NEW MEXICO ENVIRONMENT DEPARTMENT

Surface Water Quality Bureau

2023-2024 Watershed Survey

FIELD SAMPLING PLAN

Rio Chama Watershed

4/12/2023

Prepared by

Eliza Martinez
Lynette Guevara

APPROVAL PAGE

Lynette Guevara Digitally signed by Lynette Guevara
Date: 2023.04.13 08:37:26 -06'00'

Lynette Guevara
Program Manager, SWQB Monitoring, Assessment, and Standards Section

Date

Miguel Montoya Digitally signed by Miguel Montoya
Date: 2023.04.13 08:48:16 -06'00'

Miguel Montoya
SWQB Quality Assurance Officer

Date

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Surface Water Quality Bureau

Our mission is to preserve, protect, and improve New Mexico's surface water quality for present and future generations.

ACRONYMS

AU	Assessment Unit
BLM	Bureau of Land Management
CALM	Comprehensive Assessment and Listing Methodology
CWA	Clean Water Act
HUC	Hydrologic Unit Code (HUC)
IR	State of New Mexico Clean Water Act §303(d)/305(b) Integrated Report
MASS	Monitoring, Assessment, and Standards Section
MPG	Miles per gallon
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
SQUID	Surface Water Quality Information Database
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 purpose of this Field Sampling Plan (Plan) is to provide a detailed description of the two-year Water Quality Survey to be conducted in the Rio Chama watershed during 2023-2024 by the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB). The NMED SWQB prepared this FSP in accordance with SWQB *Standard Operating Procedure 2.1: Field Sampling Plan Development and Execution* (NMED/SWQB 2023). The Plan describes project objectives and decision criteria, and it includes the sampling schedule with locations, constituents, costs, and frequencies for physical, chemical, and biological data collection. It may be amended as the need arises. Amendments will be documented and justified in the subsequent survey report.

This is a companion document to the SWQB *Quality Assurance Project Plan for Water Quality Management Programs* (NMED/SWQB 2021a) (QAPP). Data will be collected according to the QAPP and the appropriate SWQB Standard Operating Procedures (SOPs). Both the QAPP and SOPs are posted on the SWQB website at https://www.env.nm.gov/surface-water-quality/qaqc/.

The Rio Chama watershed is located in the north-central part of New Mexico, lying north of Santa Fe in Rio Arriba, Sandoval, and Taos counties. The project area (**Figure 1**) consists of the perennial tributaries and lakes with headwaters in the San Juan Mountains. Historic and current land uses in the watersheds include ranching, silviculture, mining, recreation, and some urban and residential development. Land cover in the watershed is composed of evergreen forest, shrub/scrubland, grassland, deciduous and mixed forest, and lotic waters and wetlands. Land ownership in the watersheds includes U.S. Forest Service, Bureau of Land Management (BLM), U.S. Game and Fish, Tribal, and State and Private parcels. The study area encompasses approximately 3,313 square miles (~8,580 kilometers). The Rio Chama watershed is in Omernick Level III Ecoregion 21 (Southern Rockies) (USEPA 2006).

The NMED SWQB last monitored the Rio Chama watershed in 2012 to identify waters attaining New Mexico Water Quality Standards (WQS) and impaired waters (i.e., waters not attaining their specific designated uses). Streams within the watershed 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 along the AU. Lakes are assigned a unique AU for each waterbody. For this survey, selected monitoring locations will be sampled for water quality constituents 4-8 times over two consecutive years. The total number of samples for each location is determined through a priority ranking of Clean Water Act (CWA) §303(d)/ §305(b) Integrated Report (IR) classification, presence of point source discharge(s), and Total Maximum Daily Load (TMDL) status, among other considerations. The framework for monitoring prioritization is discussed in the SWQB 10-Year Monitoring and Assessment Strategy (available at https://www.env.nm.gov/surface-water-quality/protocols-and-planning/) (NMED/SWQB 2016 or current). The type of monitoring planned at each site is discussed and summarized in **Section 5.0,** Sampling Plan.

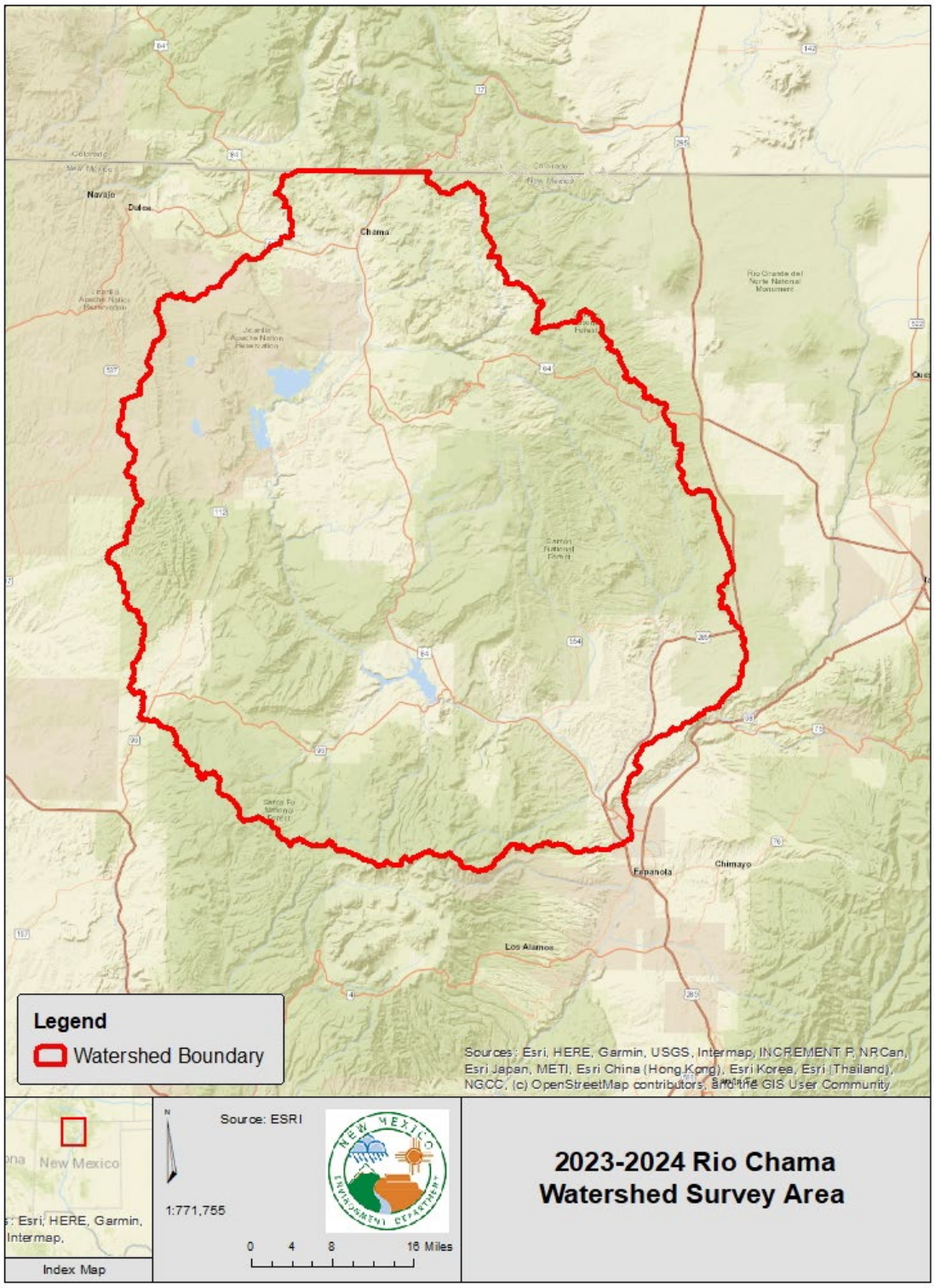


Figure 1. 2023-2024 Rio Chama Watershed Survey Area

2.0 PROJECT PERSONNEL

2.1 Personnel Roles and Responsibilities

Table 1 details the responsibilities for this project. Each team member is responsible for implementing the assigned responsibilities. If individuals are unable to fulfill their duties, it is the individual's responsibility to find assistance and/or a replacement, in coordination with appropriate supervisors. Questions or comments on this Field Sampling Plan should be directed to the MASS project supervisor.

Table 1. Personnel Roles and Responsibilities

Team Member	Position/Role	Responsibilities
Lynette Guevara Monitoring, Assessment, and Standards Section Program Manager Lynette.Guevara@env.nm.gov 505-629-8811	Program Manager	Program Manager responsibilities noted in this FSP are completed in coordination with the Project Supervisor. 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. Ensure the progress of project is kept on track by running SQUID reports and discussing on going data collection activities with Project Team. 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 Jeff Falance Monitoring Team Scientist Jeff.Falance@env.nm.gov 505-946-8713 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	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 collection will be maintained according to SOPs. Write assigned sections of reports and/or other grant deliverables required throughout the project.

