WATER QUALITY SURVEY SUMMARY

FOR THE

UPPER PECOS RIVER WATERSHED

(Sumner Reservoir to the Headwaters)

2019-2020

Pecos River near Tererro, NM

Prepared by

Surface Water Quality Bureau

New Mexico Environment Department

November 2021

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

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 the Upper Pecos River from Sumner Reservoir to the Headwaters **(Figure 1**). Some of the major tributaries included in this study are Cow Creek, Tecolote Creek, and the Gallinas River. Lake sampling was conducted at Sumner, Santa Rosa, and Storrie reservoirs and Monastery and Perch lakes. The survey area encompasses the 8-digit Hydrologic Unit Code 13060001.

Historic and current land uses in the watershed include ranching, silviculture, recreation, mining, and some urban and residential development. Land cover in the watershed is mainly composed of evergreen forest, shrub/scrubland, grassland, deciduous and mixed forest, cultivated crops and lotic waters and wetlands. Land ownership in the watershed includes U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, New Mexico State Parks, New Mexico Department of Game and Fish, Bureau of Land Management (BLM), Bureau of Reclamation (BOR), Department of Defense (DOD), Land Grant, and State and Private parcels. The study area encompasses approximately 3,490 square miles (~9,037 square kilometers) in New Mexico. The watershed is located in Omernik Level III Ecoregion 21 (Southern Rockies) in the headwaters and Level III Ecoregion 26 (Arizona/New Mexico Plateau) in the lowlands (USEPA 2006).

The SWQB divides rivers and streams 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 6-10 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] https://www.waterqualitydata.us/portal/

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

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.

Table 1. Personnel Roles and Responsibilities

Team Member	Position/Role	Responsibilities
Kris Barrios Monitoring, Assessment, and Standards Section Program Manager Kristopher.Barrios@state.nm.us (505) 946-8713	Program Manager	Approves FSP, directs staff to publish the FSP according to program and/or grant requirements. Manages project personnel and resources throughout the project in coordination with Project Manager(s) Provides oversight and coordinates with QAO and Project Manager(s) on any data collection activities conducted not in accordance with the FSP, QAPP, or current SOPs. Conducts environmental data collection activities in accordance with the developed FSP, QAPP, and current SWQB SOPs.

Team Member	Position/Role	Responsibilities
Charles Dentino Monitoring Team Supervisor Charles.Dentino1@state.nm.us (505) 946-8868	Project Manager	Manages project personnel and resources throughout the project in coordination with Program Manager. Conducts environmental data collection activities in accordance with the developed FSP, QAPP, and current SWQB SOPs. Any data collection activities not conducted in accordance with the FSP, QAPP, or current SOPs are documented and reported to the Program Manager and QAO. Conducts mid-project meeting with team to discuss any changes to the project plan. Coordinates and conducts post-project meeting with team to discuss differences between planned and actual sampling and what data gaps, if any, exist. Writes, coordinates, and assembles report and/or other grant deliverables required of the project.
Jonathan Celmer Monitoring Team Scientist Jonathan.Celmer@state.nm.us (505) 946-8808 Eliza Martinez Monitoring Team Scientist Eliza.Montoya@state.nm.us (505) 819-8099	Project Team	Conducts environmental data collection activities in accordance with the developed FSP, QAPP, and current SWQB SOPs. Any data collection activities not conducted in accordance with the FSP, QAPP, or current SOPs are documented and reported to the Project Manager. Writes assigned sections of reports and/or other grant deliverables required throughout the project.
Miguel Montoya Miguel.Montoya@state.nm.us (505) 819-9882	QAO	Approves and ensures FSP is retained in accordance with 1.21.2 NMAC, Retention and Disposition of Public Records. Conducts audits as needed to ensure compliance with FSP, QAPP and SOPs.

Team Member	Position/Role	Responsibilities
Jennifer Fullam Jennifer.Fullam@state.nm.us (505) 946-8954	Standards, Planning and Reporting Team (SPRT) Liaison	Provides information and data needs pertaining to water quality standards development and refinement located within the study area.
Heidi Henderson Heidi.Henderson@state.nm.us (505) 819-9986	TMDL and Assessment Team (TAT) Liaison	Provides information and data needs pertaining to TMDL development and assessment to be conducted in the study area.
Susan Lucas-Kamat Susan.LucasKamat@state.nm.us (505) 946-8924	Point Source Regulation Section (PSRS) Liaison	Provides information and data needs pertaining to point source discharges located within the study area.
Abe Franklin Abraham.Franklin@state.nm.us (505) 946-8952	Watershed Protection Section (WPS) Liaison	Provides information and data needs pertaining to nonpoint sources of pollution and BMPs located within the study area.

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 §303(d) Program in New Mexico consists of three major steps: monitoring of surface waters; assessing monitoring data against water quality standards (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 2018a) (IR). It 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 published prior to the survey (NMED/SWQB 2018c). Impairments for AUs in this survey area were identified during SWQB's previous surveys of this watershed, most recently conducted in 2007 and 2014, and include assessments based on data from a variety of other investigations. **Table 2** lists the AU impairment status for surveyed waterbodies in the IR current during the development of the FSP for this survey (NMED/SWQB 2018a). The "IR Category" column provides the AU status from the 2018-2020 IR (see Appendix A for definitions). "Water Quality Section" provides the applicable WQS section assigned to each AU and described in Section 20.6.4 New Mexico Administrative Code (NMAC) as governed by the New Mexico Water Quality Control Commission (WQCC) (NMAC 2020a). The purpose of 20.6.4 NMAC is to establish WQS that consist of the designated uses of surface waters of the state, the water quality criteria necessary to protect those uses, and an antidegradation policy. The "TMDL Status" column lists the EPA-approved TMDLs for the Assessment Unit.

Monitoring of surface waters across the State occurs on a ten-year watershed rotation, meaning a given waterbody is generally surveyed intensively, on average, ten eight 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 (SWQB 2020) published in 2019 and amended in 2020. The FSP was 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 takes into account a variety of factors, the SWQB utilized a two-tier monitoring system – primary and secondary – to prioritize AUs. High ranking priority waters (primary AUs) received a greater amount of monitoring, whereas lower ranking waters (*i.e.*, secondary AUs) received the fewer. 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 the monitoring data have been verified and validated, using the most recent assessment protocols. These protocols are updated every odd year (e.g. 2021) and are opened for the EPA and the public to review and comment as part of the update process. The SWQB reports its assessment conclusions every even year (e.g. 2022) on the State's IR List and subsequently develops TMDLs or TMDL alternatives for listed AUs.

