



NEW MEXICO
ENVIRONMENT DEPARTMENT
Surface Water Quality Bureau



JEMEZ RIVER WATERSHED
2013
FIELD SAMPLING PLAN

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ACRONYMS

AU	Assessment Unit
BMP	Best Management Practice
FSP	Field Sampling Plan
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
PSRS	Point Source Regulation Section
QAPP	Quality Assurance Project Plan
SFNF	Santa Fe National Forest
SLD	Scientific Laboratory Division
SOP	Standard Operating Procedures
SVOC	Semi-Volatile Organic Compound
SWQB	Surface Water Quality Bureau
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
VCNP	Valles Caldera National Preserve
VOC	Volatile Organic Compound
WPS	Watershed Protection Section
WQS	Water Quality Standards
WTU	Work Time Unit
WWTP	Wastewater Treatment Plant

INTRODUCTION

The purpose of this field sampling plan (FSP) is to provide a detailed description of the Jemez River Watershed Water Quality Survey to be conducted in 2013 by the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB). It has been prepared in accordance with SWQB Standard Operating Procedures (SOPs), and it describes project objectives and decision criteria, including the sampling plan with sampling locations, analytes, and sampling frequencies for physical, chemical and biological parameters (NMED/SWQB 2013a). It may be amended as needed, and amendments will be documented and justified in the final survey report.

This plan is a companion document to the SWQB Quality Assurance Project Plan (QAPP) for Water Quality Management Programs (NMED/SWQB 2013b). Data will be collected according to the QAPP and the most recent version of the SOPs for Water Quality Data Collection.

1.0 PROJECT PERSONNEL

1.1 Personnel Roles and Responsibilities

The survey is primarily conducted by the SWQB Monitoring, Assessment, and Standards Section (MASS). Staff from other sections within the SWQB are involved with planning, carrying out the work and using the data (Table 1).

Table 1. Survey personnel roles and responsibilities.

Name	Role	Responsibilities
Doug Eib 505-827-0106	Project Coordinators	<ul style="list-style-type: none">Organize, plan and design survey with input from other team membersCoordinate and participate in survey efforts to collect chemical, biological and habitat samples
Greg Huey 505-827-0596	Monitoring Staff	<ul style="list-style-type: none">Manage data for the survey (field forms, data entry, data verification, and analysis)Prepare final survey report integrating information from all team members
Nina Wells 505-827-0572	Watershed Protection Section (WPS) Liaison	<ul style="list-style-type: none">Provide information and data needs pertaining to nonpoint sources of pollution and best management practices (BMPs) located within the study areaCollect and verify chemical, biological, and habitat samplesAssist with development of final survey report, as needed
Barbara Cooney 505-827-0212	Point Source Regulation Section (PSRS) Liaison	<ul style="list-style-type: none">Provide information and data needs pertaining to point source discharges located within the study areaAssist with development of final survey report, as needed
Meghan Bell 505-827-0669	Total Maximum Daily Load (TMDL) Liaison	<ul style="list-style-type: none">Provide information and data needs pertaining to TMDL development in the study areaAssist with development of final survey report and develop TMDLs, as needed

Each team member is responsible for their assigned responsibilities. If an individual is unable to fulfill their duties, it is that person's responsibility to find assistance and/or a replacement in coordination with appropriate supervisors.

1.2 Organization

For the responsibilities defined in this project, the Project Coordinators and Total Maximum Daily Load (TMDL) liaison report to the MASS Program Manager. The Point Source Regulation Section (PSRS) liaison reports to the PSRS Program Manager. The Watershed Protection Section (WPS) Liaison reports to the WPS Program Manager. Program Managers report to the SWQB Bureau Chief, who works under the Resource Protection Division Director, who is appointed by the Governor of New Mexico.

2.0 PROJECT DESCRIPTION

2.1 Background

The 2001 (Valles Caldera National Preserve) and 2005 (Jemez River Watershed) SWQB water quality surveys of this watershed identified waters that are attaining New Mexico Water Quality Standards (WQS) and waters that are impaired (i.e. not attaining their specific designated uses). Rivers are divided into assessment units (AUs) based on differing geological and hydrological properties, and each AU is assessed individually using data from one or more monitoring sites located within an AU. Table 2 provides a list of AUs within the survey area, the identified impairments, and TMDL status.

Table 2. Impairment and TMDL status of survey AUs.

Assessment Unit	Designated Uses	Water Quality Segment Number	Impairments	IR Category ^A	TMDL
American Creek (Rio de las Palomas to headwaters)	-Livestock watering -Marginal warmwater aquatic life -Primary contact -Wildlife habitat	20.6.4.98	None	3	None
Calaveras Creek (Rio Cebolla to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	None	2	None
Clear Creek (Rio de las Vacas to San Gregorio Lake)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Benthic-Macroinvertebrate	5/5C	303(d) list

Assessment Unit	Designated Uses	Water Quality Segment Number	Impairments	IR Category ^A	TMDL
Clear Creek (San Gregorio Lake to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	None	3	None
East Fork Jemez (San Antonio to VCNP boundary)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Arsenic Temperature	5/5B	303(d) List Completed 2009 Completed 2009
East Fork Jemez (VCNP boundary to headwaters)	-Domestic water supply -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Oxygen, dissolved pH Temperature Turbidity	5/5B	303(d) List 303(d) List 303(d) List Completed 2006 Completed 2003
Fenton Lake	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.134	Nutrient Eutrophication	5/5C	303(d) list
Jaramillo Creek (East Fork Jemez to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Temperature Turbidity	5/5B	303(d) List Completed 2006 Completed 2006
Jemez River (Zia Pueblo boundary to Jemez Pueblo boundary)	-Irrigation -Livestock watering -Marginal warmwater aquatic life -Primary contact -Wildlife habitat	20.6.4.106	Arsenic Boron	4A	Completed 2009 Completed 2009
Jemez River (Jemez Pueblo boundary to Rio Guadalupe)	-Coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.107	Aluminum Arsenic Boron Oxygen, dissolved Turbidity	5/5B	303(d) List Completed 2009 Completed 2009 303(d) list 303(d) list

Assessment Unit	Designated Uses	Water Quality Segment Number	Impairments	IR Category ^A	TMDL
Jemez River (Rio Guadalupe to Soda Dam)	-Coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.107	Aluminum Arsenic Boron Nutrient Eutrophication Temperature Turbidity	4A	Completed 2003 Completed 2009 Completed 2009 Completed 2009 Completed 2009 Revised 2004
Jemez River (Soda Dam to East Fork)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Arsenic pH Temperature Turbidity	5/5B	Completed 2003 Completed 2009 303(d) List 303(d) List Completed 2004
La Jara Creek (East Fork Jemez to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum	5/5B	303(d) List
Redondo Creek (Sulphur Creek to VCNP boundary)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Turbidity	4A	Completed 2003
Redondo Creek (VCNP boundary to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Temperature Turbidity	5/5B	303(d) List Completed 2003 Completed 2003
Rio Cebolla (Rio de las Vacas to Fenton Lake)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	None	2	None
Rio Cebolla (Fenton Lake to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Sedimentation/Siltation Turbidity	5/5B	303(d) List Completed 2003 303(d) List