Team Member	Position/Role	Responsibilities
505-946-8808		
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. Documents approved changes of FSP in QA project files. Conduct audits as needed to ensure compliance with FSP, QAPP and SOPs.
Jennifer Fullam Jennifer.Fullam@env.nm.gov 505-946-8954	Standards, Planning and Reporting Team (SPRT) Liaison	Provide information and data needs pertaining to water quality standards development and refinement located within the study area.
Heidi Henderson Heidi.Henderson@env.nm.gov 505-819-9986	TMDL and Assessment Team (TAT) Liaison	Provide information and data needs pertaining to TMDL development and assessment to be conducted in the study area.
Susan Lucas Kamat Susan.LucasKamat@env.nm.gov 505-946-8924	Point Source Regulation Section (PSRS) Liaison	Provide information and data needs pertaining to point source discharges located within the study area.
Abe Franklin Abraham.Franklin@env.nm.gov 505-946-8952	Watershed Protection Section (WPS) Liaison	Provide information and data needs pertaining to nonpoint sources of pollution and BMPs located within the study area.
Maryann McGraw Maryann.McGraw@state.nm.us 505-819-9891	Wetlands Program Liaison	Provide information and data needs pertaining to wetlands located within the study area.

2.2 Organization

The Project Manager; Project Supervisor; Project Team; Standards, Planning and Reporting Team Liaison; and TMDL and Assessment Team Liaison report to the MASS Program Manager for the responsibilities defined in this project. The Wetlands Program Liaison reports to the Watershed Protection Section (WPS) Program Manager. The Point Source Regulation Section (PSRS) Liaison and the WPS Liaison are section Program Managers and report to the SWQB Bureau Chief. An organizational chart of the SWQB is available at https://www.env.nm.gov/surface-water-quality/contact-us-3/.

3.0 PROJECT DESCRIPTION

3.1 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 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 2022) (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 Plan are focused toward meeting the goals of the most recent, EPA-approved IR (NMED/SWQB 2022). The impairments for AUs in this survey area listed in **Table 2** were identified during SWQB's most recent survey of this watershed, conducted 2012, and 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 Section 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 the 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 Assessment Unit.

Assessment of surface waters against the WQS occurs after the 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 the EPA and the public to review and comment as part of the update process. Waterbodies determined to be impaired are reported as such every even year (e.g., 2024, 2026) on the State's IR List. TMDLs or TMDL alternatives are typically developed for listed AUs.

Table 2. Rio Chama: Impairment and TMDL Status of Survey Assessment Units

Assessment Unit Name	WQS Reference	IR Category	Impairment(s)	TMDL(s) Completed
Abiquiu Creek (Rio Chama to headwaters)	20.6.4.116	4A	Dissolved Oxygen	Dissolved Oxygen (2004)
Abiquiu Reservoir	20.6.4.117	5/5C	Mercury - Fish Consumption Advisory|PCBS - Fish Consumption Advisory	
Burns Lake (Rio Arriba)	20.6.4.99	5/5A	Nutrients	
Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	20.6.4.119	5/5C	Temperature|Turbidity|Specific Conductance|Nutrients	Temperature (2011)|Specific Conductance (2011)
Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	20.6.4.119	5/5A	Temperature|E.coli	E. coli (2020) | Turbidity (2004)
Canones Creek (Rio Chama to Jicarilla Apache bnd)	20.6.4.119	5/5A	Temperature	
Cecilia Canyon Creek (Rio Capulin to USFS bnd)	20.6.4.119	2		
Chavez Creek (Rio Brazos to headwaters)	20.6.4.119	4A	Temperature	Temperature (2004)
Chihuahuenos Creek (Canones Creek to headwaters)	20.6.4.119	5/5C	Sedimentation/Siltation|Aluminum, total recoverable	
Clear Creek (Rio Gallina to headwaters)	20.6.4.119	2		
Coyote Creek (Rio Puerco de Chama to headwaters)	20.6.4.119	4A	Sedimentation/Siltation	Sedimentation/Siltation (2020)
El Rito Creek (Perennial reaches HWY 554 to headwaters)	20.6.4.115	5/5C	Temperature|E.coli	
El Rito Creek (Perennial reaches Rio Chama to HWY 554)	20.6.4.116	5/5C	Nutrients	
Heron Reservoir	20.6.4.120	5/5A	Temperature	
Hopewell Lake	20.6.4.134	5/5A		
Nabor Creek (Rio Chamita to CO border)	20.6.4.98	3/3A		
Placer Creek (Hopewell Lake to headwaters)	20.6.4.115	4A	Temperature	Temperature (2020)
Placer Creek (Rio Vallecitos to Hopewell Lake)	20.6.4.115	1		
Poleo Creek (Rio Puerco de Chama to headwaters)	20.6.4.119	4A	Sedimentation/Siltation	Sedimentation/Siltation (2020) | Turbidity (2004)
Polvadera Creek (Canones Creek to headwaters)	20.6.4.119	2		TMDL for temperature (2004).
Rio Brazos (Chavez Creek to Jicarilla Apache bnd)	20.6.4.119	2		
Rio Brazos (Rio Chama to Chavez Creek)	20.6.4.119	4A	Temperature	Temperature (2004)

Assessment Unit Name	WQS Reference	IR Category	Impairment(s)	TMDL(s) Completed
Rio Capulin (Rio Gallina to headwaters)	20.6.4.119	4A	E. coli	E. coli (2011)
Rio Chama (Abiquiu Reservoir to El Vado Reservoir)	20.6.4.118	1		
Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	20.6.4.119	4A	Temperature|Nutrients|E. coli	Temperature (2011)|Nutrients (2011)|E. coli (2011)
Rio Chama (Little Willow Creek to CO border)	20.6.4.119	4A	Temperature	Temperature and E. coli (2011)
Rio Chama (Ohkay Owingeh to Abiquiu Dam)	20.6.4.116	1		
Rio Chama (Rio Brazos to Little Willow Creek)	20.6.4.119	4A	Temperature	Temperature (2004), E. coli and nutrients (2011)
Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	20.6.4.119	4A	Nutrients|Temperature|E. coli	Nutrients (2011)|Temperature (2011)|E. coli (2011)
Rio Chamita (Rio Chama to CO border)	20.6.4.119	4A	Nutrients|Temperature|Ammonia, Total|E.coli	Nutrients (2011)|Temperature (1999)|Ammonia, Total (1999)|E. coli (2011
Rio del Oso (Perennial prt Canada del Cerro to headwaters)	20.6.4.115	3/3A		
Rio del Oso (Rio Chama to Canada del Cerro	20.6.4.98	5/5A	Polychlorinated Biphenyls (PCBs)	
Rio Gallina (HWY 96 to headwaters)	20.6.4.119	2		
Rio Gallina (Perennial prt Rio Chama to HWY 96)	20.6.4.118	3/3A		
Rio Nutrias (Perennial prt Rio Chama to headwaters)	20.6.4.119	4A	Turbidity| E. coli	Turbidity (2004)|E. coli (2020)
Rio Ojo Caliente (Arroyo El Rito to Rio Vallecitos)	20.6.4.116	5/5C	Nutrients	
Rio Puerco de Chama (Abiquiu Reservoir to HWY 96)	20.6.4.118	5/5C	Nutrients|Temperature|E. coli	Temperature (2011)|E. coli (2011)
Rio Puerco de Chama (HWY 96 to headwaters)	20.6.4.119	2		
Rio Tusas (Perennial prt Rio Vallecitos to headwaters)	20.6.4.116	4A	Temperature|Nutrients	Temperature (2020)|Nutrients (2011)
Rio Vallecitos (Rio Tusas to headwaters)	20.6.4.115	4A	Temperature	Temperature (2004)
Rito de Tierra Amarilla (HWY 64 to headwaters)	20.6.4.119	5/5C	Temperature|Aluminum, Total Recoverable	
Rito de Tierra Amarilla (Rio Chama to HWY 64)	20.6.4.119	5/5C	Temperature|Nutrients|Turbidity|Sedimentation/Siltation|Specific Conductance	Temperature (2004)|Turbidity (2004)|Sedimentation/Siltation (2004)
Rito Encino (Rio Puerco de Chama to headwaters)	20.6.4.119	5/5A	Sedimentation/Siltation|E. coli	Sedimentation/Siltation (2020)

Assessment Unit Name	WQS Reference	IR Category	Impairment(s)	TMDL(s) Completed
Rito Redondo (Rito Resumidero to headwaters)	20.6.4.119	2		
Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	20.6.4.119	4C	Flow Regime Modification	
Sixto Creek (Rio Chamita to CO border)	20.6.4.119	4A	Temperature	Temperature (2020)
Willow Creek (Jicarilla Apache bnd to headwaters)	20.6.4.119	2		

3.2 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 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

3.3 Monitoring Strategy

SWQB monitoring of surface waters across the State currently occurs, on average, every ten years using a rotational watershed sampling approach. Monitoring occurs during the non-winter months from March through November and focuses on physical, chemical, and biological conditions, mostly in perennial waters, including sampling for most pollutants that have numeric and/or narrative criteria in the WQS.