Table 2. Impairment and TMDL Status of Survey Assessment Units (NMED/SWQB 2018a)

Assessment Unit Name	WQS Reference	IR Category	Impairments	TMDL Completed
Alamitos Canyon (Pecos River to headwaters)	20.6.4.98	3/3A		
Beaver Creek (El Porvenir Creek to headwaters)	20.6.4.215	2		
Blue Creek (Tecolote Creek to headwaters)	20.6.4.215	2		
Blue Hole	20.6.4.212	2		
Brown's Marsh	20.6.4.99	2		
Bull Creek (Cow Creek to headwaters)	20.6.4.217	2		Temperature
Burro Canyon (Gallinas River to headwaters)	20.6.4.215	2		
Cow Creek (Bull Creek to headwaters)	20.6.4.217	4A	Temperature	Temperature| Turbidity
Cow Creek (Pecos River to Bull Creek)	20.6.4.217	4A	Temperature	Temperature| Turbidity
Dalton Canyon Creek (Perennial prt Pecos R to headwaters)	20.6.4.217	4A	Specific Conductance	Specific Conductance
Doctor Creek (Holy Ghost Creek to headwaters)	20.6.4.217	2		
El Porvenir Creek (Gallinas River to SFNF bnd)	20.6.4.215	5/5C	Temperature	
El Porvenir Creek (SFNF bnd to Hollinger Canyon)	20.6.4.215	2		
El Rito (Pecos River to headwaters)	20.6.4.212	5/5C	Ammonia, Total| E. coli	E. coli
Falls Creek (Tecolote Creek to headwaters)	20.6.4.215	4A	Specific Conductance	Specific Conductance
Gallinas River (Las Vegas Diversion to USFS bnd)	20.6.4.215	4A	Temperature	Temperature
Gallinas River (Pecos Arroyo to Las Vegas Diversion)	20.6.4.220	1		
Gallinas River (Pecos River to Aguilar Creek)	20.6.4.98	5/5C	Dissolved oxygen	
Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)	20.6.4.220	5/5A	Nutrients| Temperature| Turbidity	
Gallinas River (USFS bnd to headwaters)	20.6.4.215	2		
Glorieta Ck (Perennial prt Glorieta CC WWTP to headwaters)	20.6.4.217	4C	Flow Regime Modification	
Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)	20.6.4.217	5/5B	Nutrients| Specific Conductance	
Hollinger Creek (El Porvenir Creek to headwaters)	20.6.4.215	2		
Holy Ghost Creek (Pecos River to headwaters)	20.6.4.217	2		
Indian Creek (Pecos River to headwaters)	20.6.4.217	2		
Jack's Creek (Pecos River to headwaters)	20.6.4.217	2		
Johnson Lake	20.6.4.222	3/3A		
Lake Bentley	20.6.4.99	2		
Lake Katherine	20.6.4.222	3/3A		
Lost Bear Lake	20.6.4.222	3/3A		

Assessment Unit Name	WQS Reference	IR Category	Impairments	TMDL Completed
Macho Canyon Creek (Pecos River to headwaters)	20.6.4.217	4A	Specific Conductance	Specific Conductance
McAllister Lake	20.6.4.213	5/5C	Arsenic, Dissolved	
Monastery Lake	20.6.4.224	3/3A		
North Fork Blue Creek (Blue Creek to headwaters)	20.6.4.215	2		
Panchuela Creek (Pecos River to headwaters)	20.6.4.217	2		
Park Lake	20.6.4.99	3/3A		
Pecos Arroyo (Gallinas River to headwaters)	20.6.4.221	4A	E. coli	E. coli
Pecos Baldy Lake	20.6.4.222	3/3A		
Pecos River (Alamitos Canyon to Jack's Creek)	20.6.4.217	2		Turbidity
Pecos River (Canon de Manzanita to Alamitos Canyon)	20.6.4.217	4A	Temperature	Temperature| Turbidity
Pecos River (Cow Creek to Canon de Manzanita)	20.6.4.216	1		
Pecos River (Jack's Creek to headwaters)	20.6.4.217	2		
Pecos River (Santa Rosa Reservoir to Tecolote Creek)	20.6.4.211	4A	E. coli	E. coli
Pecos River (Sumner Reservoir to Santa Rosa Reservoir)	20.6.4.211	5/5A	Nutrients	
Pecos River (Tecolote Creek to Villanueva State Park)	20.6.4.216	5/5A	Temperature	
Pecos River (Villanueva State Park to Cow Creek)	20.6.4.216	1		
Perch Lake	20.6.4.226	3/3A		
Power Dam Lake	20.6.4.212	3/3A		
Rio Mora (Pecos River to headwaters)	20.6.4.217	2		
Rito del Oso (Rio Mora to headwaters)	20.6.4.217	2		
Santa Rosa Reservoir	20.6.4.225	5/5C	Mercury - Fish Consumption Advisory	
Spirit Lake	20.6.4.222	3/3A		
Stewart Lake	20.6.4.222	3/3A		
Storrie Lake	20.6.4.214	5/5C	Mercury - Fish Consumption Advisory	
Sumner Reservoir	20.6.4.210	5/5C	Mercury - Fish Consumption Advisory	
Tecolote Creek (Blue Creek to headwaters)	20.6.4.215	2		
Tecolote Creek (I-25 to Blue Creek)	20.6.4.230	5/5A	Nutrients| Temperature	Temperature
Tecolote Creek (Pecos River to I-25)	20.6.4.98	3/3A		
Tres Lagunas (Northeast)	20.6.4.212	5/5B	pH	
Tres Lagunas (Southeast)	20.6.4.212	3/3A		
Tres Lagunas (West)	20.6.4.212	3/3A		
Truchas Lake (North)	20.6.4.222	3/3A		

Assessment Unit Name	WQS Reference	IR Category	Impairments	TMDL Completed
Truchas Lake (South)	20.6.4.222	3/3A		
Wallace Lake	20.6.4.99	3/3A		
Willow Creek (Pecos River to headwaters)	20.6.4.217	4A	Specific Conductance	Specific Conductance
Winsor Creek (Pecos River to headwaters)	20.6.4.217	2		
Wright Canyon Creek (Tecolote Creek to headwaters)	20.6.4.215	2		

2.2 Objectives

Table 3 outlines the project objectives that have been identified to meet the various needs within the SWQB. The SWQB determined its data needs based on impairments from previous studies, identified data gaps, and consultation with 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	Products/ Outcomes	Decision Criteria
Primary Objective	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?	Integrated Report	WQS as interpreted by the Assessment Protocols
Secondary Objectives	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?	TMDL loading calculations and NPDES permit limits	WQS as interpreted by the Assessment Protocols
	Evaluate restoration and mitigation measures implemented to control NPS pollution	Have watershed restoration activities and mitigation measures improved water quality?	Project Summary Reports, NPS Annual Report, *Integrated Report (De-Listing)*	WQS as interpreted by the Assessment Protocols

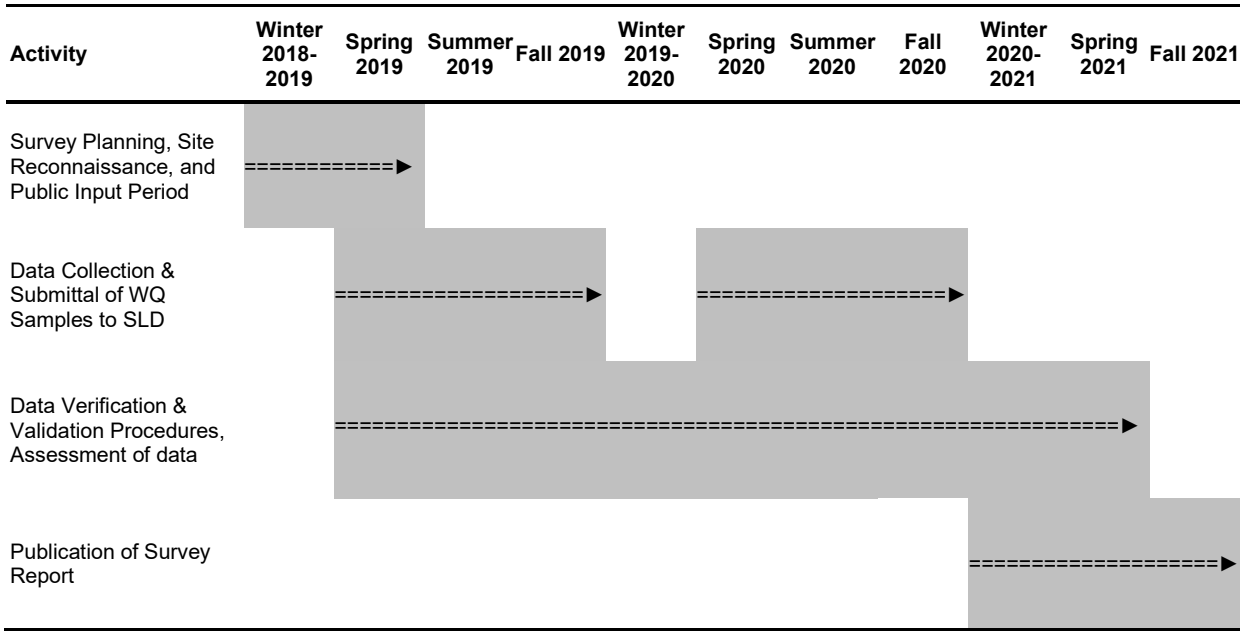
Develop or refine the WQS	Are the existing uses appropriate for the waterbody?	Use Attainability Analyses (UAA); Amendments to WQS	Are data sufficient to support a petition to the WQCC to revise WQS?