Assessment Unit	Designated Uses	Water Quality Segment Number	Impairments	IR Category ^A	TMDL
Rio de las Vacas (Rio Cebolla to Clear Creek)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Nutrient Eutrophication Temperature	4A	Completed 2009 Completed 2003
Rio de las Vacas (Clear Creek to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum	5/5B	303(d) List
Rio Guadalupe (Jemez River to Rio Cebolla)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Temperature	4A	Completed 2003 Completed 2009
Rito de las Palomas (Rio de las Vacas to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Sedimentation/Siltation Temperature Turbidity	5/5A	Completed 2009 Completed 2009 303(d) list
Rito de los Indios (San Antonio Creek to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum	5/5B	303(d) List
Rito Peñas Negras (Rio de las Vacas to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Nutrient Eutrophication Sedimentation/Siltation Temperature Turbidity	5/5C	Completed 2009 Completed 2003 Completed 2003 303(d) list

Assessment Unit	Designated Uses	Water Quality Segment Number	Impairments	IR Category ^A	TMDL
San Antonio Creek (East Fork Jemez to VCNP boundary)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Arsenic Temperature Turbidity	5/5B	303(d) List Completed 2009 Completed 2003 Completed 2003
San Antonio Creek (VCNP boundary to headwaters)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Oxygen, dissolved pH Temperature	5/5C	303(d) List 303(d) List Completed 2003
San Gregorio Lake	-Domestic water supply -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.134	None	3	None
Sulphur Creek (San Antonio Creek to Redondo Creek)	-Domestic water supply -Fish culture -High quality coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.108	Aluminum Turbidity	5/5B	303(d) List 303(d) list
Sulphur Creek (Redondo Creek to VCNP boundary)	-Limited aquatic life -Livestock watering -Secondary contact -Wildlife habitat	20.6.4.124	None	3	None
Sulphur Creek (VCNP to headwaters)	-Limited aquatic life -Livestock watering -Secondary contact -Wildlife habitat	20.6.4.124	Aluminum	5/5B	303(d) list
Vallecito Creek (Jemez Pueblo boundary to Ponderosa diversion)	-Livestock watering -Marginal warmwater aquatic life -Primary contact -Wildlife habitat	20.6.4.98	None	3	None
Vallecito Creek (Perennial portions from Ponderosa diversion to headwaters)	-Coldwater aquatic life -Irrigation -Livestock watering -Primary contact -Wildlife habitat	20.6.4.107	Aluminum Turbidity	5/5B	303(d) List 303(d) list

^A IR Category refers to the New Mexico Integrated Report (IR) categories – see Appendix A.

2.2 Objectives

The project objectives that have been identified to meet the various needs within the SWQB appear in Table 3. Data needs have been determined based on impairments from the previous surveys (NMED/SWQB 2006, 2009) and consultation with MASS, PSRS, and WPS staff, as well as other state and federal agencies, pueblos, local watershed groups, and interested parties.

Table 3. Water Quality Survey Objectives

	Intended use of data	Question to be answered	Products	Decision Criteria
Primary Objective	Assess designated use attainment for the IR and provide information to the public on the condition of surface water throughout the watershed	Are sampled waterbodies meeting WQS criteria?	Survey Report; 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 NMWQS?	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	WQS as interpreted by the Assessment Protocols
	Develop or refine surface water quality standards (WQS)	Are the existing designated uses appropriate for the waterbody?	Use Attainability Analyses (UAA); Amendments to WQS	Data sufficient to support a petition to the WQCC to revise WQS

2.3 Schedule

As part of the survey planning process, public meetings are held to solicit and receive public input on any areas of concern within the watershed and to inform interested parties about the water quality survey, assessments, TMDL processes, and our specific sampling plans in the watershed. For this survey, one public meeting was held on March 5, 2013 at the Jemez Springs conference room. Water chemistry results typically take several months to return from the NM Scientific Laboratory Division (SLD). When these data are received, they are verified and validated as described in the SOPs. Once all data have been received, validated and verified, they will be assessed according to the most recent version of the assessment protocols in time for incorporation into the 2016-2018 Integrated Report (IR). Once the assessments are complete, the TMDL development process will begin for any identified impairments. TMDLs are tentatively scheduled for completion in early 2017.

The progress of this project will be documented and tracked from its inception through implementation to ensure all sampling and analytical activities are performed in accordance with all applicable requirements

and in a cost effective manner. The tentative schedule (Table 4) illustrates that completion of all aspects of the survey will take between two and three years.

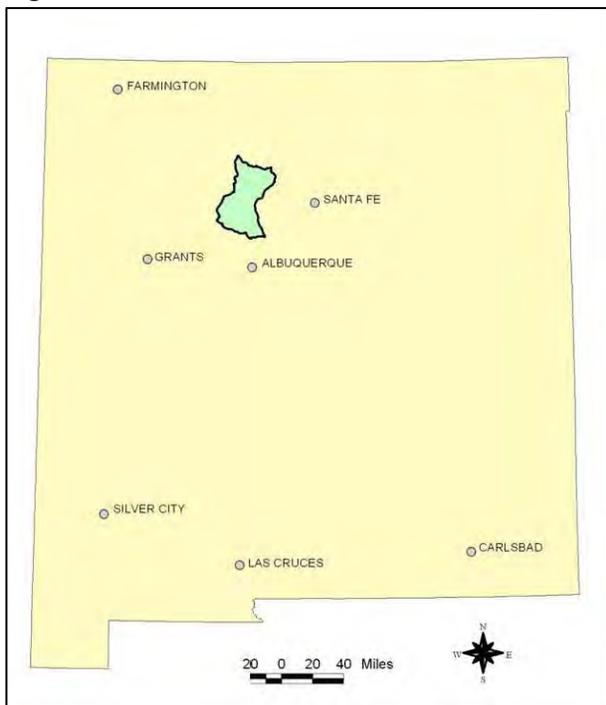
Table 4. Project Schedule.