To achieve the goals outlined in Section 3.2, the NMED SWQB utilizes a targeted monitoring design to address data needs identified for assessment, TMDLs, potential standards revisions, and point source monitoring. Monitoring sites are selected based on the data needs for an assessment unit, accessibility, and representation of and within the assessment unit. Each assessment unit is represented by one or more monitoring stations, each of which receives 4–8 site visits during the survey. Through public outreach, inter-agency coordination, and a scoring system which considers a variety of factors, a two-tier monitoring system – primary and secondary – has been developed to prioritize AUs. High ranking priority waters (primary AUs) receive the greatest amount of monitoring, whereas low ranking waters (i.e., secondary AUs) receive 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 depending on year-1 analytical results.

3.4 Project Schedule

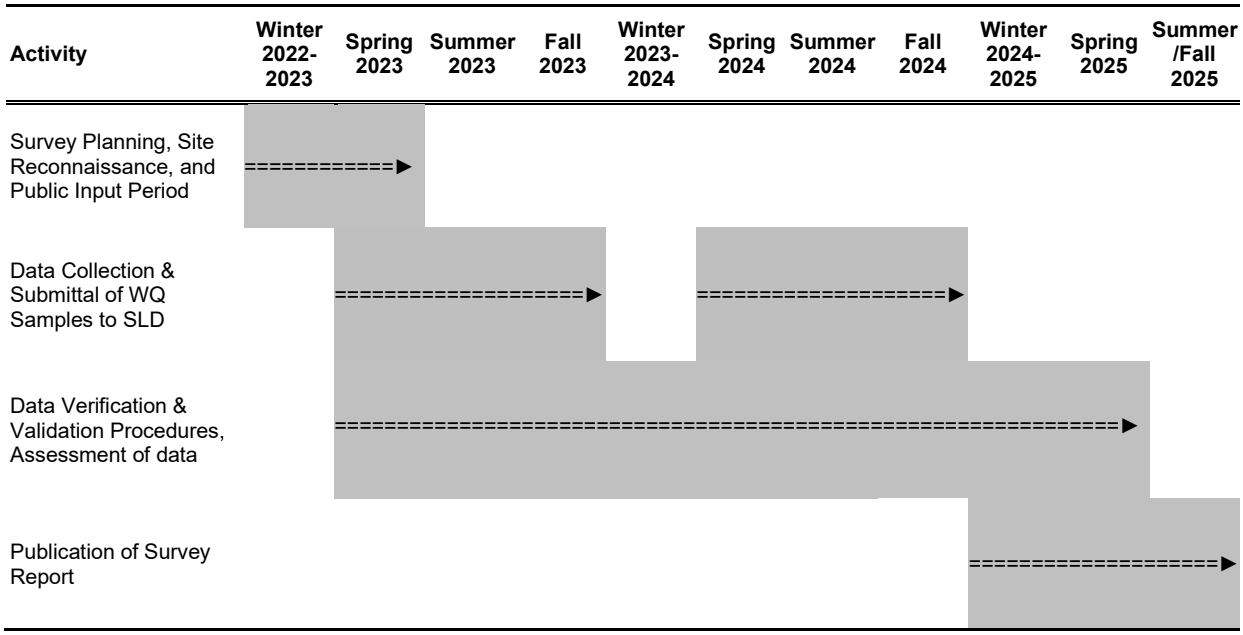
As part of the survey planning process, the NMED SWQB holds a 30-day public comment period to solicit input on any areas of concern within the AUs surveyed and to inform interested parties about the SWQB water quality survey process, the specific sampling plans in the watershed, and the assessment and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

The NMED SWQB will document the progress of this project and track it from inception through implementation to ensure all sampling and analytical activities are 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 incorporation into the 2024-2026 IR List. Once the assessments are complete, the TMDL development process will begin for any identified impairments.

Table 4. Project Schedule



3.5 Project Location

The project area consists of the perennial tributaries and lakes with headwaters in the San Juan Mountains. The survey area includes the Rio Chama watershed (HUC 13020102). The SWQB does not plan on sampling any streams within the formal boundaries of Jicarilla Apache Tribe. **Table 5** shows a complete list of stations illustrated in **Figure 2**.

Table 5. Rio Chama Watershed: Water Quality Stations

Map #	Station Name	Station ID	Assessment Unit	Rationale/Comments
1	Abiquiu Creek at US 84 bridge - 29Abiqui001.8	29Abiqui001.8	Abiquiu Creek (Rio Chama to headwaters)	AU impaired for dissolved oxygen|Bottom of AU
2	ABIQUIU RESERVOIR AT THE DAM - 29AbiquiuRDam	29AbiquiuRDam	Abiquiu Reservoir	Fish Consumption Advisory|Deep station
3	ABIQUIU RESERVOIR CHAMA R INLET - 29AbiqReInlet	29AbiqReInlet	Abiquiu Reservoir	Inlet station
4	Burns Lake at outlet - 29BurnsLkOutlet	29BurnsLkOutlet	Burns Lake (Rio Arriba)	Outlet station
5	Burns Lake deep - 29BurnsLkDp	29BurnsLkDp	Burns Lake (Rio Arriba)	Nutrient impairment|Lake monitoring station
6	Canjilon Creek 5 miles N. of Echo Amp - 29Canjil019.6	29Canjil019.6	Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	Wet station
7	Canjilon Creek above Abiquiu Reservoir at US 84 - 29Canjil006.2	29Canjil006.2	Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	Historically dry station|Flow only
8	Canones Creek at first CR 194 crossing upstream of HWY 96 - 29CanonA003.4	29CanonA003.4	Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	

9	Canones Creek at HWY 96 - 29CanonA001.7	29CanonA001.7	Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	
10	Canones Creek above HWY 84 (near Chama) - 29CanonB002.4	29CanonB002.4	Canones Creek (Rio Chama to Jicarilla Apache bnd)	AU impaired for temperature and E. coli| Bottom of AU
11	Cecilia Canyon Creek at FR 171	29Cecili000.1	Cecilia Canyon Creek (Rio Capulin to USFS bnd)	Bottom of AU
12	CHAVEZ CREEK AT HWY 512 ABOVE THE RIO BRAZOS - 29Chavez000.1	29Chavez000.1	Chavez Creek (Rio Brazos to headwaters)	AU impaired for temperature|Bottom of AU
13	Chihuahuenos Creek at FR 448 - 29Chihua005.8	29Chihua005.8	Chihuahuenos Creek (Canones Creek to headwaters)	AU impaired for sedimentation/siltation and total recoverable aluminum|Bottom of AU
14	Clear Creek at FR 76 - 29ClearC000.1	29ClearC000.1	Clear Creek (Rio Gallina to headwaters)	Bottom of AU
15	Coyote Creek at FR 316 - 29Coyote003.8	29Coyote003.8	Coyote Creek (Rio Puerco de Chama to headwaters)	AU impaired for sedimentation/siltation|Bottom of AU
16	El Rito Creek above El Rito - 29ElRito025.4	29ElRito025.4	El Rito Creek (Perennial reaches HWY 554 to headwaters)	E. coli and temperature impairment |Bottom of AU
17	El Rito Creek on FS 7 miles blw El Rito - 29ElRito008.6	29ElRito008.6	El Rito Creek (Perennial reaches Rio Chama to HWY 554)	AU impaired for nutrients| Bottom of AU
18	HERON LAKE DEEP DAM - 29HeronLDpDam	29HeronLDpDam	Heron Reservoir	Lake station
19	HERON LAKE SHALLOW - 29HeronLakeSH	29HeronLakeSH	Heron Reservoir	Shallow station
20	HOPEWELL - 29HopewellLk	29HopewellLk	Hopewell Lake	Impaired for nutrients|Lake station
21	Nabor Creek 5 yards upstream of Rio Chamita - 29NaborC000.1	29NaborC000.1	Nabor Creek (Rio Chamita to CO border)	Bottom of AU
22	Placer Creek at NM 64 - 29Placer005.1	29Placer005.1	Placer Creek (Hopewell Lake to headwaters)	AU impaired for temperature|Bottom of AU|Inlet
23	Placer Creek above Box - 29Placer001.0	29Placer001.0	Placer Creek (Rio Vallecitos to Hopewell Lake)	Bottom of AU
24	Placer Creek below Hopwell Lake - 29Placer003.8	29Placer003.8	Placer Creek (Rio Vallecitos to Hopewell Lake)	Outlet station
25	Poleo Creek at FR 103 - 29PoleoC009.5	29PoleoC009.5	Poleo Creek (Rio Puerco de Chama to headwaters)	AU impaired for Sedimentation/Siltation|Bottom of AU
26	Polvadera Creek at Forest Road 422 - 29Polvad009.8	29Polvad009.8	Polvadera Creek (Canones Creek to headwaters)	Bottom of AU
27	RIO BRAZOS ABOVE U.S. HIGHWAY 84 BRIDGE - 29RBrazo001.6	29RBrazo001.6	Rio Brazos (Rio Chama to Chavez Creek)	AU impaired for temperature, Bottom of AU
28	Rio Capulin above Cecilia Canyon Creek - 29RCapul010.3	29RCapul010.3	Rio Capulin (Rio Gallina to headwaters)	AU impaired for E. coli|Bottom of AU
29	Rio Chama above Abiquiu Reservoir at USGS gage - 29RChama079.5	29RChama079.5	Rio Chama (Abiquiu Reservoir to El Vado Reservoir)	Lake inlet station
30	Heron Lake outfall - 29HeronOutfall	29HeronOutfall	Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	Lake outlet station|AU impaired for Temperature
31	Rio Chama abv Heron Lake outfall - 29RChama137.5	29RChama137.5	Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	Lake inlet station|AU impaired for E.coli, Nutrients, Temperature