2.3 Schedule

As part of the survey planning process, the SWQB held public meetings to receive input on any areas of concern within the AUs surveyed and to inform interested parties about the SWQB water quality survey process, specific sampling plans in the watershed, and the assessment and TMDL processes.
Water chemistry results typically take several months to return from the analytical laboratory, the New Mexico Scientific Laboratory Division (SLD). The SWQB verified and validated field and laboratory data according to SWQB SOPs. These data form the bulk of information used to update the assessment conclusions in the 2022-2024 IR List. Following EPA-approval of the IR, the SWQB will begin the TMDL development process in 2022 for any identified impairments.

The progress of this project was documented and tracked from its 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.

Table 4. Project Schedule



2.4 Project Location

The survey includes the Upper Pecos River, and associated tributaries, from Sumner Reservoir to the headwaters. Some of the major tributaries included in this study are Cow Creek, Tecolote Creek, and the Gallinas River. Lake sampling was conducted at Sumner, Santa Rosa, and Storrie reservoirs and Monastery and Perch lakes. **Table 5** lists the water quality stations in the survey and **Figures 2-3** show sub-watersheds within the survey area.

Figure 1. 2019-2020 Survey Area

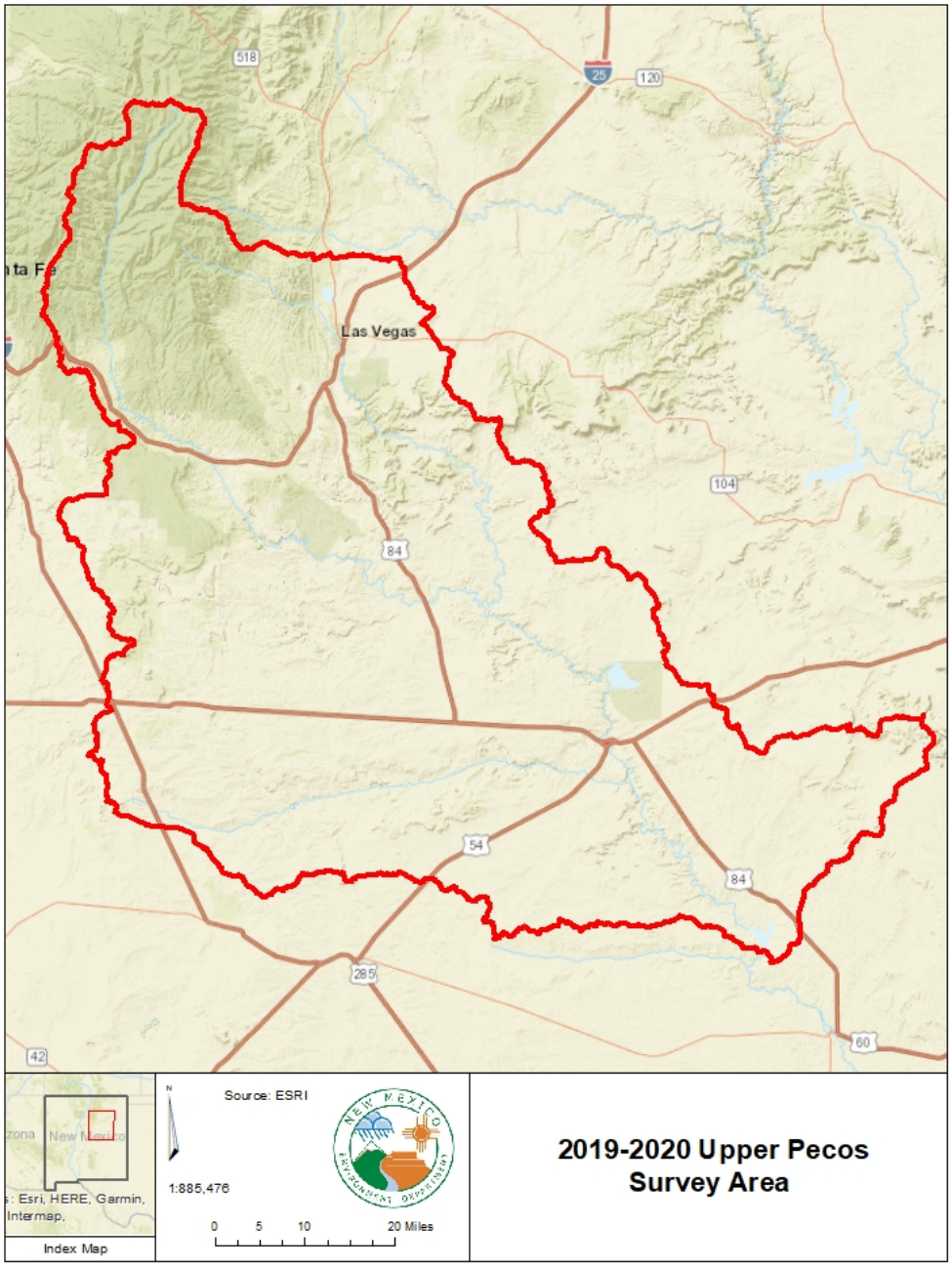


Table 5. Water Quality Stations: Upper Pecos Watershed Survey 2019-2020

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
1	Bull Creek above confluence with Cow Creek - 50BullCr000.1	50BullCr000.1	Bull Creek (Cow Creek to headwaters)	TMDL for Temperature
2	Cow Creek above confluence with Bull Creek - 50CowCre023.8	50CowCre023.8	Cow Creek (Bull Creek to headwaters)	AU impaired for Temp, TMDL for Temp/Turbidity
3	Cow Creek at North San Ysidro - 50CowCre011.5	50CowCre011.5	Cow Creek (Pecos River to Bull Creek)	AU impaired for Temp, TMDL for Temp/Turbidity, possible WQS change
4	DALTON CANYON CREEK 20 M WEST OF HWY 63 BRDG - 50Dalton000.1	50Dalton000.1	Dalton Canyon Creek (Perennial prt Pecos R to headwaters)	AU impaired for Specific Conductance, possible WQS change
5	Dalton Cny Cr blw private inholdings on Dalton Cnyn Rd - 50Dalton003.9	50Dalton003.9	Dalton Canyon Creek (Perennial prt Pecos R to headwaters)	AU impaired for Specific Conductance, possible WQS change. Station added higher in AU because baseline pre-mine data is needed.
6	Doctor Creek abv Holy Ghost Creek -50Doctor000.1	50Doctor000.1	Doctor Creek (Holy Ghost Creek to headwaters)	No impairments. Station added because baseline pre-mine data is needed.
7	El Porvenir Creek at Christian Camp, USGS 08380075 - 50ElPorv004.8	50ElPorv004.8	El Porvenir Creek (SFNF bnd to Hollinger Canyon)	Historic dissolved AL exceedances
8	El Porvenir Creek at HWY 65 above the Gallinas - 50ElPorv000.1	50ElPorv000.1	El Porvenir Creek (Gallinas River to SFNF bnd)	AU impaired for Temp
9	EL RITO CREEK DOWNSTREAM OF THE SANTA ROSA WWTF - 50ElRito000.2	50ElRito000.2	El Rito (Pecos River to headwaters)	AU impaired for Ammonia/E. coli
10	El Rito Creek upstream of Santa Rosa WWTF-50ElRito000.3	50ElRito000.3	El Rito (Pecos River to headwaters)	AU impaired for Ammonia/E. coli. No location for logger deployment lower in AU.
11	Falls Cr. at CR A 19A - 50FallsC000.1	50FallsC000.1	Falls Creek (Tecolote Creek to headwaters)	AU impaired for Specific Conductance, possible WQS change
12	Gallinas R @ CR C23 - 50Gallin103.4	50Gallin103.4	Gallinas River (Pecos Arroyo to Las Vegas Diversion)	No impairments. Better location in AU for logger deployment
13	Gallinas River 0.25 mile below Las Vegas WWTF - 50Gallin101.8	50Gallin101.8	Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)	AU impaired for Nutrients/Temperature/Turbidity
14	Gallinas River at Grand Avenue - 50Gallin104.8	50Gallin104.8	Gallinas River (Pecos Arroyo to Las Vegas Diversion)	Significant tributary
15	Gallinas River at La Liendre - 50Gallin057.8	50Gallin057.8	Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)	AU impaired for Nutrients/Temperature/Turbidity