Activity	Winter '12-13	Spring 2013	Summer 2013	Fall 2013	Winter '13-14	Spring 2014	Summer 2014	Fall 2014	Winter '14-15
Survey planning, site reconnaissance, and public input period	=====▶								
Sample collection and monitoring		=====▶							
Data verification, validation and assessment					=====▶				
Write survey report								=====▶	

2.4 Location

The study area consists of waters throughout the Jemez River watershed, reaching from the river's headwaters in the Jemez Mountains to the river crossing at NM Highway 4 upstream of San Ysidro, NM.

Figure 1. Jemez Watershed Location.



Tributaries to be sampled include American Creek, Calaveras Creek, Clear Creek, East Fork Jemez River, Jaramillo Creek, La Jara Creek, Redondo Creek, Rio Cebolla, Rio de las Vacas, Rio Guadalupe, Rito de las Palomas, Rito de los Indios, Rito Peñas Negras, San Antonio Creek, Sulphur Creek and Vallecito Creek (Table 2). Data will also be collected from Fenton and San Gregorio Lakes.

Land ownership in the upper Jemez basin is principally public, with approximately 94% of the study area managed by the Santa Fe National Forest (SFNF). Land use in the upper watershed is primarily forested cattle range, with some logging and several pumice mines. The area is heavily utilized by the public for hiking, fishing, hunting, camping and off-road vehicle use. The lower watershed below the Rio Guadalupe is primarily agricultural with numerous water diversions for irrigation.

The 89,000 acre Valles Caldera National Preserve (VCNP) contains the headwaters of the East Fork Jemez River and San Antonio Creek, including numerous tributaries with designated AUs. The VCNP is a federal property governed by an appointed board of trustees and operates as a working cattle ranch while maintaining open access to visitors and research scientists.

In 2011 the Las Conchas Fire burned 156,593 acres of the Jemez Mountains, including approximately 30,000 acres of the VCNP. Approximately 48% of the burn area ranged from moderate to high severity, with hydrophobic soils contributing to erosion and slow vegetation regrowth through those areas. NMED expects to measure and assess sedimentation in affected AUs, with impacts to benthic macroinvertebrate and fish communities being likely. Table 5 shows a complete list of water quality stations.

Table 5. SQWB Water Quality Monitoring Stations in the Jemez River Watershed

Station Number	Storet ID	Monitoring Station	Station Rationale
1	31ClearC009.2	Clear Creek above San Gregorio Lake	Lowest station in AU
2	33SanGregorLk	San Gregorio Lake	Lake monitoring
3	31ClearC002.3	Clear Creek at NM 126	Lowest station in AU
4	31RVacas023.7	Rio de Las Vacas at NM 126	Lowest station in AU
5	31Americ000.1	American Creek above Rito de las Palomas	Lowest station in AU
6	31RPalom000.1	Rito de las Palomas at NM 126	Lowest station in AU
7	31RPNegr000.1	Rito Penas Negras at NM 126	Lowest station in AU
8	31Calave001.1	Calaveras Creek above Rio Cebolla on NM 126	Lowest station in AU
9	NM0030112	Seven Springs Fish Hatchery	NPDES permit
10	31RCebol011.4	Rio Cebolla above Fenton Lake	Lowest station in AU
11	31FentonLkDam	Fenton Lake	Lake monitoring
12	31RCebol007.0	Rio Cebolla at Lake Fork Canyon	WPS monitoring station
13	31RVacas000.1	Rio de Las Vacas above the Rio Cebolla	Lowest station in AU
14	31RCebol000.1	Rio Cebolla above Rio de las Vacas	Lowest station in AU
15	31RGuada010.0	Rio Guadalupe at Deer Creek Landing	Ecoregion change
16	31RGuada000.1	Rio Guadalupe above Jemez River	Lowest station in AU
17	31SanAnt036.8	San Antonio Creek above Rito de los Indios	VCNP monitoring station
18	31RIndio000.2	Rito de los Indios above San Antonio Creek	Lowest station in AU

Station Number	Storet ID	Monitoring Station	Station Rationale
19	31SanAnt025.7	San Antonio Creek below warm springs	VCNP monitoring station; better identify AU boundary
20	31SanAnt018.0	San Antonio Creek at VCNP boundary	Lowest station in AU; better identify AU boundary
21	31SanAnt014.5	San Antonio Creek above San Antonio Hot Springs	WPS station; better identify AU boundary
22	31SanAntHotSp	San Antonio Hot Springs	Perennial tributary
23	31Sulphu003.4	Sulphur Creek above VCNP boundary	Lowest station in AU; possible AU merge
24	31Sulphu001.3	Sulphur Creek above Redondo Creek	Lowest station in AU
25	31Redond001.2	Redondo Creek above VCNP boundary	Lowest station in AU; potential AU merge
26	31Redond000.1	Redondo Creek above Sulphur Creek	Lowest station in AU; potential AU merge
27	31Sulphu000.1	Sulphur Creek above San Antonio Creek	Lowest station in AU; possible AU merge
28	31SanAnt004.7	San Antonio Creek above La Cueva	WPS station
29	31SpenceHotSp	Spence Hot Spring	Perennial tributary
30	31SanAnt000.1	San Antonio Creek above East Fork Jemez River	Lowest station in AU
31	31Jarami008.0	Jaramillo Creek above Cerro Piñon Creek	VCNP monitoring station
32	33LaJara009.7	La Jara Creek at VCNP Headquarters	VCNP monitoring station
33	31EFkJem015.2	East Fork Jemez River below Las Conchas	Lowest station in AU
34	31EFkJem000.1	East Fork Jemez River above San Antonio Creek	Lowest station in AU
35	31JemezR070.3	Jemez River below Battleship Rock	WPS monitoring station
36	31JemezR064.9	Jemez River above Soda Dam	Lowest station in AU
37	31JemezR064.2	Jemez River at Jemez State Monument	WPS monitoring station
38	31JemezHotSpr	Jemez Hot Spring	Perennial tributary
39	NM0028011	Jemez Springs WWTP outfall	Point source

Station Number	Storet ID	Monitoring Station	Station Rationale
40	31JemezR049.2	Jemez River above Rio Guadalupe	Lowest station in AU
41	NM0028479	Jemez Valley Public Schools WWTP Outfall	NPDES permit
42	31JemezR046.6	Jemez River near Cañon	Only station in AU
43	31RValle015.5	Vallecito Creek at Paliza Campground	WPS monitoring station
44	31RValle012.2	Vallecito Creek above Ponderosa diversion	Lowest perennial segment
45	31JemezR037.0	Jemez River above San Ysidro at NM Hwy 4	Lowest station in AU

3.0 DOCUMENTATION

Project documents include this FSP, probable source sheets, calibration records, data validation and verification records, field and lab data sheets (including sonde and thermograph deployment/retrieval sheets), and analytical data in hard copy or in electronic form. Documents will be maintained according to the SWQB QAPP (NMED/SWQB, 2013).