32	Rio Chama at NM 17 * 29RChama183.4	29RChama183.4	Rio Chama (Little Willow Creek to CO border)	AU impaired for temperature, |Bottom of AU
33	Abiquiu WWTP - NM0024830	NM0024830	Rio Chama (Ohkay Owingeh to Abiquiu Dam)	WWTP
34	Rio Chama at Hwy 554 - 29RChama038.3	29RChama038.3	Rio Chama (Ohkay Owingeh to Abiquiu Dam)	Bottom of AU
35	Rio Chama Below Chama Town * 29RChama174.0	29RChama174.0	Rio Chama (Rio Brazos to Little Willow Creek)	AU impaired for temperature|Bottom of AU
36	Los Ojos Hatchery outfall 1 - NM0030139_1	NM0030139_1	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	NPDES permit
37	Los Ojos Hatchery outfall 2 - NM0030139_2	NM0030139_2	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	NPDES permit
38	Rio Chama below Rito de Tierra Amarilla above gage 08284100 - 29RChama147.0	29RChama147.0	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	AU impaired for E. coli, Nutrients, temperature|Bottom of AU
39	Chama WWTP outfall - NM0027731	NM0027731	Rio Chamita (Rio Chama to CO border)	NPDES permit
40	Rio Chamita below Chama WWTP outfall - 29RChami002.7	29RChami002.7	Rio Chamita (Rio Chama to CO border)	Located below WWTP, AU impaired for Ammonia, Total|E. coli|Nutrients|Temperature
41	Rio del Oso at FR 31 - 29RioOso022.2	29RioOso022.2	Rio del Oso (Perennial prt Canada del Cerro to headwaters)	Bottom of AU
42	Rio del Oso above Rio Chama - 29RioOso004.7	29RioOso004.7	Rio del Oso (Rio Chama to Canada del Cerro)	AU impaired for PCBs| Bottom of AU
43	Rio Gallina at FR 76 - 29RGalli045.1	29RGalli045.1	Rio Gallina (HWY 96 to headwaters)	Bottom of AU
44	Rio Gallina at confluence with Rio Chama - 29RGalli000.5	29RGalli000.5	Rio Gallina (Perennial prt Rio Chama to HWY 96)	Bottom of AU
45	Rio Nutrias abv Rio Chama - 29RNutri005.4	29RNutri005.4	Rio Nutrias (Perennial prt Rio Chama to headwaters)	AU impaired for E. coli and turbidity|Bottom of AU
46	Rio Nutrias at US 84 - 29RNutri028.4	29RNutri028.4	Rio Nutrias (Perennial prt Rio Chama to headwaters)	AU impaired for E. coli and turbidity
47	Rio Ojo Caliente at Hwy 414 at Hot Springs bridge - 29ROjoCa026.1	29ROjoCa026.1	Rio Ojo Caliente (Arroyo El Rito to Rio Vallecitos)	AU impaired for nutrients| Bottom of AU
48	Rio Puerco de Chama at CR 211 - 29RPuerc011.0	29RPuerc011.0	Rio Puerco de Chama (Abiquiu Reservoir to HWY 96)	AU impaired for E. coli, temperature, and nutrients|Bottom of AU
49	Rio Puerco de Chama at FR 103 - 29RPuerc037.5	29RPuerc037.5	Rio Puerco de Chama (HWY 96 to headwaters)	Bottom of AU
50	Rio Tusas at forest service boundary - 29RTusas001.9	29RTusas001.9	Rio Tusas (Perennial prt Rio Vallecitos to headwaters)	AU impaired for nutrients, temperature |Bottom of AU
51	Rio Vallecitos 8.4 miles above Vallecitos at river crossing - 29RValle030.5	29RValle030.5	Rio Vallecitos (Rio Tusas to headwaters)	AU impaired for temperature
52	Rio Vallecitos abv Rio Ojo Caliente - 29RValle000.1	29RValle000.1	Rio Vallecitos (Rio Tusas to headwaters)	AU impaired for temperature|Bottom of AU
53	Rito Tierra Amarilla at Hwy 64 - 29RTierr026.1	29RTierr026.1	Rito de Tierra Amarilla (HWY 64 to headwaters)	AU impaired for total recoverable aluminum and temperature|Bottom of AU

54	RITO TIERRA AMARILLA AT THE HWY 112 BRIDGE ABOVE - 29RTierr000.7	29RTierr000.7	Rito de Tierra Amarilla (Rio Chama to HWY 64)	AU impaired for temperature, nutrients, sedimentation/siltation, specific conductants, and turbidity|Bottom of AU
55	Rito Encino at FR 100Z - 29REncin009.7	29REncin009.7	Rito Encino (Rio Puerco de Chama to headwaters)	AU impaired for sedimentation/siltation and conductance. coli|Bottom of AU
56	Rito Resumidero at FR 93 * 29RResum002.5	29RResum002.5	Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	AU impaired for flow regime modification|Wet station
57	Rito Resumidero below Resumidero Spring - 29RResum001.9	29RResum001.9	Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	AU impaired for flow regime modification. Flow only site.
58	Sixto Creek above Rio Chamita - 29SextoC000.1	29SixtoC000.1	Sixto Creek (Rio Chamita to CO border)	AU impaired for temperature|
59	Willow Creek abv Heron Lake - 29Willow000.1	29Willow000.1	Willow Creek (Jicarilla Apache bnd to headwaters)	Bottom of AU

