Middle Rio Grande 2014

FIELD SAMPLING PLAN

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Prepared by

NMED Surface Water Quality Bureau

APPROVAL PAGE

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ACRONYMS / ABBREVIATIONS

AU	Assessment Unit
blw	below
bnd	boundary
ck	creek
confl	confluence
CWA	Clean Water Act
DM	Dissolved Metals
DO	Dissolved Oxygen
d/s	downstream
EIA	U.S. Energy Information Administration
FSP	Field Sampling Plan
hdwt	headwaters
Hg	Mercury
immed	immediately
IR	State of New Mexico Clean Water Act §303(d)/305(b) Integrated Report
JPA	Joint Powers Agreement
LTD	Long Term Deployment (Sondes, Thermographs, DO Loggers)
MASS	Monitoring, Assessment, and Standards Section
MPG	Miles per gallon
MRG	Middle Rio Grande
MRGESACP	Middle Rio Grande Endangered Species Act Collaboration Program
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NPS	Non-point Source
PCBs	Polychlorinated biphenyls
PSRS	Point Source Regulation Section
PM	Program Manager
prt	part
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAD	Radionuclide
RGSM	Rio Grande silvery minnow
rsvr	reservoir
SBD	Stream Bottom Deposits
SC	Specific Conductance
SLD	Scientific Laboratory Division
SOP	Standard Operating Procedures
SQUID	Surface water QUality Information Database
STORET WQX	STOrage and RETieval Water Quality eXchange
SSTEMP	Stream Segment Temperature
SVOC	Semi-Volatile Organic Carbon
SWQB	Surface Water Quality Bureau
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TM	Total Metals
TMDL	Total Maximum Daily Load
TRC	Total Recoverable Chlorine
trib	Tributary
TSS	Total Suspended Solids
u/s	upstream

USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Carbon
WPS	Watershed Protection Section
WQ	Water Quality
WQCC	Water Quality Control Commission
WQS	Water Quality Standard
WTU	Work Time Unit
WWTP	Wastewater Treatment Plant

INTRODUCTION

The purpose of this field sampling plan is to provide a detailed description of the Middle Rio Grande (MRG) Water Quality Survey to be conducted during 2014 by the New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB). It has been prepared in accordance with Standard Operating Procedure (SOP) 2.1, Field Sampling Plans (FSPs). It describes project objectives and decision criteria, and includes the sampling plan with sampling locations, parameters and sampling frequencies for physical, chemical and biological data. It may be amended as the need arises, and any amendments will be documented and justified in the survey report, which will be published after completion of the field sampling.

This plan is a companion document to the SWQB Quality Assurance Project Plan (QAPP) for Water Quality (WQ) Management Programs (NMED/SWQB 2013). Data will be collected according to the QAPP and the most recent version of the applicable SOPs (NMED/SWQB 2014. Current versions of SOPs are available on the SWQB website (www.nmenv.state.nm.us/swqb/SOP).

The 2014 water quality survey of the MRG will be the first study where SWQB collects data along the main stem Rio Grande and its tributaries during the same year. The most recent comprehensive water quality sampling campaign conducted by SWQB along the MRG tributaries occurred in 2005. SWQB also collected water quality data from October 2006 to September 2007 in cooperation with the Middle Rio Grande Endangered Species Act Collaboration Program (MRGESACP). SWQB solicited and compiled water quality data collected from other sources ranging from 2000-2008. The purpose of the MRGESACP cooperative effort was to determine if poor water quality is contributing to the decline of Rio Grande silvery minnow (RGSM) populations in the Rio Grande. These studies resulted in impairment determinations for dissolved oxygen (DO), temperature, polychlorinated biphenyls (PCBs), turbidity, nutrient/eutrophication, sedimentation, aluminum, radionuclides, specific conductance (SC), and *E. coli* in several reaches of the MRG. Current impairments in the MRG are listed in Table 2.

SWQB conducts intensive watershed-based water quality surveys to fulfill work plan requirements of the Clean Water Act (CWA) Section 106 grant. This grant provides federal funding to collect water quality data to ensure that high quality, defensible data are available to make informed policy decisions. Data and conclusions are publically available to interested parties by making a formal request to the Monitoring, Assessments, and Standards Section (MASS) Program Manager (PM). The purpose of water quality sampling is to assess the quality of surface waters in the state, determine where water quality standards are not being met (i.e. waters are impaired), and to inform development of Total Maximum Daily Loads (TMDLs) for impaired waters, which lay the foundation for restoring these waters.