Project activities will be documented in SWQB Monitoring Section Field Sheets. Information from the field sheets is entered in the SWQB database or maintained in the Project Coordinator's files which are placed in the survey files at the conclusion of the project. Analytical results are electronically transferred into the Bureau's database and eventually moved to STORET WQX. The project is completed with the completion of the Survey Report. Figure 2 shows the survey area and sampling locations.

4.0 SAMPLING PLAN

The survey includes chemical samples to be collected between April and October. Biological sampling is conducted within a biological index period, August 15 through November 15, for appropriate comparability of samples and life history requirements. Multi-parameter datalogger sondes (sondes) are deployed at select sites in the stream for 3-10 days to record field parameters (dissolved oxygen, pH, turbidity, conductivity, temperature and salinity). Thermographs (data logging thermometers) are deployed from May through September at select sites throughout the survey to measure temperature fluctuations.

The SFNF and VCNP are currently using sondes to collect field parameters in the upper watershed in conjunction with the SWQB WPS. This survey will include collection of geomorphology and water chemistry data at those locations.

4.1 Chemical Sampling

Water chemistry samples will be collected and submitted to SLD or processed in the SWQB laboratory. Chemistry sampling stations are usually positioned near the lower end of the AU, access permitting. Additional stations may be located within the AU to document the condition of the stream below potential pollution sources and at other locations of interest. Stations from previous surveys are used whenever possible to allow the evaluation of trends. Table 5 provides a list of monitoring stations and the rationale for including each in this survey. Figure 2 shows the sampling locations within the project area.

Planned sampling frequencies for chemical analytes at each monitoring station are specified in Table 6. In addition to the variables listed, field parameters and discharge will be measured during each sampling event. Total residual chlorine will be measured in wastewater treatment plant (WWTP) effluent.