16	Gallinas River at Montezuma, USGS Gage 08380500 - 50Gallin119.7	50Gallin119.7	Gallinas River (Las Vegas Diversion to USFS bnd)	AU impaired for Temp
17	Gallinas River at San Augustin - 50Gallin075.0	50Gallin075.0	Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)	AU impaired for Nutrients/Temperature/Turbidity
18	Glorieta Conference Center/WWTP - NM0028088	NM0028088	Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)	NPDES permit
19	Glorieta Creek above confluence with Pecos River - 50Glorie001.8	50Glorie001.8	Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)	AU impaired for Nutrient/Specific Conductance, possible WQS change

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
20	Glorieta Creek above Glorieta Conference Center WWTP - 50Glorie014.0	50Glorie014.0	Glorieta Ck (Perennial prt Glorieta CC WWTP to headwaters)	AU impaired for Flow Regime Modification, possible WQS change
21	HOLY GHOST CR 300M UPSTRM HWY63 BR OVER PECOS R - 50HolyGh000.1	50HolyGh000.1	Holy Ghost Creek (Pecos River to headwaters)	Historic station, significant tributary.
22	INDIAN CREEK 3M WEST OF HWY 63 BRDG - 50Indian000.1	50Indian000.1	Indian Creek (Pecos River to headwaters)	No impairments. Station added because baseline pre-mine data is needed.
23	LAS VEGAS, NM WWTP OUTFALL PIPE (MAS) - NM0028827-A	NM0028827-A	Gallinas River (Perennial prt Aguilar Creek to Pecos Arroyo)	NPDES permit
24	Lisboa Springs fish hatchery effluent discharge - NM0030121	NM0030121	Pecos River (Alamitos Canyon to Jack's Creek)	NPDES permit
25	MACHO CANYON CREEK 10M WEST OF HWY 63 BRDG - 50MachoC000.2	50MachoC000.2	Macho Canyon Creek (Pecos River to headwaters)	AU impaired for Specific Conductance
26	Monastery Lake Deep, 40 meters from south end of lake near spillway. Acces - 50MonasteLake	50MonasteLake	Monastery Lake	Unassessed recreational site
27	Monastery Lake Inlet - 50MonasteryInlet	50MonasteryInlet	Monastery Lake	Lake inlet
28	NMG&FD/Rock Lake Fish Hatchery	NM0030155	Pecos River (Sumner Reservoir to Santa Rosa Reservoir)	NPDES permit
29	Pecos abv Villanueva State Park - 50PecosR697.0	50PecosR697.0	Pecos River (Villanueva State Park to Cow Creek)	Major river, bottom of AU
30	PECOS ARROYO ABOVE THE GALLINAS RIVER - 50PecosA000.3	50PecosA000.3	Pecos Arroyo (Gallinas River to headwaters)	AU impaired for E. coli
31	Pecos R @ NM 119 bridge nr Anton Chico - 50PecosR657.3	50PecosR657.3	Pecos River (Santa Rosa Reservoir to Tecolote Creek)	AU impaired for E. coli, possible WQS change
32	Pecos R at Puerto de Luna - 50Pecos540.8	50Pecos540.8	Pecos River (Sumner Reservoir to Santa Rosa Reservoir)	Lake outlet, AU impaired for Nutrients
33	Pecos R blw Glorieta Cr - 50PecosR763.6	50PecosR763.6	Pecos River (Canon de Manzanita to Alamitos Canyon)	AU impaired for Temp, TMDL for Temp/Turbidity
34	PECOS RIVER ABOVE CONFLUENCE WITH TECOLOTE CREEK - 50PecosR666.7	50PecosR666.7	Pecos River (Tecolote Creek to Villanueva State Park)	AU impaired for Temp
35	Pecos River at Adelo Property behind Catholic Church in Pecos - 50PecosR772.0	50PecosR772.0	Pecos River (Alamitos Canyon to Jack's Creek)	TMDL for Turbidity
36	Pecos River at South San Ysidro - 50PecosR740.0	50PecosR740.0	Pecos River (Cow Creek to Canon de Manzanita)	Major river, possible WQS change
37	Pecos River at wilderness boundary - 50PecosR806.0	50PecosR806.0	Pecos River (Jack's Creek to headwaters)	Major river, Rio Grande Cutthroat Trout restoration
38	PECOS RIVER BELOW SANTA ROSA DAM - 50PecosR575.0	50PecosR575.0	Pecos River (Sumner Reservoir to Santa Rosa Reservoir)	AU impaired for Nutrients, possible WQS change
39	PECOS RIVER BELOW SUMNER DAM AT USGS GAGE - 52PecosR485.0	52PecosR485.0	Pecos River (Truchas Creek to Sumner Reservoir)	Lake outlet only, AU not in survey
40	PECOS RIVER BLW VILLAGE OF PECOS WWTP - 50PecosR770.0	50PecosR770.0	Pecos River (Canon de Manzanita to Alamitos Canyon)	AU impaired for Temp, TMDL for Temp/Turbidity
41	PECOS RIVER NEAR COLONIAS, NM - 50PecosR593.1	50PecosR593.1	Pecos River (Santa Rosa Reservoir to Tecolote Creek)	AU impaired for E. coli