1.0 PROJECT PERSONNEL

1.1 Personnel Roles and Responsibilities

Staff responsibilities for the 2014 MRG project are listed in Table 1. Each team member is responsible for implementing their assigned responsibilities. If an individual is unable to fulfill their duties it is that individual's responsibility to find assistance and/or a replacement, in coordination with appropriate supervisors.

Table 1
2014 MRG Personnel Roles and Responsibilities

Team Member	Position/Role	Responsibilities
		Coordinates survey planning efforts (integrates the documentation of various team members' information into the field sampling plan and planning spreadsheet);
	Monitoring Team	Coordinates and participates in the collection of chemical, biological, and habitat data including sonde and thermograph data collection efforts;
Chuck Dentino	Lake Coordinator	Manages chemical, biological, and habitat data for study (forms, data entry and analysis);
Greg Huey	MRG South Coordinator	Provides chemical, biological, and habitat results for final report and writes appropriate portions of the survey report; and
Seva Joseph	Tributary Coordinator	Coordinates development of final survey report (integrates information from all team members into final survey report).
Scott Murray	MRG North Coordinator	
Gary Schiffmiller	Data Logger Coordinator	
Sandra Gabaldon Barbara Cooney	Point Source Regulation Section (PSRS) Liaisons	Provides information and data needs pertaining to point source discharges located within the study area; Assists with development of final survey report, as needed.
Mike Matush Nina Wells	Watershed Protection Section (WPS) Liaisons	Provides information and data needs pertaining to nonpoint sources of pollution and BMPs located within the study area.
Heidi Henderson	TMDL Liaison	Provides information and data needs pertaining to TMDL development to be conducted in the study area; Assists with development of final survey report, as needed; and develops TMDLs as needed.

1.2 Organization

For the responsibilities defined in this project, the Project Coordinator(s) report to the MASS Program Manager.

2.0 PROJECT DESCRIPTION

2.1 Background

Stream assessment units within the study area and where the designated uses are not being attained based on data collected during the previous SWQB survey and collaborative studies in the area (NMED/SWQB 2010; NMED/SWQB 2008; NMED/SWQB 2009) are listed in Table 2. IR Category refers to the New Mexico's Integrated Report (IR) categories (See Appendix A).

The impairments listed in Table 2 were identified during the 2005 survey of the Middle Rio Grande watershed and data collected and compiled through the MRGESACP project (NMED/SWQB 2008; NMED/SWQB 2009; NMED/SWQB 2010). Data needs for the 2014 MRG study were determined based on impairments from the 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 2
Existing MRG Impairments

Assessment Unit	WQS[1] Segment	Impairments	IR Category	Completed TMDLs
Caballo Reservoir	20.6.4.104	Mercury in fish tissue	/5C	303(d) List (no TMDL in place)
Elephant Butte Reservoir	20.6.4.104	Mercury in fish tissue	/5C	303(d) List (no TMDL in place)
Elephant Butte Reservoir	20.6.4.104	PCB in fish tissue	/5C	303(d) List (no TMDL in place)
Galisteo Ck (Perennial reaches abv Kewa Pueblo bnd)[2]	20.6.4.121	Specific conductance	/5B	303(d) List (no TMDL in place)
Galisteo Ck (Perennial reaches abv Kewa Pueblo bnd)[2]	20.6.4.121	Temperature	/5B	303(d) List (no TMDL in place)
Las Huertas Ck (perennial prt Santa Ana Pueblo bnd to hdwts)	20.6.4.111	Nutrient/Eutrophication	/5C	303(d) List (no TMDL in place)
Las Huertas Ck (perennial prt Santa Ana Pueblo bnd to hdwts)	20.6.4.111	Turbidity	/5C	303(d) List (no TMDL in place)
Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	20.6.4.105	Dissolved oxygen	/5A	303(d) List (no TMDL in place)
Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	20.6.4.105	*E. coli*	/5A	TMDL Completed 2010
Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	20.6.4.105	PCB in fish tissue	/5A	303(d) List (no TMDL in place)
Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	20.6.4.105	Temperature	/5A	303(d) List (no TMDL in place)
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	20.6.4.106	Ambient bioassays -- acute	/5C	303(d) List (no TMDL in place)
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	20.6.4.106	Dissolved oxygen	/5C	303(d) List (no TMDL in place)
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	20.6.4.106	*E. coli*	/5C	TMDL Completed 2010
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	20.6.4.106	Gross alpha, adjusted	/5C	303(d) List (no TMDL in place)
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	20.6.4.106	PCB in fish tissue	/5C	303(d) List (no TMDL in place)
Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	20.6.4.106	PCB in water column	/5C	303(d) List (no TMDL in place)