Figure 2. Project Area and Sampling Locations

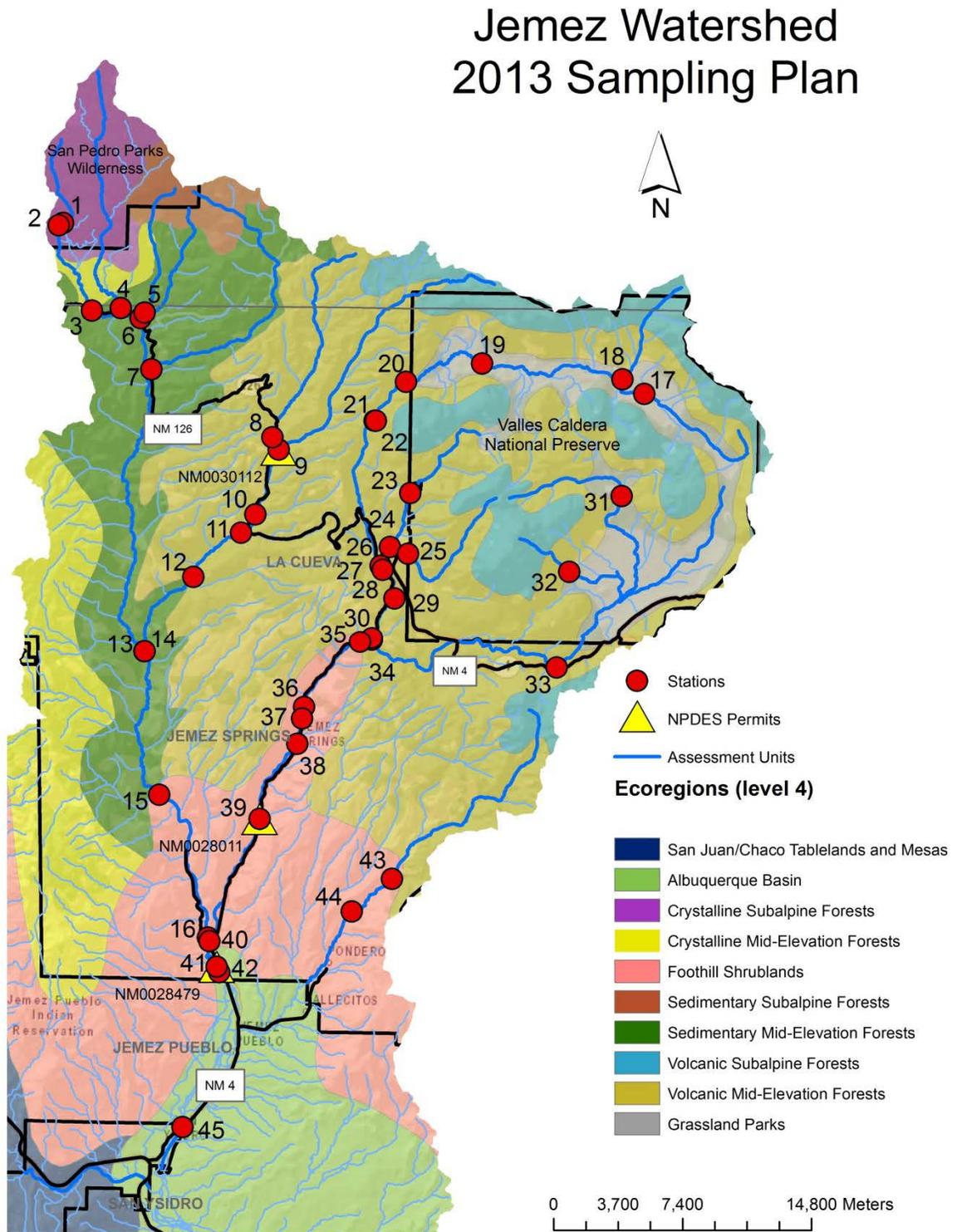


Table 6. Water Chemistry Sampling Summary

Map ID	Station Name	Assessment Unit	TDS/TSS	Nutrients ¹	Dissolved Metals ²	Total Metals ³	E. coli	SVOC ⁴	VOC ⁵	Radionuclides ⁶
1	Clear Creek above San Gregorio Lake	Clear Creek (San Gregorio Lake to headwaters)	6	6	3	3	6	0	0	0
2	San Gregorio Lake	San Gregorio Lake	2	2	2	2	2	2	2	2
3	Clear Creek at NM 126	Clear Creek (Rio de las Vacas to San Gregorio Lake)	6	6	3	3	6	0	0	0
4	Rio de las Vacas at NM 126	Rio de las Vacas (Clear Creek to headwaters)	6	6	3	3	6	0	0	0
5	American Creek above Rito de las Palomas	American Creek (Rio de las Palomas to headwaters)	6	6	3	3	6	0	0	0
6	Rito de las Palomas at NM 126	Rito de las Palomas (Rio de las Vacas to headwaters)	6	6	3	3	6	0	0	0
7	Rito Penas Negras at NM 126	Rito Penas Negras (Rio de las Vacas to headwaters)	6	6	3	3	6	0	0	0
8	Calaveras Creek above Rio Cebolla on NM 126	Calaveras Creek (Rio Cebolla to headwaters)	6	6	3	3	6	0	0	0
9	Seven Springs Fish Hatchery	Rio Cebolla (Fenton Lake to headwaters)	3	3	3	3	3	0	0	0
10	Rio Cebolla above Fenton Lake	Rio Cebolla (Fenton Lake to headwaters)	6	6	3	3	6	0	0	0
11	Fenton Lake at dam	Fenton Lake	3	3	3	3	3	2	2	2
12	Rio Cebolla at Lake Fork Canyon	Rio Cebolla (Rio de las Vacas to Fenton Lake)	6	6	0	0	6	0	0	0
13	Rio de las Vacas above the Rio Cebolla	Rio de las Vacas (Rio Cebolla to Clear Creek)	8	8	3	3	8	0	0	0
14	Rio Cebolla above Rio de las Vacas	Rio Cebolla (Rio de las Vacas to Fenton Lake)	8	8	3	3	8	0	0	0
15	Rio Guadalupe at Deer Creek Landing	Rio Guadalupe (Jemez River to Rio Cebolla)	8	8	3	3	8	0	0	0
16	Rio Guadalupe above Jemez River	Rio Guadalupe (Jemez River to Rio Cebolla)	8	8	3	3	8	2	2	2
17	San Antonio Creek above Rito de los Indios	San Antonio Creek (VCNP boundary to headwaters)	6	6	0	0	6	0	0	0
18	Rito de los Indios above San Antonio Creek	Rito de los Indios (San Antonio Creek to headwaters)	6	6	3	3	6	0	0	0
19	San Antonio Creek below warm springs	San Antonio Creek (VCNP boundary to headwaters)	6	6	0	0	6	0	0	0

Map ID	Station Name	Assessment Unit								
			TDS/TSS	Nutrients ¹	Dissolved Metals ²	Total Metals ³	E. coli	SVOC ⁴	VOC ⁵	Radionuclides ⁶
20	San Antonio Creek at VCNP boundary	San Antonio Creek (VCNP boundary to headwaters)	6	6	3	3	6	0	0	0
21	San Antonio Creek above San Antonio Hot Springs	San Antonio Creek (East Fork Jemez to VCNP boundary)	6	6	0	0	6	0	0	0
22	San Antonio Hot Springs	San Antonio Creek (East Fork Jemez to VCNP boundary)	2	2	2	2	2	0	0	0
23	Sulphur Creek above VCNP boundary	Sulphur Creek (VCNP to headwaters)	6	6	3	3	6	0	0	0
24	Sulphur Creek above Redondo Creek	Sulphur Creek (Redondo Creek to VCNP boundary)	8	8	3	3	8	0	0	0
25	Redondo Creek above VCNP boundary	Redondo Creek (VCNP boundary to headwaters)	6	6	3	3	6	0	0	0
26	Redondo Creek above Sulphur Creek	Redondo Creek (Sulphur Creek to VCNP boundary)	8	8	3	3	8	0	0	0
27	Sulphur Creek above San Antonio Creek	Sulphur Creek (San Antonio Creek to Redondo Creek)	8	8	3	3	8	0	0	0
28	San Antonio Creek above La Cueva	San Antonio Creek (East Fork Jemez to VCNP boundary)	8	8	0	0	8	0	0	0
29	Spence Hot Spring	Jemez River (Soda Dam to East Fork Jemez River)	2	2	2	2	2	0	0	0
30	San Antonio Creek above East Fork Jemez River	San Antonio Creek (East Fork Jemez to VCNP boundary)	8	8	3	3	8	0	0	2
31	Jaramillo Creek above Cerro Piñon Creek	Jaramillo Creek (East Fork Jemez River to headwaters)	6	6	3	3	6	0	0	0
32	La Jara Creek at VCNP Headquarters	La Jara Creek (Perennial reaches above Arroyo San Jose)	6	6	3	3	6	0	0	0
33	East Fork Jemez River below Las Conchas day use area	East Fork Jemez River (VCNP to headwaters)	8	8	3	3	8	0	0	0
34	East Fork Jemez River above San Antonio Creek	East Fork Jemez River (San Antonio Creek to VCNP)	8	8	3	3	8	0	0	2
35	Jemez River at USGS gage below Battleship Rock	Jemez River (Soda Dam to East Fork Jemez River)	8	8	0	0	8	0	0	0
36	Jemez River above Soda Dam	Jemez River (Soda Dam to East Fork Jemez River)	8	8	3	3	8	0	0	0
37	Jemez River at Jemez State Monument	Jemez River (Rio Guadalupe to Soda Dam)	8	8	0	0	8	0	0	0
38	Jemez Hot Spring	Jemez River (Rio Guadalupe to Soda Dam)	2	2	2	2	2	0	0	0

Map ID	Station Name	Assessment Unit								
			TDS/TSS	Nutrients ¹	Dissolved Metals ²	Total Metals ³	E. coli	SVOC ⁴	VOC ⁵	Radionuclides ⁶
39	Jemez Springs WWTP outfall	Jemez River (Rio Guadalupe to Soda Dam)	3	3	3	3	3	0	0	0
40	Jemez River above Rio Guadalupe	Jemez River (Rio Guadalupe to Soda Dam)	8	8	3	3	8	2	2	2
41	Jemez Valley Public Schools WWTP Outfall	Jemez River (Jemez Pueblo boundary to Rio Guadalupe)	3	3	3	3	3	0	0	0
42	Jemez River near Cañon	Jemez River (Jemez Pueblo boundary to Rio Guadalupe)	8	8	3	3	8	2	2	2
43	Vallecito Creek at Paliza Campground	Vallecito Creek (Perennial reaches from diversion above Ponderosa to headwaters)	6	6	0	0	6	0	0	0
44	Vallecito Creek above Ponderosa diversion	Vallecito Creek (Perennial reaches from diversion above Ponderosa to headwaters)	6	6	3	3	6	0	0	0
45	Jemez River above San Ysidro at NM Hwy 4	Jemez River (Zia Pueblo boundary to Jemez Pueblos boundary)	8	8	3	3	8	2	2	2
<i>Quality Control Samples</i>			-	11	6	-	11	4	4	4
Totals			276	287	113	107	287	16	16	20

¹ Suite includes total Kjeldahl nitrogen (TKN), nitrate+nitrite, ammonia and total phosphorus.

