,3-Dichlorobenzene
2-Chlorophenol	1,3-Dichloropropane
2-Methylnaphthalene	1,4-Dichlorobenzene
2-Methylphenol	1,4-Dioxane
2-Nitroaniline	2,2-Dichloropropane
2-Nitrophenol	2-Butanone (MEK)
3,3'-Dichlorobenzidine	2-Chloroethyl vinyl ether
3-Methylphenol & 4-Methylphenol	2-Chlorotoluene
3-Nitroaniline	2-Hexanone

Organics (semi-volatiles)	Organics (volatiles)
4,4'-DDD	4-Chlorotoluene
4,4'-DDE	4-Isopropyltoluene
4,4'-DDT	4-Methyl-2-pentanone
4,6-Dinitro-2-methylphenol	Acetone
4-Bromophenyl Phenyl Ether	Acetonitrile
4-Chloro-3-methylphenol	Acrolein
4-Chloroaniline	Acrylonitrile
4-Chlorophenyl Phenyl Ether	Allyl chloride
4-Nitroaniline	Benzene
4-Nitrophenol	Bromobenzene
Acenaphthene	Bromochloromethane
Acenaphthylene	Bromodichloromethane
Alachlor	Bromoform
Aldrin	Bromomethane
alpha-BHC	Carbon disulfide
Aniline	Carbon tetrachloride
Anthracene	Chlorobenzene
Atrazine	Chloroethane
Azobenzene	Chloroform
Benzidine	Chloromethane
Benzo(a)anthracene	Chloroprene
Benzo(a)pyrene	cis-1,2-Dichloroethene
Benzo(b)fluoranthene	cis-1,3-Dichloropropene
Benzo(g,h,i)perylene	cis-1,4-Dichloro-2-butene
Benzo(k)fluoranthene	Dibromochloromethane
Benzyl alcohol	Dibromomethane

Organics (semi-volatiles)	Organics (volatiles)
beta-BHC	Dichlorodifluoromethane
bis(2-Chloroethoxy)methane	Ethyl methacrylate
bis(2-Chloroethyl)ether	Ethylbenzene
bis(2-Chloroisopropyl)ether	Hexachlorobutadiene
bis(2-Ethylhexyl)adipate	Iodomethane
bis(2-Ethylhexyl)phthalate	Isobutyl alcohol
Butyl Benzyl Phthalate	Isopropylbenzene
Carbazole	m- & p-Xylenes
Chrysene	Methyl methacrylate
cis-Chlordane	Methylacrylonitrile
Cyanazine	Methylene chloride (Dichloromethane)
delta-BHC	Naphthalene
Dibenz(a,h)anthracene	n-Butylbenzene
Dibenzofuran	Nitrobenzene
Dieldrin	o-Xylene
Diethylphthalate	Pentachloroethane
Dimethylphthalate	Propionitrile
Di-n-butyl Phthalate	Propylbenzene
Di-n-octyl phthalate	sec-Butylbenzene
Endosulfan I	Styrene
Endosulfan II	tert-Butyl methyl ether (MTBE)
Endosulfan sulfate	tert-Butylbenzene
Endrin	Tetrachloroethene
Endrin aldehyde	Tetrahydrofuran (THF)
Endrin ketone	Toluene
Fluoranthene	Total trihalomethanes

Organics (semi-volatiles)	Organics (volatiles)
Fluorene	Total xylenes
gamma-BHC (lindane)	trans-1,2-Dichloroethene
Heptachlor	trans-1,3-Dichloropropene
Heptachlor epoxide	trans-1,4-Dichloro-2-butene
Hexachlorobenzene	Trichloroethene
Hexachlorobutadiene	Trichlorofluoromethane
Hexachlorocyclopentadiene	Vinyl acetate
Hexachloroethane	Vinyl chloride
Indeno(1,2,3-cd)pyrene	
Isophorone	
Methoxychlor	
Metolachlor	
Metribuzin	
Naphthalene	
Nitrobenzene	
N-nitrosodimethylamine	
N-nitroso-di-n-propylamine	
N-nitrosodiphenylamine	
Pentachlorophenol	
Phenanthrene	
Phenol	
Prometryne	
Pyrene	
Pyridine	
Simazine	
trans-Chlordane	