Assessment Unit	WQS[1] Segment	Impairments	IR Category	Completed TMDLs
Rio Grande (Rio Puerco to Isleta Pueblo bnd)	20.6.4.105	*E. coli*	/5A	TMDL Completed 2010
Rio Grande (Rio Puerco to Isleta Pueblo bnd)	20.6.4.105	Temperature	/5A	303(d) List (no TMDL in place)
Rio Grande (San Marcial at USGS gage to Rio Puerco)	20.6.4.105	Aluminum	/5A	TMDL Completed 2010
Rio Grande (San Marcial at USGS gage to Rio Puerco)	20.6.4.105	*E. coli*	/5A	TMDL Completed 2010
San Pedro Creek (San Felipe bnd to headwaters)	20.6.4.125	Benthic macroinvertebrate. community	/5C	303(d) List (no TMDL in place)
Santa Fe River (Cochiti Pueblo bnd to Paseo del Canon)	20.6.4.113	Nutrient/Eutrophication	/5A	303(d) List (no TMDL in place)
Santa Fe River (Cochiti Pueblo bnd to Paseo del Canon)	20.6.4.113	Sedimentation/Siltation	/5A	TMDL Completed 2000
Santa Fe River (Paseo del Canon to Santa Fe WWTP)	20.6.4.113	Nutrient/Eutrophication	/5A	303(d) List (no TMDL in place)
Santa Fe River (Santa Fe WWTP to Nichols Rsvr)[3]	20.6.4.98	Aluminum	/5A	303(d) List (no TMDL in place)
Santa Fe River (Santa Fe WWTP to Nichols Rsvr)[3]	20.6.4.98	*E. coli*	/5A	303(d) List (no TMDL in place)
Santa Fe River (Santa Fe WWTP to Nichols Rsvr)[3]	20.6.4.98	PCB in Water Column	/5A	303(d) List (no TMDL in place)
Tijeras Arroyo (Four Hills Bridge to headwaters)	20.6.4.99	Benthic macroinvertebrate. community	/5C	303(d) List (no TMDL in place)
Tijeras Arroyo (Four Hills Bridge to headwaters)	20.6.4.99	Nutrient/Eutrophication	/5C	303(d) List (no TMDL in place)

[1] WQS = Water Quality Standards

[2] Since this listing the Assessment Unit split into 2 AUs: Galisteo Creek (Perennial prt Kewa bnd to 2.2 mi abv Lamy) and Galisteo Creek (Perennial prt 2.2 mi abv Lamy to headwaters)

[3] Since this listing the Assessment Unit split at Guadalupe St into 2 AUs: Santa Fe River (Santa Fe WWTP to Guadalupe St) and Santa Fe River (Guadalupe St to Nichols Rsvr)

2.2 Objectives

The data goals, desired outcomes and criteria for the 2014 MRG survey are listed in Table 3.

Table 3
2014 MRG Project Goals, Desired Outcomes and Criteria

	Data Collection Goal	Question to be answered	Products/ Outcomes	Decision Criteria
Primary Objective	Assess designated use attainment for the *Integrated Report* and provide information to the public on the condition of surface water	Are sampled waterbodies meeting WQS criteria?	Survey Report; Integrated Report	WQS as interpreted by the APs[1]
Secondary Objectives	Develop load and waste load allocations for TMDLs	What is the maximum pollutant load a waterbody can receive and meet the requirements of the WQS?	TMDL loading calculations and NPDES[2] 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[3] Annual Report, *Integrated Report (De-Listing)*	WQS as interpreted by the Assessment Protocols
	Develop or refine surface WQS	Are the existing uses appropriate for the waterbody?	UAA[4]; Amendments to New Mexico WQS	Are data sufficient to support a petition to the WQCC[5] to revise WQS?