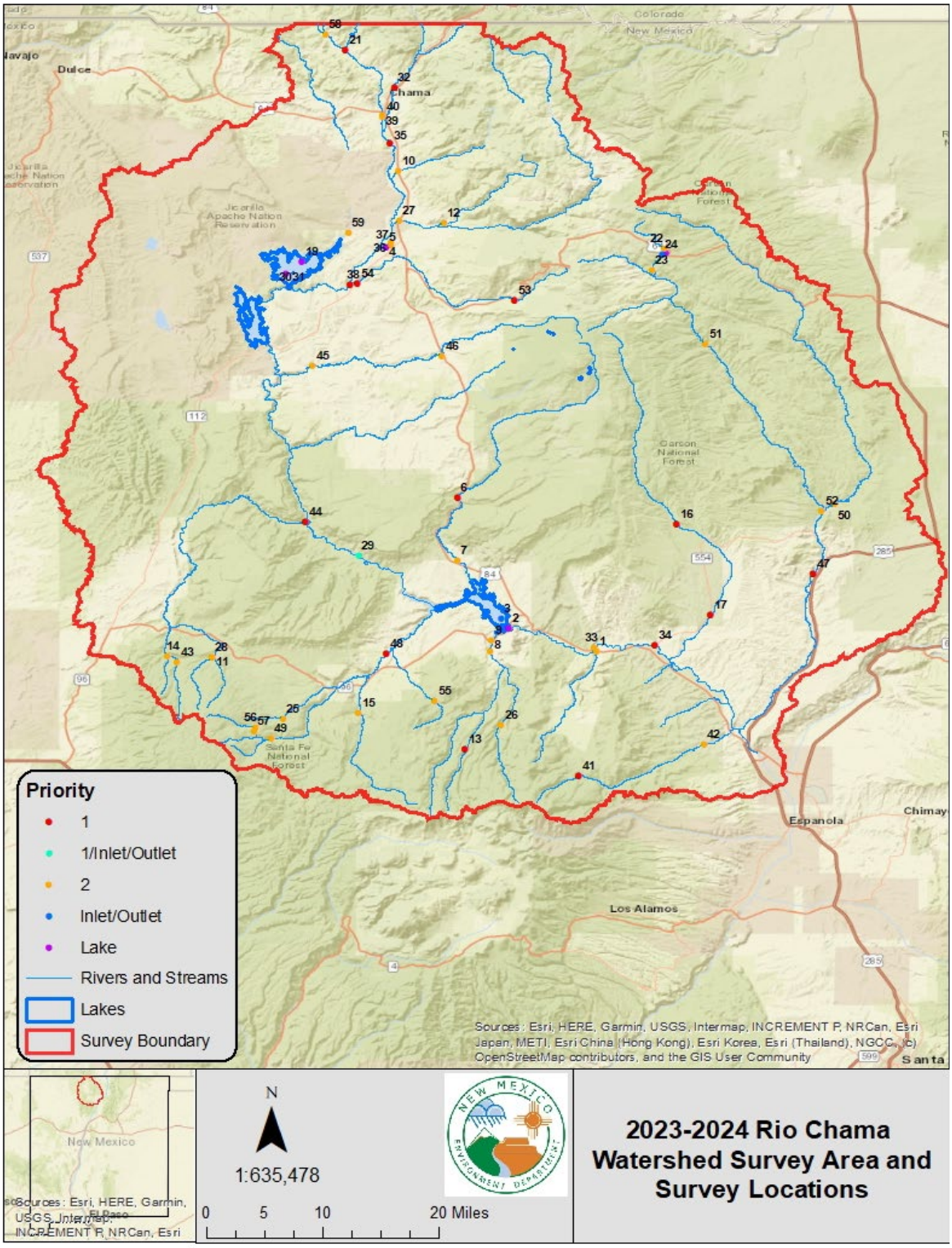


Figure 2. Rio Chama Watershed Sampling Area and Monitoring Locations

4.0 DOCUMENTATION

Project documents will include this field sampling plan, field sheets (including chemistry, biohabitat, probable source observations and data logger deployment/retrieval sheets), calibration records, 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 will be maintained in accordance with the requirements of the SWQB QAPP for Water Quality Management Programs (NMED/SWQB 2021a).

The survey data will be organized within the following project folder in the SWQB database:

- Rio Chama Watershed (2023-2024)

The NMED SWQB will document project activities on SWQB Monitoring Field Sheets and enter and maintain information from field sheets in the SWQB database in accordance with the SWQB QAPP and SOPs. Analytical results will be electronically transferred into the SWQB database and uploaded to US EPA'S Water Quality Exchange (WQX) database. The project is completed once the Survey Report is finalized.

Narrative descriptions of progress, any plan deviations, issues, or corrective actions throughout the project will be documented in the mid-survey revised FSP and the Survey Report. Any deviations from SOPs and other field, laboratory, and data analysis practices will be presented to the MASS Program Manager and the Quality Assurance Officer for consideration and approval.

5.0 SAMPLING PLAN

5.1 Chemistry Sampling

Sample collection techniques, preservation and acidification requirements, equipment, and quality control activities associated with the sampling of surface water for analytes listed in Table 6 will be conducted in accordance with SWQB SOP 8.1 Chemical Sampling – Equipment Cleaning Procedure, SOP 8.2 Chemical Sampling in Lotic Environments, SOP 9.1 Bacteriological Sampling and SOP 12.1 Lake Sampling.

Water quality samples will be analyzed by the SLD or the SWQB laboratory in accordance with procedures outlined in the SWQB SOPs. Nutrient samples where high phosphorus are levels are expected, such as WWTPs, will be analyzed using a method with a higher reporting limit.

Table 6 outlines the water quality analytes to be measured during the two-year survey and their sampling frequency. The Priority column of **Table 6** documents chemical sampling priority for each sampling station. The numbers listed within the analyte columns describe the number of analyte samples planned for each station during the 2023-2024 survey. The footnotes to **Table 6** contain more detailed information.

Chemistry sample analytical suites for each station are planned based on the data needs identified for each assessment unit and to address the most common sources of impairment in lakes and streams. Due to limited resources, not all the water quality criteria listed in 20.6.4.900 NMAC will be sampled at all stations. Radionuclides and volatile/semi-volatile organic compounds will be sampled in major tributaries,

above and below NPDES permit discharges, and lakes. Microbial Source Tracking (MST) sampling may be conducted at three stations on the Rio Chamita in the Spring of 2023. PCBs generally will not be sampled in the water column since these compounds have not been detected at levels of concern in previous water samples for these areas. Assessment units with current or historic metals impairments have received higher numbers of metals samples.

In addition to the analytes listed, instantaneous measurements for field parameters such as temperature, specific conductance, salinity, dissolved oxygen concentration, dissolved oxygen saturation, pH, and turbidity will be measured at each site using an In-Situ® multi-parameter sonde in accordance with SWQB SOPs.

Table 6. Rio Chama Watershed: Water Chemistry Sampling Frequency

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
1	Abiquiu Creek at US 84 bridge - 29Abiqui001.8	29Abiqui001.8	Abiquiu Creek (Rio Chama to headwaters)	2	4	4		4	4	4	4			
2	ABIQUIU RESERVOIR AT THE DAM - 29AbiquiuRDam	29AbiquiuRDam	Abiquiu Reservoir	L	4	4		4	4	4	4	2	2	2
3	ABIQUIU RESERVOIR CHAMA R INLET - 29AbiqReInlet	29AbiqReInlet	Abiquiu Reservoir	IO	4	4		4	4	4	4			
4	Burns Lake at outlet - 29BurnsLkOutlet	29BurnsLkOutlet	Burns Lake (Rio Arriba)	IO	4	4		4	4	4	4			
5	Burns Lake deep - 29BurnsLkDp	29BurnsLkDp	Burns Lake (Rio Arriba)	L	4	4		4	4	4	4	2	2	2
6	Canjilon Creek 5 miles N. of Echo Amp - 29Canjil019.6	29Canjil019.6	Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	1	8	8		8	6	6	8			
7	Canjilon Creek above Abiquiu Reservoir at US 84 - 29Canjil006.2[10]	29Canjil006.2	Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	2										

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
8	Canones Creek at first CR 194 crossing upstream of HWY 96 - 29CanonA003.4	29CanonA003.4	Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	2	4	4		4	4	4	4			
9	Canones Creek at HWY 96 - 29CanonA001.7	29CanonA001.7	Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	2	4	4		4	4	4	4			
10	Canones Creek above HWY 84 (near Chama) - 29CanonB002.4	29CanonB002.4	Canones Creek (Rio Chama to Jicarilla Apache bnd)	2	4	4		4	4	4	4			
11	Cecilia Canyon Creek at FR 171	29Cecili000.1	Cecilia Canyon Creek (Rio Capulin to USFS bnd)	2	4	4		4	4	4	4			
12	CHAVEZ CREEK AT HWY 512 ABOVE THE RIO BRAZOS - 29Chavez000.1	29Chavez000.1	Chavez Creek (Rio Brazos to headwaters)	2	4	4		4	4	4	4			
13	Chihuahuenos Creek at FR 448 - 29Chihua005.8	29Chihua005.8	Chihuahuenos Creek (Canones Creek to headwaters)	1	8	8		8	6	6	8			
14	Clear Creek at FR 76 - 29ClearC000.1	29ClearC000.1	Clear Creek (Rio Gallina to headwaters)	2	4	4		4	4	4	4			
15	Coyote Creek at FR 316 - 29Coyote003.8	29Coyote003.8	Coyote Creek (Rio Puerco de Chama to headwaters)	2	4	4		4	4	4	4			
16	El Rito Creek above El Rito - 29ElRito025.4	29ElRito025.4	El Rito Creek (Perennial reaches HWY	1	8	8		8	6	6	8			

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
			554 to headwaters)											
17	El Rito Creek on FS 7 miles blw El Rito - 29ElRito008.6	29ElRito008.6	El Rito Creek (Perennial reaches Rio Chama to HWY 554)	1	8	8		8	6	6	8			
18	HERON LAKE DEEP DAM - 29HeronLDpDam	29HeronLDpDam	Heron Reservoir	L	4	4		4	4	4	4	2	2	2
19	HERON LAKE SHALLOW - 29HeronLakeSH	29HeronLakeSH	Heron Reservoir	L	4	4		4	4	4	4	2	2	2
20	HOPEWELL - 29HopewellLk	29HopewellLk	Hopewell Lake	L	4	4		4	4	4	4	2	2	2
21	Nabor Creek 5 yards upstream of Rio Chamita - 29NaborC000.1	29NaborC000.1	Nabor Creek (Rio Chamita to CO border)	1	8	8		8	6	6	8			
22	Placer Creek at NM 64 - 29Placer005.1	29Placer005.1	Placer Creek (Hopewell Lake to headwaters)	2	4	4		4	4	4	4			
23	Placer Creek above Box - 29Placer001.0	29Placer001.0	Placer Creek (Rio Vallecitos to Hopewell Lake)	2	4	4		4	4	4	4			
24	Placer Creek below Hopwell Lake - 29Placer003.8	29Placer003.8	Placer Creek (Rio Vallecitos to Hopewell Lake)	IO	4	4		4	4	4	4			
25	Poleo Creek at FR 103 - 29PoleoC009.5	29PoleoC009.5	Poleo Creek (Rio Puerco de Chama to headwaters)	2	4	4		4	4	4	4			
26	Polvadera Creek at Forest Road 422 - 29Polvad009.8	29Polvad009.8	Polvadera Creek (Canones Creek to headwaters)	2	4	4		4	4	4	4			