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
42	Pecos, Village of/WWTP - NM0029041	NM0029041	Pecos River (Canon de Manzanita to Alamitos Canyon)	NPDES permit
43	Perch Lake (sink hole) - 50PerchLakeDp	50PerchLakeDp	Perch Lake	Unassessed, recreational use
44	RIO MORA AT USGS GAGE 08377900 abv Pecos campground - 50RioMor000.3	50RioMor000.3	Rio Mora (Pecos River to headwaters)	Significant tributary
45	SANTA ROSA L. DP. STA. MIDCHANNEL BUOY AT DAM - 50SantaRLkMid	50SantaRLkMid	Santa Rosa Reservoir	Mercury - Fish Consumption Advisory
46	SANTA ROSA WASTEWATER PLANT - NM0024988	NM0024988	El Rito (Pecos River to headwaters)	NPDES permit
47	Storrie Inlet	50StorrieIn	Storrie Lake	Lake inlet
48	STORRIE LAKE DEEP 30 YDS W OF DAM, N END - 50StorrieDeep	50StorrieDeep	Storrie Lake	Impaired for Mercury
49	Storrie Outlet	50StorrieOut	Storrie Lake	Lake outlet
50	SUMNER LAKE DAM AT SPILLWAY CANYON OPENING - 50SumnerLkDam	50SumnerLkDam	Sumner Reservoir	Mercury - Fish Consumption Advisory
51	TECOLOTE CREEK AT I-25 NEAR TECOLOTE - 50Tecolo041.2	50Tecolo041.2	Tecolote Creek (I-25 to Blue Creek)	AU impaired for Nutrients/Temperature
52	WILLOW CR BLW WHITE DRAIN - 50Willow000.1	50Willow000.1	Willow Creek (Pecos River to headwaters)	AU impaired for Specific Conductance, mine reclamation area
53	Willow Creek abv Fish Barrier - 50Willow000.6	50Willow000.6	Willow Creek (Pecos River to headwaters)	Historic sedimentation/siltation impairment
54	WILLOW CR JUST ABV SR 63 AT MINE - 50Willow000.4	50Willow000.4	Willow Creek (Pecos River to headwaters)	AU impaired for Specific Conductance
55	SUMNER LAKE SHALLOW AT ROCK BLUFF NR BASS CN - 50SumnerReser	50SumnerReser	Sumner Reservoir Shallow	Mercury - Fish Consumption Advisory
56	SANTA ROSA L. SHALLOW NEAR INFLOW - 50SantaRosaSH	50SantaRosaSH	Santa Rosa Reservoir Shallow	Mercury - Fish Consumption Advisory
57	STORRIE LAKE MIDDLE, 0.25 MI WEST OF ISLAND - 50StorrieLMid	50StorrieLMid	STORRIE LAKE MIDDLE	Mercury - Fish Consumption Advisory
58	Dalton Cny Cr nr 123A - 50Dalton002.3	50Dalton002.3	Dalton Canyon Creek (Perennial prt Pecos R to headwaters)	AU impaired for Specific Conductance, possible WQS change
59	Falls Cr. @ CR A18A - 50FallsC004.6	50FallsC004.6	Falls Creek (Tecolote Creek to headwaters)	AU impaired for Specific Conductance, possible WQS change
60	Glorieta Creek @ NM 50 - 50Glorie011.4	50Glorie011.4	Glorieta Ck (Perennial prt Pecos R to Glorieta CC WWTP)	AU impaired for Nutrient/Specific Conductance, possible WQS change

Figure 2. Upper Pecos River: northern sampling area and monitoring locations

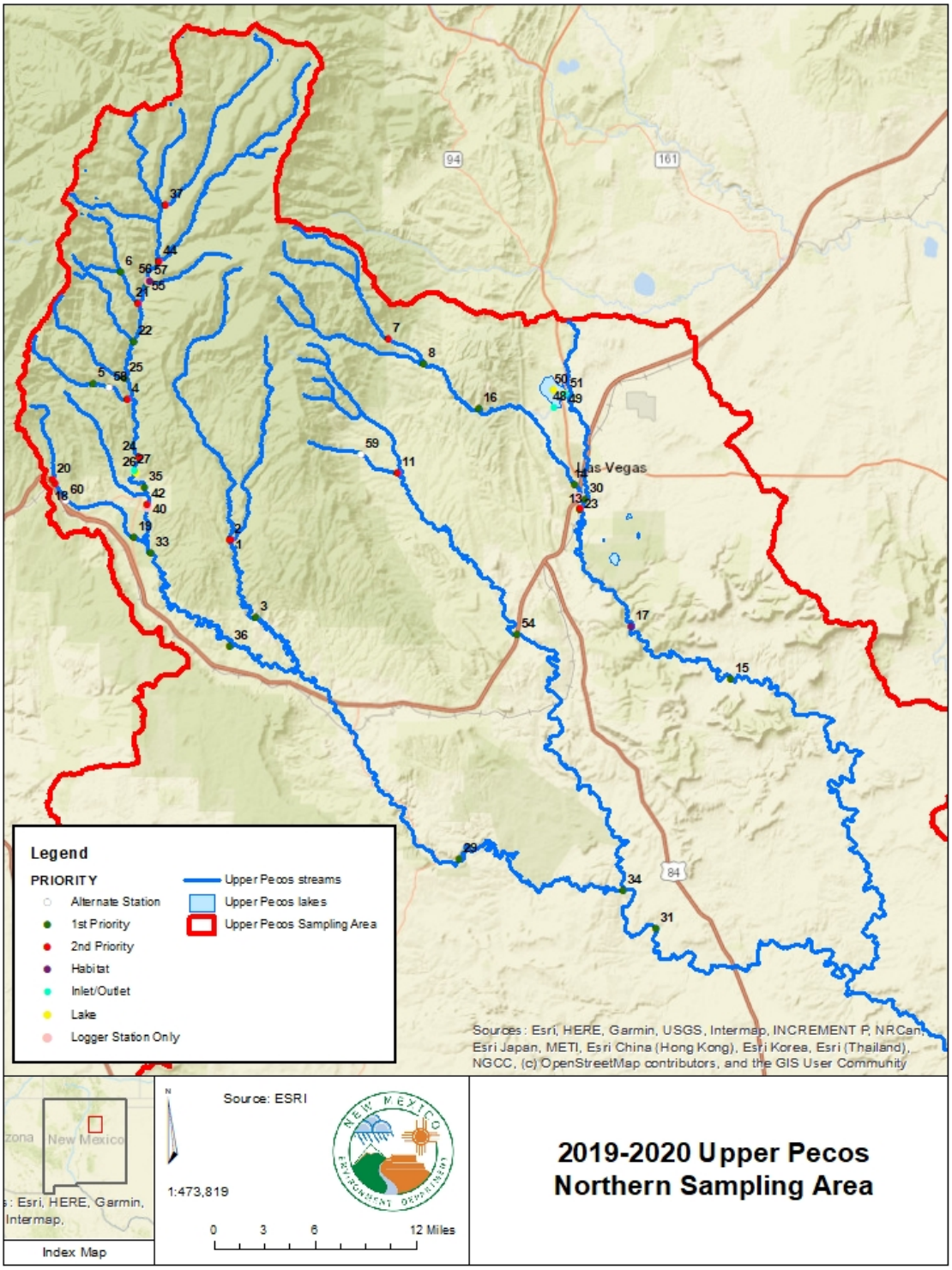
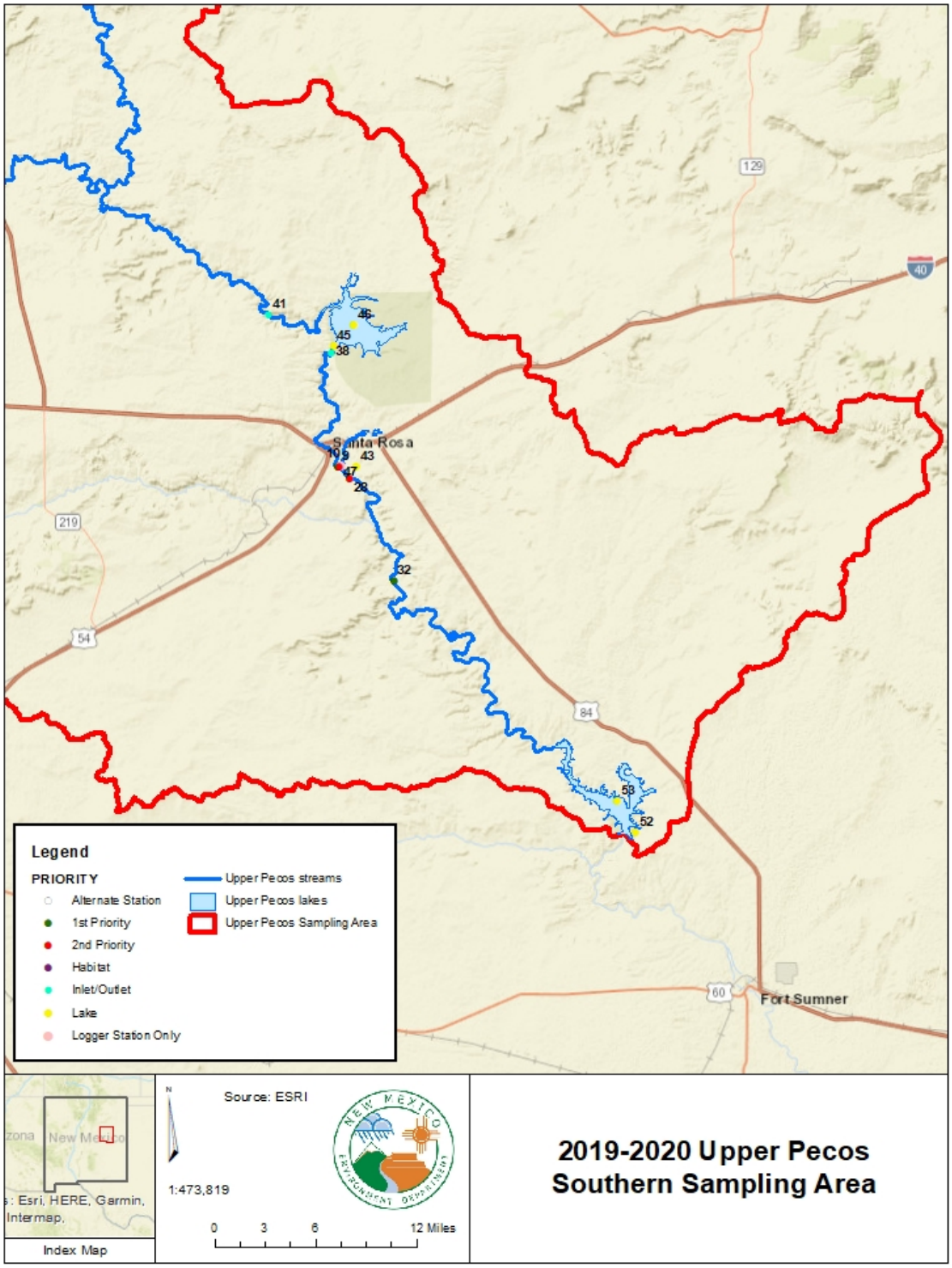