[1] APs = Assessment Protocols
[2] NPDES = National Pollutant Discharge Elimination System
[3] NPS = Non-Point Source
[4] UAA = Use Attainability Analysis
[5] WQCC = Water Quality Control Commission

2.3 Schedule

As part of the survey planning process public meetings are held to receive public input on any areas of concern within the assessment units surveyed and to inform interested parties about the general water quality survey, assessment and TMDL processes, as well as our specific sampling plans in the watershed this year. For this survey, one public meeting was held on January 29, 2014 at the NMED District 1 office in Albuquerque from 6-8 p.m. A draft FSP was released for public comment at that time. This final version includes changes stemming from the public input process.

Water chemistry results typically take several months to return from the State analytical laboratory, Scientific Laboratory Division (SLD). When these data are received, they are verified and validated as described in NMED/SWQB 2013. Once all data have been received and validated and verified, the data will be assessed according to the most recent version of the assessment protocols

(www.nmenv.state.nm.us/swqb/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 for currently listed impairments are tentatively scheduled for completion in Fall 2016. TMDLs for new impairments determined from the 2014 MRG Survey are tentatively scheduled for 2019.

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 proposed project timeline for the 2014 MRG survey is shown in Table 4. Significant developments, changes, or events will be shared with a mailing list of interested parties.

Table 4
2014 MRG Project Schedule

Activity	Winter '13-14	Spring '14	Summer '14	Fall '14	Winter '14-15	Spring '15	Summer '15	Fall '15	Winter '15
Survey Planning, Site Reconnaissance, and Public Input Period	==========▶								
Data Collection & Submittal of WQ Samples to SLD		==========▶							
Final Data Verification & Validation Procedures, Assessment of data					==========▶				
Publication of Survey Report						==========▶			

2.4 Location

Middle Rio Grande main stem and tributaries from Cochiti Dam to Caballo Reservoir.
The project area includes the MRG and tributaries from the USGS gage below Cochiti Reservoir to below Caballo Reservoir (Table 5, Figure 1a and Figure 1b). Sampling will also occur on several tributaries to the MRG, including the Santa Fe River, Rio Galisteo, Las Huertas Creek, San Pedro Creek, Tijeras Arroyo, Abo Arroyo, Rio Salado, and possibly others if time and resources allow. The two major reservoirs within the MRG watershed, Elephant Butte and Caballo, are included in the survey.

Table 5
SWQB Water Quality Stations in the 2014 MRG WQ Survey
(Stations ordered downstream to upstream)

#	Station ID	Station Name	Station Rationale
1	42RGrand171.9	Rio Grande Blw Caballo Dam, NM	Most downstream station, bracket reservoir
2	41CaballoLkDam	CABALLO LAKE AT DAM DEEP	Typical deep station where depth profiles can be recorded and light extinction measured
3	41RGrand217.5	RIO GRANDE BELOW E. BUTTE DAM AT USGS GAGE	Need to evaluate availability/suitability of existing data. Need nutrient protocol
4	40EButteReDam	Elephant Butte Lake AT DAM DEEP	Typical deep station where depth profiles can be recorded and light extinction measured
5	40RGrand274.0	Rio Grande blw Confl Conveyance Channel and River	Lowest station on complete river before it enters Elephant Butte Reservoir
6	32RGrand292.8	Rio Grande at USGS gage near San Marcia	Lowest station in AU (Rio Grande)
7	32RGrand295.3	Rio Grande Conveyance Channel at San Marcial near USGS gage 0858300	A BOR/USGS station (CCGS). This gage is in the conveyance channel
8	32RGrand322.1	Rio Grande at Socorro	Brackett NPDES discharge
9	NM0028835-A	Socorro WWTP effluent	NPDES discharge
10	38RSalad030.0	Rio Salado 1 mile above The Box	Only station in AU
11	32RGrand391.9	Rio Grande at US 60 near Bernardo	Bottom of AU
12	32AboArr037.7	Abo Arroyo blw Hwy 60	Only station in AU
13	NM0020150-A	Belen WWTP effluent	NPDES discharge
14	32RGrand421.4	RIO GRANDE AT BELEN (309 BRIDGE)	Low station in AU
15	NM0020303-A	Los Lunas WWTP effluent	NPDES discharge
16	NM0030279-A	Bosque Farms WWTP effluent	NPDES discharge
17	32RGrand446.9	Rio Grande abv Bosque Farms WWTP	NPDES discharge
18	32RGrand463.6	Rio Grande at Los Padillas	Below Abq WWTP, and South AMAFCA Channel
19	NM0022250-A	Albuquerque WWTP effluent	Station Samples discharge from the Albuquerque WWTP
20	32RGrand466.5	Rio Grande above Rio Bravo Bridge	Station is above Albuquerque WWTP
21	32Tijera027.2	Tijeras Arroyo blw Deadmans Curve	Site in the middle of the AU, may be the lower extent of the perennial reach. Future wildlife corridor
22	32RGrand488.9	Rio Grande above Alameda Bridge	Bottom of AU. Downstream of Rio Rancho WWTP #2
23	NM0027987-A	Rio Rancho #2 WWTP	NPDES discharge
24	32RGrand499.2	Rio Grande above Rio Rancho WWTF #2	Station is above Rio Rancho WWTP #2 discharge
25	NM0023485-A	Bernalillo WWTP effluent	Discharge from Bernalillo WWTP
26	32RGrand508.0	Rio Grande abv Hwy 550 Bridge	Station is downstream of Jemez River and Above Bernalillo WWTP; bottom of AU
27	30LHuert010.0	Las Huertas Creek at Tres Amigos Rd	This site is in the lowest perennial portion of the AU