² Suite includes aluminum, antimony, arsenic, barium, boron, cadmium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, molybdenum, nickel, silicon, silver, tin, vanadium, zinc and hardness.

³ Aluminum, selenium and mercury only.

⁴ Semi-volatile organic compounds. See Appendix B for a list of analytes included in this suite

⁵ Volatile organic compounds. See Appendix B for a list of analytes included in this suite.

⁶ A radionuclide sample will initially be analyzed for gross alpha and gross beta radiation and, depending on results of the gross alpha and gross beta screen, may include uranium mass and radium 226 + 228.

4.2 Biological/Habitat Sampling

Measuring biological response indicators concurrent to physical habitat and water chemistry gives an overall interpretation of the biological integrity of a reach, provides more complete information on characteristics of sediment and nutrients currently cycling through the stream, and may provide enough information to investigate or eliminate specific potential sources of water quality stress. SWQB is currently collecting fish, periphyton, macroinvertebrate, 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 are conducted in accordance with the SOPs.

While a preliminary pebble count is conducted for sedimentation in each AU, resources and other issues, such as property ownership, do not allow for the collection of biological and physical habitat data at all stations. Stations are selected based on 1) current Integrated List status, 2) results of any preliminary assessments, 3) observations of the surrounding land use, including upland and riparian habitat conditions. Additional sites determined, or considered, to be in "reference" or "best available condition" will also be selected for biological and habitat monitoring for inclusion in development and refinement of biological and habitat criteria. Phytoplankton will be collected from both Fenton and San Gregorio Lakes for taxonomic analysis. Hydrology protocol surveys are conducted at sites where stream flow status is in question (perennial, intermittent or ephemeral). Table 7 provides a summary of planned biological and habitat monitoring.

Table 7. Biological and Habitat Sampling Summary

Map ID	Station	Assessment Unit	Macroinvertebrates	Nutrient Level 1	Chlorophyll a ¹	Sonde	Pebble Count ²	Thermograph ³	Fish ⁴	Hydroprotocol
1	Clear Creek above San Gregorio Lake	Clear Creek (San Gregorio Lake to headwaters)	1	1	-	1	1	1	-	1
2	San Gregorio Lake	San Gregorio Lake	-	-	2 ⁵	-	-	-	-	-
3	Clear Creek at NM 126	Clear Creek (Rio de las Vacas to San Gregorio Lake)	1	1	-	1	1	1	-	1
4	Rio de las Vacas at NM 126	Rio de las Vacas (Clear Creek to headwaters)	-	1	-	1	1	1	-	-
5	American Creek above Rito de las Palomas	American Creek (Rio de las Palomas to headwaters)	1	1	-	1	1	1	-	1
6	Rito de las Palomas at NM 126	Rito de las Palomas (Rio de las Vacas to headwaters)	1	1	-	1	1	1	-	-
7	Rito Penas Negras at NM 126	Rito Penas Negras (Rio de las Vacas to headwaters)	-	-	1	1	1	1	-	-
8	Calaveras Creek above Rio Cebolla on NM 126	Calaveras Creek (Rio Cebolla to headwaters)	-	1	-	1	1	1	-	-
9	Seven Springs Fish Hatchery	Rio Cebolla (Fenton Lake to headwaters)	-	-	-	-	-	-	-	-
10	Rio Cebolla above Fenton Lake	Rio Cebolla (Fenton Lake to headwaters)	-	1	-	1	1	1	-	-
11	Fenton Lake at dam	Fenton Lake	-	-	3 ⁵	-	-	-	-	-
12	Rio Cebolla at Lake Fork Canyon	Rio Cebolla (Rio de las Vacas to Fenton Lake)	1	1	-	-	1	1	-	-

Map ID	Station	Assessment Unit	Macroinvertebrates	Nutrient Level 1	Chlorophyll a ¹	Sonde	Pebble Count ²	Thermograph ³	Fish ⁴	Hydroprotocol
13	Rio de las Vacas above the Rio Cebolla	Rio de las Vacas (Rio Cebolla to Clear Creek)	1	-	1	1	1	1	1	-
14	Rio Cebolla above Rio de las Vacas	Rio Cebolla (Rio de las Vacas to Fenton Lake)	-	1	-	1	1	1	1	-
15	Rio Guadalupe at Deer Creek Landing	Rio Guadalupe (Jemez River to Rio Cebolla)	1	1	-	1	1	1	-	-
16	Rio Guadalupe above Jemez River	Rio Guadalupe (Jemez River to Rio Cebolla)	1	1	-	1	1	1	1	-
17	San Antonio Creek above Rito de los Indios	San Antonio Creek (VCNP boundary to headwaters)	-	1	-	-	1	1	-	-
18	Rito de los Indios above San Antonio Creek	Rito de los Indios (San Antonio Creek to headwaters)	-	1	-	-	1	1	-	-
19	San Antonio Creek below warm springs	San Antonio Creek (VCNP boundary to headwaters)	-	1	-	-	1	1	-	-
20	San Antonio Creek at VCNP boundary	San Antonio Creek (VCNP boundary to headwaters)	1	1	1	1	-	1	-	-
21	San Antonio Creek above San Antonio Hot Springs	San Antonio Creek (East Fork Jemez to VCNP boundary)	-	1	-	-	1	1	-	-
22	San Antonio Hot Springs	San Antonio Creek (East Fork Jemez to VCNP boundary)	-	-	-	-	-	-	-	-
23	Sulphur Creek above VCNP boundary	Sulphur Creek (VCNP to headwaters)	-	1	-	-	1	1	-	1
24	Sulphur Creek above Redondo Creek	Sulphur Creek (Redondo Creek to VCNP boundary)	1	1	-	-	1	1	-	-
25	Redondo Creek above VCNP boundary	Redondo Creek (VCNP boundary to headwaters)	-	1	-	1	1	1	-	-
26	Redondo Creek above Sulphur Creek	Redondo Creek (Sulphur Creek to VCNP boundary)	1	1	-	1	1	1	-	-
27	Sulphur Creek above San Antonio Creek	Sulphur Creek (San Antonio Creek to Redondo Creek)	-	1	-	1	1	1	-	-
28	San Antonio Creek above La Cueva	San Antonio Creek (East Fork Jemez to VCNP boundary)	1	1	-	-	1	1	-	-
29	Spence Hot Spring	Jemez River (Soda Dam to East Fork Jemez River)	-	-	-	-	-	-	-	-