Figure 3. Upper Pecos River: southern sampling area and monitoring locations



3.0 DOCUMENTATION

Project documents include the field sampling plan, 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 2018b).

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

Project activities were documented in SWQB Monitoring Field Sheets. Information from field sheets were entered in the SWQB database or maintained in the Project Coordinator's survey files at the conclusion of the project. Analytical results were electronically transferred into the Bureau's database and uploaded 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 2018b) 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	TSS/TDS/Cl/ S04		Total Nutrients (TP, NH4, TKN, Nitrate+Nitrite)		Dissolved Organic Carbon		Total Metals[1]		Dissolved Metals[2]		SWQB E. Coli		Volatile Organics[3]		Semi-Volatile Organics[4]		Radionuclides[5]	
Planned/Completed		P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C
1	Bull Creek above confluence with Cow Creek - 50BullCr000.1	4	4	4	4	2		4	4	4	4	4	4						
2	Cow Creek above confluence with Bull Creek - 50CowCre023.8	4	4	4	4	2		4	4	4	4	4	4						
3	Cow Creek at North San Ysidro - 50CowCre011.5	8	8	8	8	2		6	6	6	6	8	8						
4	DALTON CANYON CREEK 20 M WEST OF HWY 63 BRDG - 50Dalton000.1	4	2	4	2	2		4	2	4	2	4	2						
5	Dalton Cny Cr blw private inholdings on Dalton Cnyn Rd - 50Dalton003.9	6	4	6	4	2		6	4	6	4	6	4						
6	Doctor Creek abv Holy Ghost Creek - 50Doctor000.1	6	5	6	5	2		6	5	6	5	6	5						
7	El Porvenir Creek at Christian Camp, USGS 08380075 - 50ElPorv004.8	4	4	6	5	2		4	4	4	4	4	4						
8	El Porvenir Creek at HWY 65 above the Gallinas - 50ElPorv000.1	8	6	8	6	2		6	5	6	5	8	6						
9	EL RITO CREEK DOWNSTREAM OF THE SANTA ROSA WWTF - 50ElRito000.2	8	4	8	4	2		6	3	6	3	8	4						
10	El Rito Creek upstream of Santa Rosa WWTF-50ElRito000.3																		
11	Falls Cr. at CR A 19A - 50FallsC000.1	4	1	4	1	2		4	1	4	1	4	1						
12	Gallinas R @ CR C23 - 50Gallin103.4																		
13	Gallinas River 0.25 mile below Las Vegas WWTF - 50Gallin101.8	8	4	8	4	2		6	3	6	3	8	4						
14	Gallinas River at Grand Avenue - 50Gallin104.8	8	8	8	8	2		6	6	6	6	8	8						
15	Gallinas River at La Liendre - 50Gallin057.8	8	8	8	8	2		6	6	6	6	8	8	2	3	2	3	2	3
16	Gallinas River at Montezuma, USGS Gage 08380500 - 50Gallin119.7	8	8	8	8	2		6	6	6	6	8	8						

Map #	Station Name	TSS/TDS/Cl/ S04		Total Nutrients (TP, NH4, TKN, Nitrate+Nitrite)		Dissolved Organic Carbon		Total Metals[1]		Dissolved Metals[2]		SWQB E. Coli		Volatile Organics[3]		Semi-Volatile Organics[4]		Radionuclides[5]	
17	Gallinas River at San Augustin - 50Gallin075.0																		
18	Glorieta Conference Center/WWTP - NM0028088	6	4	6	4	2			0			6	4						
19	Glorieta Creek above confluence with Pecos River - 50Glorie001.8	8	4	8	4	2		6	4	6	4	8	4						
20	Glorieta Creek above Glorieta Conference Center WWTP - 50Glorie014.0	4	1	4	1	2		4	1	4	1	4	1						
21	HOLY GHOST CR 300M UPSTRM HWY63 BR OVER PECOS R - 50HolyGh000.1	4	4	6	5	2		4	4	4	4	4	4						
22	INDIAN CREEK 3M WEST OF HWY 63 BRDG - 50Indian000.1	6	6	6	6	2		6	6	6	6	6	6						
23	LAS VEGAS, NM WWTP OUTFALL PIPE (MAS) - NM0028827-A	6	4	6	4	2		4	3	4	3	6	4						
24	Lisboa Springs fish hatchery effluent discharge - NM0030121	6	4	6	4	2			0										
25	MACHO CANYON CREEK 10M WEST OF HWY 63 BRDG - 50MachoC000.2	6	1	6	1	2		6	1	6	1	6	1						
26	Monastery Lake Deep, 40 meters from south end of lake near spillway. Acces - 50MonasteLake	4	2	4	2	2		4	2	4	2	4	1	2	1	2	1	2	1
27	Monastery Lake Inlet - 50MonasteryInlet	4	2	4	2	2		4	2	4	2	4	1						
28	NMG&FD/Rock Lake Fish Hatchery	6	6	6	6	2		4	5	4	5		1						
29	Pecos abv Villanueva State Park - 50PecosR697.0	8	8	8	8	2		6	6	6	6	8	8						
30	PECOS ARROYO ABOVE THE GALLINAS RIVER - 50PecosA000.3	6	6	6	6	2		6	6	6	6	6	6						
31	Pecos R @ NM 119 bridge nr Anton Chico - 50PecosR657.3	6	6	6	6	2		6	6	6	6	6	6						
32	Pecos R at Puerto de Luna - 50PecosR540.8	8	10	8	10	2		6	9	6	9	8	10						
33	Pecos R blw Glorieta Cr - 50PecosR763.6	8	8	8	8	2		6	6	6	6	8	8						
34	PECOS RIVER ABOVE CONFLUENCE WITH TECOLOTE CREEK - 50PecosR666.7	8	8	8	8	2		6	6	6	6	8	8						