#	Station ID	Station Name	Station Rationale
28	30SanPed011.1	San Pedro Creek at Conservation Easement	This is the only site in the AU
29	30RGrand517.3	Rio Grande Below Angostura Diversion Works	Upstream of Jemez confluence
30	TBD	Rio Grande at Pena Blanca	Most upstream station on Rio Grande
31	30Galist030.9	Galisteo Creek at Hwy 14 near Cerrillos	Only station in AU
32	30Galist071.4	Galisteo Creek at Spirit Valley Rd in Canoncito	Only station in AU
33	30Apache003.0	Apache Canyon	New station to monitor perennial stream
34	30DeerCr000.7	Deer Creek above I25	New station to monitor perennial stream
35	30SantaF012.9	SANTA FE RIVER above Cochiti AT USGS GAGE 08317200	Bottom of AU
36	30LaCien000.1	CIENEGA CREEK NE 90 FT ABV MOUTH ON SF RIV	Only station in AU
37	30SantaF028.4	Santa Fe River above CRd 56 d/s of river preserve	Perennial reach of Santa Fe River, below NPDES discharge
38	30SantaF032.4	Santa Fe River at Upper Preserve below WWTP	319 monitoring; below Santa Fe WWTP
39	NM0022292	Santa Fe WWTP effluent channel outfall	NPDES discharge
40	30SantaF035.9	Santa Fe River above Hwy 599	Only station in AU. Site is below the city but above the WWTP
41	30SantaF050.5	Santa Fe River ~75m u/s of Sandoval St	Lowest station in AU
41a	30SantaF052.4	Santa Fe River below Cerro Gordo RD	Alternate sampling location if 41 is dry
42	30SantaF061.1	Santa Fe River above McClure Reservoir at gage	Site is lowest available on unregulated reach of Santa Fe River

All UPPERCASE indicates historic SWQB data are available at this station.

3.0 DOCUMENTATION

Project documents include this field sampling plan, calibration records, sonde and logger download data, validation and verification records, sample collection data, records of analytical data in hard copy or in electronic form and quality control (QC) records. Documents will be maintained in accordance with the requirements of the SWQB QAPP.

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

Project activities will be documented in SWQB MASS Section Field Sheets. Information from field sheets is entered and organized in the SWQB's Surface water QUality Information Database (SQUID). Analytical results are electronically transferred into the SQUID database and eventually moved to the U.S. Environmental Protection Agency's (USEPA) STOrage and RETrieval Water Quality eXchange (STORET WQX). All data are verified and validated for completeness and accuracy. Project data housed in SQUID are organized in reports and assessed by the SWQB Assessment Team to determine if water quality standards are being attained. A survey report summarizing the MRG 2014 Water Quality Survey is tentatively planned for completion in February 2015.