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
27	RIO BRAZOS ABOVE U.S. HIGHWAY 84 BRIDGE - 29RBrazo001.6	29RBrazo001.6	Rio Brazos (Rio Chama to Chavez Creek)	2	4	4		4	4	4	4			
28	Rio Capulin above Cecilia Canyon Creek - 29RCapul010.3	29RCapul010.3	Rio Capulin (Rio Gallina to headwaters)	2	4	4		4	4	4	4			
29	Rio Chama above Abiquiu Reservoir at USGS gage - 29RChama079.5	29RChama079.5	Rio Chama (Abiquiu Reservoir to El Vado Reservoir)	1/IO	8	8		8	6	6	8			
30	Heron Lake outfall - 29HeronOutfall	29HeronOutfall	Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	IO	4	4		4	4	4	4			
31	Rio Chama abv Heron Lake outfall - 29RChama137.5	29RChama137.5	Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	IO	4	4		4	4	4	4			
32	Rio Chama at NM 17 * 29RChama183.4	29RChama183.4	Rio Chama (Little Willow Creek to CO border)	1	8	8		8	6	6	8			
33	Abiquiu WWTP - NM0024830	NM0024830	Rio Chama (Ohkay Owingeh to Abiquiu Dam)	2	4		4	4	4	4	4			
34	Rio Chama at Hwy 554 - 29RChama038.3	29RChama038.3	Rio Chama (Ohkay Owingeh to Abiquiu Dam)	1	8	8		8	6	6	8	2	2	2
35	Rio Chama Below Chama Town * 29RChama174.0	29RChama174.0	Rio Chama (Rio Brazos to Little Willow Creek)	1	8	8		8	6	6	8			

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
36	Los Ojos Hatchery outfall 1 - NM0030139_1	NM0030139_1	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	2	4		4	4	4	4	4			
37	Los Ojos Hatchery outfall 2 - NM0030139_2	NM0030139_2	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	2	4		4	4	4	4	4			
38	Rio Chama below Rito de Tierra Amarilla above gage 08284100 - 29RChama147.0	29RChama147.0	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	1	8	8		8	6	6	8			
39	Chama WWTP outfall - NM0027731	NM0027731	Rio Chamita (Rio Chama to CO border)	2	4		4	4	4	4	4			
40	Rio Chamita below Chama WWTP outfall - 29RChami002.7[7]	29RChami002.7	Rio Chamita (Rio Chama to CO border)	2	4	4		4	4	4	4			
41	Rio del Oso at FR 31 - 29RioOso022.2	29RioOso022.2	Rio del Oso (Perennial prt Canada del Cerro to headwaters)	1	8	8		8	6	6	8			
42	Rio del Oso above Rio Chama - 29RioOso004.7	29RioOso004.7	Rio del Oso (Rio Chama to Canada del Cerro)	2	4	4		4	4	4	4			
43	Rio Gallina at FR 76 - 29RGalli045.1	29RGalli045.1	Rio Gallina (HWY 96 to headwaters)	2	4	4		4	4	4	4			
44	Rio Gallina at confluence with Rio Chama - 29RGalli000.5	29RGalli000.5	Rio Gallina (Perennial prt Rio Chama to HWY 96)	1	8	8		8	6	6	8			
45	Rio Nutrias abv Rio Chama - 29RNutri005.4	29RNutri005.4	Rio Nutrias (Perennial prt Rio Chama to headwaters)	2	4	4		4	4	4	4			

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
46	Rio Nutrias at US 84 - 29RNutri028.4	29RNutri028.4	Rio Nutrias (Perennial prt Rio Chama to headwaters)	2	4	4		4	4	4	4			
47	Rio Ojo Caliente at Hwy 414 at Hot Springs bridge - 29ROjoCa026.1	29ROjoCa026.1	Rio Ojo Caliente (Arroyo El Rito to Rio Vallecitos)	1	8	8		8	6	6	8			
48	Rio Puerco de Chama at CR 211 - 29RPuerc011.0	29RPuerc011.0	Rio Puerco de Chama (Abiquiu Reservoir to HWY 96)	1	8	8		8	6	6	8			
49	Rio Puerco de Chama at FR 103 - 29RPuerc037.5	29RPuerc037.5	Rio Puerco de Chama (HWY 96 to headwaters)	2	4	4		4	4	4	4			
50	Rio Tusas at forest service boundary - 29RTusas001.9	29RTusas001.9	Rio Tusas (Perennial prt Rio Vallecitos to headwaters)	2	4	4		4	4	4	4			
51	Rio Vallecitos 8.4 miles above Vallecitos at river crossing - 29RValle030.5	29RValle030.5	Rio Vallecitos (Rio Tusas to headwaters)	2	4	4		4	4	4	4			
52	Rio Vallecitos abv Rio Ojo Caliente - 29RValle000.1	29RValle000.1	Rio Vallecitos (Rio Tusas to headwaters)	2	4	4		4	4	4	4			
53	Rito Tierra Amarilla at Hwy 64 - 29RTierr026.1	29RTierr026.1	Rito de Tierra Amarilla (HWY 64 to headwaters)	1	8	8		8	6	6	8			
54	RITO TIERRA AMARILLA AT THE HWY 112 BRIDGE ABOVE - 29RTierr000.7	29RTierr000.7	Rito de Tierra Amarilla (Rio Chama to HWY 64)	1	8	8		8	6	6	8			

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	TDS/TSS[2]	Nutrients (Low P)[3]	Nutrients (High P)[4]	Dissolved Organic Carbon	Total Metals[5]	Dissolved Metals[6]	E. coli	Volatile Organics[8]	Semi-volatile Organics[8]	Radionuclides[9]
55	Rito Encino at FR 100Z - 29REncin009.7	29REncin009.7	Rito Encino (Rio Puerco de Chama to headwaters)	2	4	4		4	4	4	4			
56	Rito Resumidero at FR 93 * 29RResum002.5	29RResum002.5	Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	2	4	4		4	4	4	4			
57	Rito Resumidero below Resumidero Spring - 29RResum001.9[10]	29RResum001.9	Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	2										
58	Sixto Creek above Rio Chamita - 29SextoC000.1	29SixtoC000.1	Sixto Creek (Rio Chamita to CO border)	2	4	4		4	4	4	4			
59	Willow Creek abv Heron Lake - 29Willow000.1	29Willow000.1	Willow Creek (Jicarilla Apache bnd to headwaters)	2	4	4		4	4	4	4			
Quality Control			Blanks Collected per QAPP		30	28		30		26	30			6
Total Number of Samples					322	308	12	322	260	286	322	16	16	22

[1] Priority rankings: 1 are highest priorities (sampled 8x), and 2 the lowest (sampled 4x). "L" are lake stations; "IO" are lake inlets or outlets; "LSO" is "logger station only" and no water chemistry sampling is planned at the station.

[2] Asterisk (*) next to station indicates TDS/TSS/Cl-/SO4 will be collected due to water quality standards for sulfate and chloride.

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

[4] Nutrient samples where high phosphorus levels are expected, such as WWTPs, will be analyzed using a method with a higher reporting limit.

[5] Suite includes aluminum, mercury, selenium.

[6] 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.

[7] Microbial source location to determine fecal pollution sources

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

[9]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.
[10]Flow site only.

5.2 Physical Habitat, Biological Sampling, and Datalogger Deployment

Measuring biological response indicators (fish, macroinvertebrates, and phytoplankton) concurrent to physical habitat measurements and chemistry gives an overall interpretation of the biological integrity of the reach represented. These data also provide further information such as characteristics of sediment and nutrients currently cycling through the stream and potential sources of water quality stress.

SWQB currently collects fish, periphyton, macroinvertebrates and physical habitat data at select sites to assess waterbodies for potential impairment from increased temperatures, sediment deposition, nutrient enrichment, and toxic pollutants.

Sampling methods will be conducted in accordance with the SWQB SOPs. Fish data will be collected in accordance with SOP 11.4 Fish Community Sampling. Macroinvertebrate sampling will be conducted in accordance with SOP 11.2 Benthic Macroinvertebrates. Biological sampling will be conducted within a biological index period for appropriate comparability of samples and life history requirements. Physical habitat data will be collected in accordance with SOP 5.0 Physical Habitat Measurements. Chlorophyll *a* and microcystin will be collected in accordance with SOP 12.1 Lake Sampling.

Sondes and data loggers will be deployed at select sites in the stream for a minimum of 7 days to record specific conductance, dissolved oxygen, turbidity, or pH fluctuations. For more information on minimum deployment intervals needed to complete the regarding assessment for specific parameters please refer to the most up to date CALM (NMED/SWQB 2021b). Thermographs (water temperature data loggers) are generally deployed from May through September in targeted AUs throughout the survey to measure temperature fluctuations. Thermographs will be deployed in accordance with SOP 6.3 Temperature data loggers.