Map #	Station Name	TSS/TDS/Cl/ S04		Total Nutrients (TP, NH4, TKN, Nitrate+Nitrite)		Dissolved Organic Carbon		Total Metals[1]		Dissolved Metals[2]		SWQB E. Coli		Volatile Organics[3]		Semi-Volatile Organics[4]		Radionuclides[5]	
35	Pecos River at Adelo Property behind Catholic Church in Pecos - 50PecosR772.0	8	8	8	8	2		6	6	6	6	8	8						
36	Pecos River at South San Ysidro - 50PecosR740.0	8	8	8	8	2		6	6	6	6	8	8						
37	Pecos River at wilderness boundary - 50PecosR806.0	4	5	6	5	2		4	4	4	4	4	5						
38	PECOS RIVER BELOW SANTA ROSA DAM - 50PecosR575.0	4	1	4	1	2		4	1	4	1	4	1						
39	PECOS RIVER BELOW SUMNER DAM AT USGS GAGE - 52PecosR485.0	4	4	4	4	2		4	4	4	4	4	4						
40	PECOS RIVER BLW VILLAGE OF PECOS WWTP - 50PecosR770.0																		
41	PECOS RIVER NEAR COLONIAS, NM - 50PecosR593.1	4	3	4	3	2		4	3	4	3	4	3	2	1	2	1	2	1
42	Pecos, Village of/WWTP - NM0029041	6	4	6	4	2			0			6	4						
43	Perch Lake (sink hole) - 50PerchLakeDp	4	2	4	2	2		4	2	4	2	4	2	2	1	2	1	2	1
44	RIO MORA AT USGS GAGE 08377900 abv Pecos campground - 50RioMor000.3	4	4	6	5	2		4	4	4	4	4	4						
45	SANTA ROSA L. DP. STA. MIDCHANNEL BUOY AT DAM - 50SantaRLkMid	4	4	4	4	2		4	4	4	4	4	4	2	2	2	2	2	2
46	SANTA ROSA WASTEWATER PLANT - NM0024988	6	4	6	4	2			0			6	4						
47	Storrie Inlet - 50StorrieIn	4	2	4	2	2		4	2	4	2	4	2						
48	STORRIE LAKE DEEP 30 YDS W OF DAM, N END - 50StorrieDeep	4	4	4	4	2		4	4	4	4	4	4	2	2	2	2	2	2
49	Storrie Outlet - 50StorrieOut	4	4	4	4	2		4	4	4	4	4	4						
50	SUMNER LAKE DAM AT SPILLWAY CANYON OPENING - 50SumnerLkDam	4	4	4	4	2		4	4	4	4	4	4	2	2	2	2	2	2
51	TECOLOTE CREEK AT I-25 NEAR TECOLOTE - 50Tecolo041.2	8	8	8	8	2		6	6	6	6	8	8						
52	WILLOW CR BLW WHITE DRAIN - 50Willow000.1	8	8	8	8	2		6	6	6	6	8	8						

Map #	Station Name	TSS/TDS/Cl/ S04		Total Nutrients (TP, NH4, TKN, Nitrate+Nitrite)		Dissolved Organic Carbon		Total Metals[1]		Dissolved Metals[2]		SWQB E. Coli		Volatile Organics[3]		Semi-Volatile Organics[4]		Radionuclides[5]	
53	Willow Creek abv Fish Barrier - 50Willow000.6																		
54	WILLOW CR JUST ABV SR 63 AT MINE - 50Willow000.4																		
55	SUMNER LAKE SHALLOW AT ROCK BLUFF NR BASS CN - 50SumnerReser	2		2		2		2		2									
56	SANTA ROSA L. SHALLOW NEAR INFLOW - 50SantaRosaSH	2		2		2		2		2									
57	STORRIE LAKE MIDDLE, 0.25 MI WEST OF ISLAND - 50StorrieLMid	2		2		2		2		2									
58	Dalton Cny Cr nr 123A - 50Dalton002.3																		
59	Falls Cr. @ CR A18A - 50FallsC004.6		1		1				1		1		1						
60	Glorieta Creek @ NM 50 - 50Glorie011.4		1		1				1		1		1						
Sampling Totals		286	233	294	236	102	0	226	188	226	188	262	222	14	12	14	12	14	12
Percent Completed		81.5		80.3		0.0		83.2		83.2		84.7		85.7		85.7		85.7	

[1] Suite includes aluminum, mercury, selenium

[2] 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.

[3] See Appendix B for a complete list of analytes.

[4] Radionuclide samples include gross alpha and gross beta and depending on detections may include Uranium mass and Radium 226 + 228.

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) were deployed at stations in selected assessment units primarily to examine diel fluxes in pH and dissolved oxygen (DO) and to record turbidity data for assessment against maximum-duration thresholds. Thermographs and sondes were programmed to record at 15-minute intervals. Thermographs and conductivity loggers were deployed season long (approximately May to October). Sondes and DO loggers were deployed for a minimum of 7 days with the maximum being 14 to 21 days to avoid sensor fouling

and drift. Chlorophyll and phytoplankton data were collected at lake stations for nutrient assessments. **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 2019-2020

Map #	Station Name	Dissolved Oxygen		Turbidity		Conductivity		pH		Temperature		Flow		Physical Habitat		Chlorophyll a + Phytoplankton		Microcystin		Fish	
Planned/Completed		P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C
1	Bull Creek above confluence with Cow Creek - 50BullCr000.1	1	1									4	4								
2	Cow Creek above confluence with Bull Creek - 50CowCre023.8	1	1	1	1	1	1	1	1	1		4	4								
3	Cow Creek at North San Ysidro - 50CowCre011.5	1	1	1	1	1	1	1	1	1	2	8	8								
4	DALTON CANYON CREEK 20 M WEST OF HWY 63 BRDG - 50Dalton000.1	1										4	6								
5	Dalton Cny Cr blw private inholdings on Dalton Cnyn Rd - 50Dalton003.9					2	1					6	6								
6	Doctor Creek abv Holy Ghost Creek - 50Doctor000.1	1	1			2	2					6	5								
7	El Porvenir Creek at Christian Camp, USGS 08380075 - 50ElPorv004.8	1	1							1	1	4	5								
8	El Porvenir Creek at HWY 65 above the Gallinas - 50ElPorv000.1									1	2	8	8								
9	EL RITO CREEK DOWNSTREAM OF THE SANTA ROSA WWTF - 50ElRito000.2	1										8	4								
10	El Rito Creek upstream of Santa Rosa WWTF- 50ElRito000.3	1	1							1	1										
11	Falls Cr. at CR A 19A - 50FallsC000.1					1	1					4	2								
12	Gallinas R @ CR C23 - 50Gallin103.4	1								1	1										