Figure 1a. Project area and sampling locations, Northern Stations

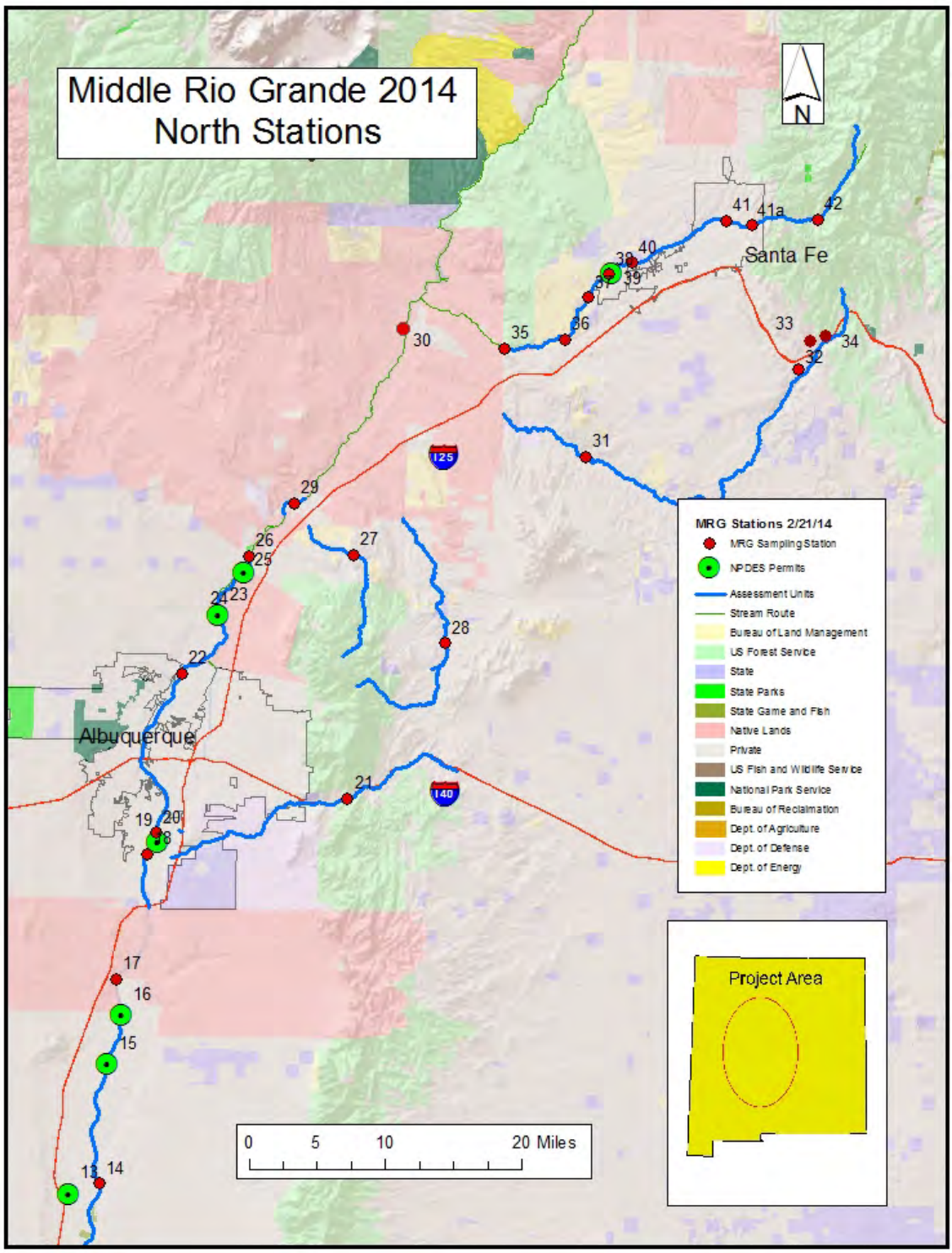
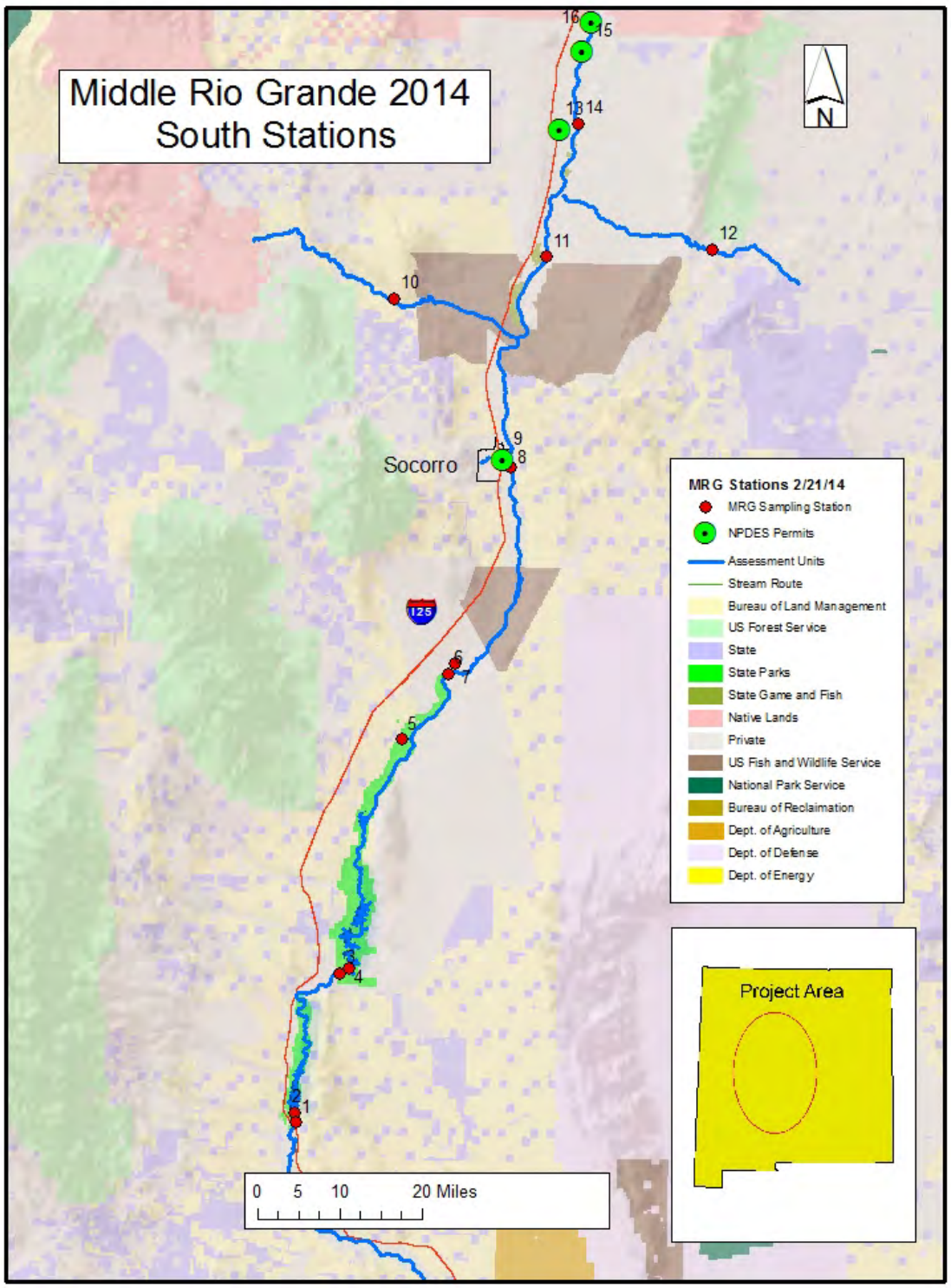