Map ID	Station	Assessment Unit	Macroinvertebrates	Nutrient Level 1	Chlorophyll a ¹	Sonde	Pebble Count ²	Thermograph ³	Fish ⁴	Hydroprotocol
30	San Antonio Creek above East Fork Jemez River	San Antonio Creek (East Fork Jemez to VCNP boundary)	-	1	-	1	1	1	1	-
31	Jaramillo Creek above Cerro Piñon Creek	Jaramillo Creek (East Fork Jemez River to headwaters)	-	1	-	1	1	1	-	1
32	La Jara Creek above irrigation diversion at VCNP	La Jara Creek (Perennial reaches above Arroyo San Jose)	-	1	-	1	1	1	-	-
33	East Fork Jemez River below Las Conchas day use area	East Fork Jemez River (VCNP to headwaters)	1	-	1	1	1	1	-	-
34	East Fork Jemez River above San Antonio Creek	East Fork Jemez River (San Antonio Creek to VCNP)	-	1	-	1	1	1	-	-
35	Jemez River at USGS gage below Battleship Rock	Jemez River (Soda Dam to East Fork Jemez River)	-	1	-	-	-	-	-	-
36	Jemez River above Soda Dam	Jemez River (Soda Dam to East Fork Jemez River)	1	1	-	1	1	1	1	-
37	Jemez River at Jemez State Monument	Jemez River (Rio Guadalupe to Soda Dam)	-	1	-	-	-	-	-	-
38	Jemez Hot Spring	Jemez River (Rio Guadalupe to Soda Dam)	-	-	-	-	-	-	-	-
39	Jemez Springs WWTP outfall	Jemez River (Rio Guadalupe to Soda Dam)	-	-	-	-	-	-	-	-
40	Jemez River above Rio Guadalupe	Jemez River (Rio Guadalupe to Soda Dam)	1	-	1	1	1	1	1	-
41	Jemez Valley Public Schools WWTP Outfall	Jemez River (Jemez Pueblo boundary to Rio Guadalupe)	-	-	-	-	-	-	-	-
42	Jemez River near Cañon	Jemez River (Jemez Pueblo boundary to Rio Guadalupe)	-	-	1	1	1	1	-	-
43	Vallecito Creek at Paliza Campground	Vallecito Creek (Perennial reaches from diversion above Ponderosa to headwaters)	-	1	-	-	-	-	-	1
44	Vallecito Creek above Ponderosa diversion	Vallecito Creek (Perennial reaches from diversion above Ponderosa to headwaters)	1	1	-	1	1	1	-	1
45	Jemez River above San Ysidro at NM Hwy 4	Jemez River (Zia Pueblo boundary to Jemez Pueblo boundary)	-	1	-	1	1	1	1	1
		<i>Quality Control Samples</i>	<i>1</i>	<i>-</i>	<i>1</i>	<i>-</i>	<i>1</i>	<i>-</i>	<i>-</i>	<i>1</i>

Map ID	Station	Assessment Unit	Macroinvertebrates	Nutrient Level 1	Chlorophyll a ¹	Sonde	Pebble Count ²	Thermograph ³	Fish ⁴	Hydroprotocol
Totals			17	32	12	25	34	34	7	9

1. Additional stations will be added as indicated by the preliminary nutrient assessment.
2. If sedimentation data (pebble counts) exceed the threshold value for percent sand/fines at a site, more extensive habitat data are collected.
3. If preliminary analysis of thermograph data indicates potential for impairment - cross-section, flow, canopy cover, and slope data required to use SSTEMP temperature modeling software will be collected.
4. Fish sampling will be determined by interagency cooperation and the availability of river shocking equipment.
5. Phytoplankton community composition samples are also collected in lakes.

5.0 RESOURCE REQUIREMENTS

Water chemistry samples submitted to SLD are paid for with an internal currency, work-time units (WTUs), supplied by means of a memorandum of agreement between NMED and the New Mexico Department of Health. Chlorophyll *a* and *E. coli* samples are analyzed in the SWQB laboratory by staff. Benthic macroinvertebrate and phytoplankton samples are sent to contract labs for identification and enumeration and are paid for with United States Environmental Protection Agency funding. These expenditures are summarized in Table 8.

Table 8. Estimated analytical charges.

Analyte/Analysis	Number of Samples	Cost per Sample	Totals
TDS/TSS	276	24	6,624
Nutrients	287	100	28,700
Dissolved Metals	113	235	26,555
Total Metals	107	90	9,630
Volatile Organic Compounds (VOCs)	16	150	2,400
Semi-Volatiles (SVOCs)	16	180	2,880
Radionuclides	20	120	2,400
Total (WTUs)			79,189
<i>E. coli</i> (SWQB)	287	\$5.08	\$1,458
Benthic Macroinvertebrates	17	\$175	\$2,975
Chlorophyll <i>a</i> (SWQB) ¹	30	\$45	\$1,350
Phytoplankton	5	\$165	\$825
Total (USD)			\$6,608

1. Estimated prior to conducting preliminary nutrient assessments.

A round trip for this survey is approximately 260 miles. Gasoline costs are estimated at \$3.50 per gallon. Vehicles typically used for surveys average 15 miles per gallon. Eight water chemistry sampling trips are planned for streams for this survey and three trips combining lakes and streams. An additional seven trips are planned for biological, habitat and nutrient surveys, and conducting the hydrology protocol. Transportation costs are estimated in Table 9.

Table 9. Transportation Costs

Type of Work	Approximate miles per trip	Number of Trips	Fuel Costs
Water Chemistry Sampling – Streams	260	8	\$486
Water Chemistry Sampling – Lakes	260	3	\$182
Nutrient/Habitat/ Surveys + Hydrology Protocol	260	7	\$425
Total			\$1,093

Water chemistry sampling trips will require two nights of per diem for two staff. Lake sampling trips will require one night of per diem for two staff. Biological and habitat trips require two nights of per diem for two staff completing four sites per day, and fish population surveys require three staff for two nights completing 2-3 sites per day. Per diem costs and staff time are estimated in Table 10.

Table 10. Per Diem and Staff Time Estimates

	Water Chemistry Sampling	Lake Sampling	Biological/Habitat Sampling + Hydrology Protocol	Total	Cost
Per Diem (number of nights)	32	6	22	60	\$5,100 ¹
Staff Days	64	12	41	127 ²	

¹ Per Diem estimates do not include partial days and are based on \$85/night.

² Time for preparation, loading and unloading vehicles, maintenance and cleaning of equipment, and lab work is not included.

Table 10 provides a summary of the estimated resources needed for the entire project, but excludes items such as sample containers, preservatives, parts, vehicle maintenance, and calibration standards and maintenance for sondes.