Map #	Station Name	Dissolved Oxygen		Turbidity		Conductivity		pH		Temperature		Flow		Physical Habitat		Chlorophyll a + Phytoplankton		Microcystin		Fish	
13	Gallinas River 0.25 mile below Las Vegas WWTF - 50Gallin101.8	1	1									8	4								
14	Gallinas River at Grand Avenue - 50Gallin104.8		1									8	8								
15	Gallinas River at La Liendre - 50Gallin057.8	1	1	1	1	1	1	1	1	1	2	8	8								
16	Gallinas River at Montezuma, USGS Gage 08380500 - 50Gallin119.7									1	2	8	8								
17	Gallinas River at San Augustin - 50Gallin075.0													1	1						
18	Glorieta Conference Center/WWTP - NM0028088																				
19	Glorieta Creek above confluence with Pecos River - 50Glorie001.8	2										8	7								
20	Glorieta Creek above Glorieta Conference Center WWTP - 50Glorie014.0											4	2								
21	HOLY GHOST CR 300M UPSTRM HWY63 BR OVER PECOS R - 50HolyGh000.1	1	1									4	5								
22	INDIAN CREEK 3M WEST OF HWY 63 BRDG - 50Indian000.1					1	2					6	6								
23	LAS VEGAS, NM WWTP OUTFALL PIPE (MAS) - NM0028827-A																				
24	Lisboa Springs fish hatchery effluent discharge - NM0030121																				
25	MACHO CANYON CREEK 10M WEST OF HWY 63 BRDG - 50MachoC000.2					1	1					6	6								
26	Monastery Lake Deep, 40 meters from south end of lake near spillway. Acces - 50MonasteLake															4	2	2			
27	Monastery Lake Inlet - 50MonasteryInlet											4	2								

Map #	Station Name	Dissolved Oxygen		Turbidity		Conductivity		pH		Temperature		Flow		Physical Habitat		Chlorophyll a + Phytoplankton		Microcystin		Fish	
28	NMG&FD/Rock Lake Fish Hatchery																				
29	Pecos abv Villanueva State Park - 50PecosR697.0	1	1	1	1	1	1	1	1	1	1	8	8								
30	PECOS ARROYO ABOVE THE GALLINAS RIVER - 50PecosA000.3											6	6								
31	Pecos R @ NM 119 bridge nr Anton Chico - 50PecosR657.3	1	2	1	1	1	1	1	1	1	1	6	6								
32	Pecos R at Puerto de Luna - 50PecosR540.8	1	1									8	10								
33	Pecos R blw Glorieta Cr - 50PecosR763.6	1	1	1	1	1	1	1	1	1	2	8	8								
34	PECOS RIVER ABOVE CONFLUENCE WITH TECOLOTE CREEK - 50PecosR666.7	1	1	1	1	1	1	1	1	1	1	8	8								
35	Pecos River at Adelo Property behind Catholic Church in Pecos - 50PecosR772.0	1	1	1	1	1	1	1	1			8	8								
36	Pecos River at South San Ysidro - 50PecosR740.0	1	1							1	1	8	8								
37	Pecos River at wilderness boundary - 50PecosR806.0	1	1									4	5								
38	PECOS RIVER BELOW SANTA ROSA DAM - 50PecosR575.0	1										4	1								
39	PECOS RIVER BELOW SUMNER DAM AT USGS GAGE - 52PecosR485.0	1										4	4								
40	PECOS RIVER BLW VILLAGE OF PECOS WWTP - 50PecosR770.0	1	2							1	1										
41	PECOS RIVER NEAR COLONIAS, NM - 50PecosR593.1	1										4	3								

Map #	Station Name	Dissolved Oxygen		Turbidity		Conductivity		pH		Temperature		Flow		Physical Habitat		Chlorophyll a + Phytoplankton		Microcystin		Fish	
42	Pecos, Village of/WWTP - NM0029041																				
43	Perch Lake (sink hole) - 50PerchLakeDp															4	2	2			
44	RIO MORA AT USGS GAGE 08377900 abv Pecos campground - 50RioMor000.3	1	1									4	5								
45	SANTA ROSA L. DP. STA. MIDCHANNEL BUOY AT DAM - 50SantaRLkMid															4	4	2			
46	SANTA ROSA WASTEWATER PLANT - NM0024988																				
47	Storrie Inlet - 50StorrieIn											4	4								
48	STORRIE LAKE DEEP 30 YDS W OF DAM, N END - 50StorrieDeep															4	4	2		1	1
49	Storrie Outlet - 50StorrieOut											4	4								
50	SUMNER LAKE DAM AT SPILLWAY CANYON OPENING - 50SumnerLkDam															4	4	2			
51	TECOLOTE CREEK AT I-25 NEAR TECOLOTE - 50Tecolo041.2	1	2							1		8	8								
52	WILLOW CR BLW WHITE DRAIN - 50Willow000.1						1					8	8								
53	Willow Creek abv Fish Barrier - 50Willow000.6											1		1	1						
54	WILLOW CR JUST ABV SR 63 AT MINE - 50Willow000.4					1	1														
55	SUMNER LAKE SHALLOW AT ROCK BLUFF NR BASS CN - 50SumnerReser															2		2			
56	SANTA ROSA L. SHALLOW NEAR INFLOW - 50SantaRosaSH															2		2			

Map #	Station Name	Dissolved Oxygen		Turbidity		Conductivity		pH		Temperature		Flow		Physical Habitat		Chlorophyll a + Phytoplankton		Microcystin		Fish	
57	STORRIE LAKE MIDDLE, 0.25 MI WEST OF ISLAND - 50StorrieLMid															2		2			
58	Dalton Cny Cr nr 123A - 50Dalton002.3		1				1														
59	Falls Cr. @ CR A18A - 50FallsC004.6												4								
60	Glorieta Creek @ NM 50 - 50Glorie011.4		1				1						2								
Sampling Totals		28	26	8	8	16	19	8	8	15	18	225	218	2	2	26	16	16	0	1	1
Percent Completed		92.9		100.0		118.8		100.0		120.0		96.9		100.0		61.5		0.0		100.0	

4.3.1 Microcystin Sampling

Although scheduled at lake stations, microcystin sample collection was not completed due to a delay in laboratory adoption of the analytical method as a result of the reallocation of resources to COVID-19 response. Higher priority was assigned to monitoring parameters used for assessment.

4.4 Deviations from the 2019-2020 Field Sampling Plan

Major reductions in the implementation of the 2019-2020 Upper Pecos River, San Francisco River, Gila River, Mimbres River, and Lower Rio Grande Field Sampling Plan were necessary as a result of dry conditions, resource limitations, and COVID-19 travel restrictions.

5.0 SUMMARY

The data from this project will be assessed 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 2022-2024 Integrated Report, which is planned for completion in 2022 and will be posted to the SWQB website at https://www.env.nm.gov/surface-water-quality/303d-305b/. In cases where impairments to water or habitat quality are found or confirmed, data from this survey will be used to draft TMDL 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 2019-2020 survey have been validated and verified according to SWQB SOP (NMED/SWQB 2020c) and have been uploaded to USEPA's Water Quality Portal via The Water Quality Exchange (WQX). To download this dataset, visit the Water Quality Portal at https://www.waterqualitydata.us/portal/ and query Organization ID *21NMEX_WQX* and HUC 13060001, or click on this link. 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 through a public records request to the SWQB.

6.0 REFERENCES

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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
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
beta-BHC	Dichlorodifluoromethane
bis(2-Chloroethoxy)methane	Ethyl methacrylate
bis(2-Chloroethyl)ether	Ethylbenzene

Organics (semi-volatiles)	Organics (volatiles)
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
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	