Figure 1b. Project area and sampling locations, Southern Stations



4.0 SAMPLING PLAN

4.1 Chemistry Sampling

Water quality samples will be submitted to the New Mexico Scientific Laboratory Division (SLD) or processed in the SWQB laboratory in accordance with procedures as outlined in the SWQB Standard Operating Procedures for Data Collection (SOPs) (NMED/SWQB 2014 or more recent if available).

The water quality parameters to be measured and the sampling frequency are listed in Table 6. In addition to the parameters listed, field parameters (temperature, specific conductance, salinity, dissolved oxygen concentration, dissolved oxygen saturation, pH, and turbidity) will be measured at each site using a multi-parameter sonde. Where United States Geological Survey (USGS) flow data are unavailable, primarily on tributaries, flow will be measured. SWQB is hoping to conduct sampling within Assessment Units (AUs) that have an existing impairment for PCBs, pending sufficient resources and funding. If this sampling occurs, an addendum to this FSP will be drafted and announced to interested parties and collaborators.

Chemistry sampling sites are located in each AU with additional sites chosen based on existing or potential point or non-point sources of pollution. Existing and potential sources of pollution are identified from point source permits, historical data, information from other agencies, and local residents. Sampling stations were selected at locations that bracket potential pollution sources, allow access to the waterbody and represent each of the assessment units in the watershed except for very small or mostly ephemeral systems. Where possible, established stations will be monitored to allow for examination of trends.