Resources, site access, and other issues do not allow for the deployment of datalogging instruments or collection of biological and habitat data at every AU. Stations are selected for biological and physical habitat monitoring based on 1) current IR status, 2) results from nutrient, sediment, and temperature data, 3) observations of the surrounding land use including upland and riparian habitat conditions, and observation of probable source(s). Additional sites determined to be in “reference” or “best available condition” will also be selected for biological and physical monitoring for inclusion in development and refinement of biological and habitat criteria. **Table 7** summarizes the biological and habitat sampling that is planned for this survey. The Priority column of **Table 7** documents chemical sampling priority for each sampling station. The numbers listed within the **Table 7** data type columns describe the type and number of data collection events planned for each station during the 2023-2024 survey. The footnotes to **Table 7** contain more detailed information.

Sonde/DO/conductivity logger deployments described in **Table 7** are planned in accordance with the data requirements identified in the current 2021 CALM (NMED/SWQB 2021b). Revision of the CALM in 2023 may lead to changes in sampling methods or the sampling schedule. Any resulting changes to the FSP will be documented in the 2024 revision of this FSP or in the survey report.

Table 7. Rio Chama Watershed: Biological and Habitat Sampling

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	Sonde/DO/Cond[2,3]	Thermograph	Flow[4]	Physical Habitat	Chlorophyll a[5]	Phytoplankton	Microcystins[6]	Macro-invertebrates	Fish
1	Abiquiu Creek at US 84 bridge - 29Abiqui001.8	29Abiqui001.8	Abiquiu Creek (Rio Chama to headwaters)	2	D		4	1					
2	ABIQUIU RESERVOIR AT THE DAM - 29AbiquiuRDam	29AbiquiuRDam	Abiquiu Reservoir	L					4	4	4		1
3	ABIQUIU RESERVOIR CHAMA R INLET - 29AbiqReInlet	29AbiqReInlet	Abiquiu Reservoir	IO			4						
4	Burns Lake at outlet - 29BurnsLkOutlet	29BurnsLkOutlet	Burns Lake (Rio Arriba)	IO									
5	Burns Lake deep - 29BurnsLkDp	29BurnsLkDp	Burns Lake (Rio Arriba)	L			4		4	4	4		
6	Canjilon Creek 5 miles N. of Echo Amp - 29Canjil019.6	29Canjil019.6	Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	1	S	1	4	1					
7	Canjilon Creek above Abiquiu Reservoir at US 84 - 29Canjil006.2*	29Canjil006.2	Canjilon Ck (Perennial portions Abiquiu Rsrv to headwaters)	2			4						
8	Canones Creek at first CR 194 crossing upstream of HWY 96 - 29CanonA003.4	29CanonA003.4	Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	2	D	1	4	1					
9	Canones Creek at HWY 96 - 29CanonA001.7	29CanonA001.7	Canones Creek (Abiquiu Rsvr to Chihuahuenos Ck)	2		1	8						
10	Canones Creek above HWY 84 (near Chama) - 29CanonB002.4	29CanonB002.4	Canones Creek (Rio Chama to Jicarilla Apache bnd)	2	D	1	4	1					
11	Cecilia Canyon Creek at FR 171	29Cecili000.1	Cecilia Canyon Creek (Rio Capulin to USFS bnd)	2			4						

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	Sonde/DO/Cond[2,3]	Thermograph	Flow[4]	Physical Habitat	Chlorophyll a[5]	Phytoplankton	Microcystins[6]	Macro-invertebrates	Fish
12	CHAVEZ CREEK AT HWY 512 ABOVE THE RIO BRAZOS - 29Chavez000.1	29Chavez000.1	Chavez Creek (Rio Brazos to headwaters)	2		1	4						
13	Chihuahuenos Creek at FR 448 - 29Chihua005.8	29Chihua005.8	Chihuahuenos Creek (Canones Creek to headwaters)	1			8	1					
14	Clear Creek at FR 76 - 29ClearC000.1	29ClearC000.1	Clear Creek (Rio Gallina to headwaters)	2			4						
15	Coyote Creek at FR 316 - 29Coyote003.8	29Coyote003.8	Coyote Creek (Rio Puerco de Chama to headwaters)	2			4	1					
16	El Rito Creek above El Rito - 29ElRito025.4	29ElRito025.4	El Rito Creek (Perennial reaches HWY 554 to headwaters)	1		1	8	1					
17	El Rito Creek on FS 7 miles blw El Rito - 29ElRito008.6	29ElRito008.6	El Rito Creek (Perennial reaches Rio Chama to HWY 554)	1	D		8						
18	HERON LAKE DEEP DAM - 29HeronLDpDam	29HeronLDpDam	Heron Reservoir	L					4	4	4		
19	HERON LAKE SHALLOW - 29HeronLakeSH	29HeronLakeSH	Heron Reservoir	L					4	4	4		
20	HOPEWELL - 29HopewellLk	29HopewellLk	Hopewell Lake	L					4	4	4		
21	Nabor Creek 5 yards upstream of Rio Chamita - 29NaborC000.1	29NaborC000.1	Nabor Creek (Rio Chamita to CO border)	1			4	1					
22	Placer Creek at NM 64 - 29Placer005.1	29Placer005.1	Placer Creek (Hopewell Lake to headwaters)	2		1	4	1					
23	Placer Creek above Box - 29Placer001.0	29Placer001.0	Placer Creek (Rio Vallecitos to Hopewell Lake)	2			4	1					
24	Placer Creek below Hopwell	29Placer003.8	Placer Creek (Rio Vallecitos	IO			4						

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	Sonde/DO/Cond[2,3]	Thermograph	Flow[4]	Physical Habitat	Chlorophyll a[5]	Phytoplankton	Microcystins[6]	Macro-invertebrates	Fish
	Lake - 29Placer003.8		to Hopewell Lake)										
25	Poleo Creek at FR 103 - 29PoleoC009.5	29PoleoC009.5	Poleo Creek (Rio Puerco de Chama to headwaters)	2			4	1					
26	Polvadera Creek at Forest Road 422 - 29Polvad009.8	29Polvad009.8	Polvadera Creek (Canones Creek to headwaters)	2			4	1					
27	RIO BRAZOS ABOVE U.S. HIGHWAY 84 BRIDGE - 29RBrazo001.6	29RBrazo001.6	Rio Brazos (Rio Chama to Chavez Creek)	2		1	4	1					
28	Rio Capulin above Cecilia Canyon Creek - 29RCapul010.3	29RCapul010.3	Rio Capulin (Rio Gallina to headwaters)	2			4	1					
29	Rio Chama above Abiquiu Reservoir at USGS gage - 29RChama079.5	29RChama079.5	Rio Chama (Abiquiu Reservoir to El Vado Reservoir)	1/IO	D		8						
30	Heron Lake outfall - 29HeronOutfall	29HeronOutfall	Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	IO			4						
31	Rio Chama abv Heron Lake outfall - 29RChama137.5	29RChama137.5	Rio Chama (El Vado Reservoir to Rito de Tierra Amarilla)	IO	D		4						
32	Rio Chama at NM 17 * 29RChama183.4	29RChama183.4	Rio Chama (Little Willow Creek to CO border)	1	D	1	8	1					
33	Abiquiu WWTP - NM0024830	NM0024830	Rio Chama (Ohkay Owingeh to Abiquiu Dam)	2			4						
34	Rio Chama at Hwy 554 - 29RChama038.3	29RChama038.3	Rio Chama (Ohkay Owingeh to Abiquiu Dam)	1			4						
35	Rio Chama Below Chama	29RChama174.0	Rio Chama (Rio Brazos to	1	D	1	8	1					

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	Sonde/DO/Cond[2,3]	Thermograph	Flow[4]	Physical Habitat	Chlorophyll a[5]	Phytoplankton	Microcystins[6]	Macro-invertebrates	Fish
	Town * 29RChama174.0		Little Willow Creek)										
36	Los Ojos Hatchery outfall 1 - NM0030139_1	NM0030139_1	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	2			4						
37	Los Ojos Hatchery outfall 2 - NM0030139_2	NM0030139_2	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	2			4						
38	Rio Chama below Rito de Tierra Amarilla above gage 08284100 - 29RChama147.0	29RChama147.0	Rio Chama (Rito de Tierra Amarilla to Rio Brazos)	1	D	1	8	1					
39	Chama WWTP outfall - NM0027731	NM0027731	Rio Chamita (Rio Chama to CO border)	2			4						
40	Rio Chamita below Chama WWTP outfall - 29RChami002.7	29RChami002.7	Rio Chamita (Rio Chama to CO border)	2	D	1	4						
41	Rio del Oso at FR 31 - 29RioOso022.2	29RioOso022.2	Rio del Oso (Perennial prt Canada del Cerro to headwaters)	1			8						
42	Rio del Oso above Rio Chama - 29RioOso004.7	29RioOso004.7	Rio del Oso (Rio Chama to Canada del Cerro)	2			4	1					
43	Rio Gallina at FR 76 - 29RGalli045.1	29RGalli045.1	Rio Gallina (HWY 96 to headwaters)	2			4						
44	Rio Gallina at confluence with Rio Chama - 29RGalli000.5	29RGalli000.5	Rio Gallina (Perennial prt Rio Chama to HWY 96)	1			4	1					
45	Rio Nutrias abv Rio Chama - 29RNutri005.4	29RNutri005.4	Rio Nutrias (Perennial prt Rio Chama to headwaters)	2	S		4	1					
46	Rio Nutrias at US 84 - 29RNutri028.4	29RNutri028.4	Rio Nutrias (Perennial prt Rio Chama to headwaters)	2	S		4						
47	Rio Ojo Caliente at Hwy 414 at Hot Springs	29ROjoCa026.1	Rio Ojo Caliente (Arroyo El	1	D		8						