Table 10. Total Cost Estimates

WTUs	Analyses	Fuel	Per Diem	Staff Days
79,189	\$6,608	\$ 1,093	\$5,100	127

6.0 REFERENCES

NMED/SWQB 2006. *Water Quality Survey Summary for the Valles Caldera National Preserve Watershed, 2001*. New Mexico Environment Department Surface Water Quality Bureau. (<http://www.nmenv.state.nm.us/swqb/Surveys/VallesCalderaWQS2001.pdf>)

NMED/SWQB 2009. *Water Quality Survey Summary for the Jemez River Watershed, 2005*. New Mexico Environment Department Surface Water Quality Bureau. (<ftp://ftp.nmenv.state.nm.us/www/swqb/MAS/Surveys/JemezRiverWatershed-2005SurveySummary.pdf>)

NMED/SWQB. 2013a. *Standard Operating Procedures for Sample Collection and Handling*. New Mexico Environment Department Surface Water Quality Bureau. (<http://www.nmenv.state.nm.us/swqb/SOP/index.html/>)

NMED/SWQB. 2013b. *Quality Assurance Project Plan for Water Quality Management Programs*, New Mexico Environment Department Surface Water Quality Bureau. (<http://www.nmenv.state.nm.us/swqb/QAPP/>)

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 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	No reliable monitored data and/or information to determine if any designated or existing use is attained. AUs are listed in this category where data to support an attainment determination for any use are not available, consistent with requirements of the assessment and listing methodology.
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 5/5A	Impaired for one or more designated or existing uses and a TMDL is underway or scheduled. AUs are listed in this category if the AU is impaired for one or more designated uses by a pollutant. Where more

than one pollutant is associated with the impairment of a single AU, the AU remains in Category 5A until TMDLs for all pollutants have been completed and approved by USEPA.

IR Category 5/5B

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

IR Category 5/5C

Impaired for one or more designated or existing uses and Additional data will be collected before a TMDL is scheduled. AUs are listed in this category if there is not enough data to determine the pollutant of concern or there is not adequate data to develop a TMDL. For example, AUs with biological impairment will be listed in this category until further research can determine the particular pollutant(s) of concern. When the pollutant(s) are determined, the AU will be moved to 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
1,2-Diphenylhydrazine	1,1,2-Trichloroethane
1,3-Dichlorobenzene	1,1-Dichloroethane
1,3-Dinitrobenzene	1,1-Dichloroethene
1,4-Dichlorobenzene	1,1-Dichloropropene
1,4-Dinitrobenzene	1,2,3-Trichlorobenzene
1-Methylnaphthalene	1,2,3-Trichloropropane
2,3,4,6-Tetrachlorophenol	1,2,4-Trichlorobenzene
2,3,5,6-Tetrachlorophenol	1,2,4-Trimethylbenzene
2,4,5-Trichlorophenol	1,2-Dibromo-3-chloropropane (DBCP)
2,4,6-Trichlorophenol	1,2-Dibromoethane (Ethylene dibromide (EDB))
2,4-Dichlorophenol	1,2-Dichlorobenzene
2,4-Dimethylphenol	1,2-Dichloroethane
2,4-Dinitrophenol	1,2-Dichloropropane
2,4-Dinitrotoluene	1,3,5-Trimethylbenzene
2,6-Dinitrotoluene	1,3-Dichlorobenzene
2-Chloronaphthalene	1,3-Dichloropropane
2-Chlorophenol	1,4-Dichlorobenzene
2-Methylnaphthalene	1,4-Dioxane
2-Methylphenol	2,2-Dichloropropane
2-Nitroaniline	2-Butanone (MEK)
2-Nitrophenol	2-Chloroethyl Vinyl Ether
3,3'-Dichlorobenzidine	2-Chlorotoluene
3-Methylphenol & 4-Methylphenol	2-Hexanone
3-Nitroaniline	4-Chlorotoluene
4,4'-DDD	4-Isopropyltoluene
4,4'-DDE	4-Methyl-2-pentanone
4,4'-DDT	Acetone
4,6-Dinitro-2-methylphenol	Acetonitrile
4-Bromophenyl Phenyl Ether	Acrolein
4-Chloro-3-methylphenol	Acrylonitrile
4-Chloroaniline	Allyl Chloride
4-Chlorophenyl Phenyl Ether	Benzene
4-Nitroaniline	Bromobenzene
4-Nitrophenol	Bromochloromethane
Acenaphthene	Bromodichloromethane
Acenaphthylene	Bromoform
Alachlor	Bromomethane
Aldrin	Carbon Disulfide
alpha-BHC	Carbon Tetrachloride
Aniline	Chlorobenzene
Anthracene	Chloroethane
Atrazine	Chloroform
Azobenzene	Chloromethane
Benzidine	Chloroprene
Benzo(a)anthracene	cis-1,2-Dichloroethene
Benzo(a)pyrene	cis-1,3-Dichloropropene
Benzo(b)fluoranthene	cis-1,4-Dichloro-2-butene
Benzo(g,h,i)perylene	Dibromochloromethane
Benzo(k)fluoranthene	Dibromomethane

Organics (semi-volatiles)	Organics (volatiles)
Benzyl alcohol	Dichlorodifluoromethane
beta-BHC	Ethyl Methacrylate
bis(2-Chloroethoxy)methane	Ethylbenzene
bis(2-Chloroethyl)ether	Hexachlorobutadiene
bis(2-Chloroisopropyl)ether	Iodomethane
bis(2-Ethylhexyl)adipate	Isobutyl Alcohol
bis(2-Ethylhexyl)phthalate	Isopropylbenzene
Butyl Benzyl Phthalate	meta para Xylene mix
Carbazole	Methacrylonitrile
Chrysene	Methyl Methacrylate
cis-Chlordane	Methylene Chloride (Dichloromethane)
Cyanazine	Naphthalene
delta-BHC	n-Butylbenzene
Dibenz(a,h)anthracene	Nitrobenzene
Dibenzofuran	ortho-Xylene
Dieldrin	Pentachloroethane
Diethylphthalate	Propionitrile
Dimethylphthalate	Propylbenzene
Di-n-butyl Phthalate	sec-Butylbenzene
Di-n-octyl phthalate	Styrene
Endosulfan I	tert-Butyl Methyl Ether (MTBE)
Endosulfan II	tert-Butylbenzene
Endosulfan sulfate	Tetrachloroethene
Endrin	Tetrahydrofuran (THF)
Endrin aldehyde	Toluene
Endrin ketone	trans-1,2-Dichloroethene
Fluoranthene	trans-1,3-Dichloropropene
Fluorene	trans-1,4-Dichloro-2-butene
gamma-BHC (lindane)	Trichloroethene
Heptachlor	Trichlorofluoromethane
Heptachlor epoxide	Trihalomethanes
Hexachlorobenzene	Vinyl Acetate
Hexachlorobutadiene	Vinyl Chloride
Hexachlorocyclopentadiene	Xylene
Hexachloroethane	
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	
1,2,4-Trichlorobenzene	