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	Sonde/DO/Cond[2,3]	Thermograph	Flow[4]	Physical Habitat	Chlorophyll a[5]	Phytoplankton	Microcystins[6]	Macro-invertebrates	Fish
	bridge - 29ROjoCa026.1		Rito to Rio Vallecitos)										
48	Rio Puerco de Chama at CR 211 - 29RPuerc011.0	29RPuerc011.0	Rio Puerco de Chama (Abiquiu Reservoir to HWY 96)	1	D	1	8	1					
49	Rio Puerco de Chama at FR 103 - 29RPuerc037.5	29RPuerc037.5	Rio Puerco de Chama (HWY 96 to headwaters)	2			4						
50	Rio Tusas at forest service boundary - 29RTusas001.9	29RTusas001.9	Rio Tusas (Perennial prt Rio Vallecitos to headwaters)	2	D	1	4	1					
51	Rio Vallecitos 8.4 miles above Vallecitos at river crossing - 29RValle030.5	29RValle030.5	Rio Vallecitos (Rio Tusas to headwaters)	2		1	4						
52	Rio Vallecitos abv Rio Ojo Caliente - 29RValle000.1	29RValle000.1	Rio Vallecitos (Rio Tusas to headwaters)	2		1	4	1					
53	Rito Tierra Amarilla at Hwy 64 - 29RTierr026.1	29RTierr026.1	Rito de Tierra Amarilla (HWY 64 to headwaters)	1		1	8	1					
54	RITO TIERRA AMARILLA AT THE HWY 112 BRIDGE ABOVE - 29RTierr000.7	29RTierr000.7	Rito de Tierra Amarilla (Rio Chama to HWY 64)	1	S	1	8	1					
55	Rito Encino at FR 100Z - 29REncin009.7	29REncin009.7	Rito Encino (Rio Puerco de Chama to headwaters)	2			4	1					
56	Rito Resumidero at FR 93 * 29RResum002.5	29RResum002.5	Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	2			4						
57	Rito Resumidero below Resumidero Spring - 29RResum001.9	29RResum001.9	Rito Resumidero (Perennial prt R Puerco de Chama to hdwt)	2			4	1					

Map #	Station Name	Station ID	Assessment Unit	Priority[1]	Sonde/DO/Cond[2,3]	Thermograph	Flow[4]	Physical Habitat	Chlorophyll a[5]	Phytoplankton	Microcystins[6]	Macro-invertebrates	Fish
58	Sixto Creek above Rio Chamita - 29SextoC000.1*	29SixtoC000.1	Sixto Creek (Rio Chamita to CO border)	2		1	4						
59	Willow Creek abv Heron Lake - 29Willow000.1	29Willow000.1	Willow Creek (Jicarilla Apache bnd to headwaters)	2			4	1					
Total Number of Sampling Events					18	19	264	28	20	20	20	0	1

[1] Priority rankings: 1 are highest priority, and 2 are the lowest. "L" are lake stations; "IO" are lake inlets or outlets; "LSO" is "logger station only".

[2] Multiparameter sondes and/or dissolved oxygen (DO) loggers are deployed at sites that indicate elevated turbidity or nutrient enrichment or have been previously listed for turbidity or nutrients. Conductivity loggers are deployed to measure specific conductance over time in streams of concern.

[3] Logger types: S (sonde), D (DO logger), or C (conductivity logger)

[4] Flow, water quality and temperature data will be used from USGS gages where possible.

[5] Chlorophyll-a samples are collected at lake monitoring locations.

[6] If resources permit, up to 2 additional samples may be taken in high recreation areas or areas of concern for macrocystis.

6.0 RESOURCE REQUIREMENTS

Sample analysis costs include: SLD work-time units (WTUs) for chemical analysis performed at SLD and provided to SWQB through a Joint Powers Agreement between the State agencies; analysis costs for chemical and biological samples sent to contract laboratories; and equipment costs for *E. coli* analysis performed by qualified SWQB staff. Sample analysis expenses are summarized in **Table 8**.

Approximate monthly fuel expenses are summarized in **Table 9**. Vehicles will require standard preventative maintenance and unforeseen costs may arise at any time.

Water quality sampling trips will require two staff. Habitat surveys will require three staff surveying one to two sites per day. Biological survey crew maximum requirements are three to four staff surveying one to three sites per day. Staff field days and per diem costs are summarized in **Table 10**. Staff receive $155 per night per diem for travel costs. Costs not included below may involve general sampling supplies such as water quality sample containers and preservatives, sonde calibration solutions, and periphyton, macroinvertebrate, fish, and habitat sampling/monitoring equipment. Total costs for the survey are summarized in **Table 11**.

Table 8. Biological and Chemical Cost Summary for the Rio Chama Watershed Survey

Analyte	Total # of Samples	Cost per Sample (WTU unless indicated in $)	Total Expenditure (WTU unless indicated in $)
TDS/TSS	322	45	14490
TDS/TSS/SO^4/Cl^-	0	105	0
Nutrients	12	100	1200
Nutrients (low P)	308	95	29260
DOC	322	30	9660
Total Metals	260	85	22100
Dissolved Metals	286	140	40040
E. Coli	322	$8.58	$2762.76
Microbial Source Tracking	3	$510	$1530
Volatile Organics	22	150	3300
Semi-Volatile Organics	16	235	3760
Radionuclides	16	520	8320
Chlorophyll a	20	$40	800
Phytoplankton	20	$138	2760
Microcystins	20	150	3000
Totals		**WTU**	135,130
		Dollar	$7,852.76

Table 9. Vehicle Costs for the Rio Chama Watershed Survey

Month	Approximate Miles	Estimated MPG	Estimated Cost of Gasoline per Gallon	Total Fuel Costs/yr	Total Fuel Costs
March	400	17	$3.00	$70.59	$141.18
April	400	17	$3.00	$70.59	$141.18
May	400	17	$3.00	$70.59	$141.18
June	400	17	$3.00	$70.59	$141.18
July	400	17	$3.00	$70.59	$141.18
August	400	17	$3.00	$70.59	$141.18
September	400	17	$3.00	$70.59	$141.18
October	400	17	$3.00	$70.59	$141.18
TOTAL				**$564.71**	**$1,129.41**

Table 10. Field Staff Days and Per Diem Costs for the Rio Chama Watershed Survey

Expense	Water Chemistry Surveys*	Biological and Habitat Surveys*	Data Logger Deployments*	Per diem rate	Total/yr	Total
Per Diem (number of nights out per year)	8	10	0	$155	$2,790	$5,580
Field Staff Days (number of days per year)	24	30	16		70	140

*A field run typically consists of two staff for two to four days

Table 11. Total Cost Estimates for the Rio Chama Watershed Survey

WTUs	Contract Labs $	Supplies $	Fuel $	Per Diem $	Staff Field Days
135,130	$7,852.76	$13,141.47	$1,129.41	$5,580	140

7.0 REPORTING

Following completion of the survey and verification and validation of all data collected during the project (following SWQB SOP 15.0 Verification and Validation), a final survey report will be produced that summarizes the data collected during the survey and describes any deviations from the original or amended Field Sampling Plan. Progress during the survey will be documented in biannual progress reports to EPA for the CWA 106 grant. Other reports and documents that may use information collected during this survey include TMDL reports, proposals for water quality standards revision, and/or NPDES permits.

8.0 REFERENCES

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U.S. Environmental Protection Agency, 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

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 (n = 0 to 1) 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 (n = 1) 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.

3C. Limited data (n = 1 to 3) available, exceedance(s). AUs are listed in this subcategory when there are exceedances of one or more applicable criteria 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 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 particular 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

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

Organics (semi-volatiles)	Organics (volatiles)
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
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	

Organics (semi-volatiles)	Organics (volatiles)
Methoxychlor	
Metolachlor	
Metribuzin	
Naphthalene	
Nitrobenzene	
N-nitrosodimethylamine	
N-nitroso-di-n-propylamine	
N-nitrosodiphenylamine	
Pentachlorophenol	
Phenanthrene	
Phenol	
Prometryne	
Pyrene	
Pyridine	
Simazine	
trans-Chlordane	