Table 6
2014 MRG Draft Water Chemistry Sampling Summary

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P)[1]	Total Metals (Hg, Se, Al)	Dissolved Metals[2]	*E. coli*	Volatile Organic Compounds[3]	Semi-volatile Organics[3]	Radionuclides[4]
1	Rio Grande Blw Caballo Dam, NM	Rio Grande (one mile below Percha Dam to Caballo Reservoir)		4	4	4	4	4	2	2	2
2	CABALLO LAKE AT DAM DEEP	Caballo Reservoir		4	4	4	4	4	2	2	2
3	RIO GRANDE BELOW E. BUTTE DAM AT USGS GAGE	Rio Grande (Caballo Reservoir to Elephant Butte Reservoir)		8	8	4	4	8	2	2	2
4	Elephant Butte Lake AT DAM DEEP	Elephant Butte Reservoir		4	4	4	4	4	2	2	2
5	Rio Grande blw Confl Conveyance Channel and River	Rio Grande (Elephant Butte Rsvr to San Marcial at USGS)		8	8	4	4	8	2	2	2
6	Rio Grande at USGS gage near San Marcia	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8	8	4	4	8	2	2	2

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P)[1]	Total Metals (Hg, Se, Al)	Dissolved Metals[2]	*E. coli*	Volatile Organic Compounds[3]	Semi-volatile Organics[3]	Radionuclides[4]
7	Rio Grande Conveyance Channel at San Marcial near USGS gage 0858300	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8	8	4	4	8			
8	Rio Grande at Socorro	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8	8	4	4	8			
9	Socorro WWTP effluent	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8	8	4	4	8			
10	Rio Salado 1 mile above The Box	Rio Salado (Rio Grande to Alamo Navajo bnd)		4	4	4	4	4	2	2	2
11	Rio Grande at US 60 near Bernardo	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8	8	4	4	8	2	2	2
12	Abo Arroyo blw Hwy 60	Abo Arroyo (Rio Grande to headwaters)		4	4	4	4	4	2	2	2
13	Belen WWTP effluent	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8	8	4	4	8			
14	RIO GRANDE AT BELEN (309 BRIDGE)	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8	8	4	4	8			
15	Los Lunas WWTP effluent	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8	8	4	4	8			
16	Bosque Farms WWTP effluent	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8	8	4	4	8			
17	Rio Grande abv Bosque Farms WWTP	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8	8	4	4	8			
18	Rio Grande at Los Padillas	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		8	8	4	4	8	2	2	2
19	Albuquerque WWTP effluent	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		8	8	4	4	8			
20	Rio Grande above Rio Bravo Bridge	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		8	8	4	4	8			
21	Tijeras Arroyo blw Deadmans Curve	Tijeras Arroyo (Four Hills Bridge to headwaters)	4	4	8	4	4	8	2	2	2
22	Rio Grande above Alameda Bridge	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8	8	4	4	8	2	2	2

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P)[1]	Total Metals (Hg, Se, Al)	Dissolved Metals[2]	*E. coli*	Volatile Organic Compounds[3]	Semi-volatile Organics[3]	Radionuclides[4]
23	Rio Rancho #2 WWTP	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8	8	4	4	8			
24	Rio Grande above Rio Rancho WWTF #2	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8	8	4	4	8			
25	Bernalillo WWTP effluent	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8	8	4	4	8			
26	Rio Grande abv Hwy 550 Bridge	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)		8	8	4	4	8	2	2	2
27	Las Huertas Creek at Tres Amigos Rd	Las Huertas Ck (Perennial prt Santa Ana Pueblo bnd to hws)	4	4	8	4	4	8			
28	San Pedro Creek at Conservation Easement	San Pedro Creek (San Felipe bnd to headwaters)	4	4	8	4	4	8			
29	Rio Grande Below Angostura Diversion Works	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)	8		8	4	4	8	2	2	2
30	Rio Grande at Pena Blanca	Rio Grande (non-pueblo Angostura Div to Cochiti Rsrv)	4		4	4	4	4	2	2	2
31	Galisteo Creek at Hwy 14 near Cerrillos	Galisteo Ck (Perennial prt Kewa bnd to 2.2 mi abv Lamy)	8		8	4	4	8	2	2	2
32	Galisteo Creek at Spirit Valley Rd in Canoncito	Galisteo Ck (Perennial prt 2.2 mi abv Lamy to hdwts)	8		8	4	4	8			
33	Apache Canyon	Apache Canyon (Galisteo Creek to Hdwt)	8		8	4	4	8			
34	Deer Creek above I25	Deer Ck (perennial prt Galisteo Ck to hdwts)	8		8	4	4	8			
35	SANTA FE RIVER above Cochiti AT USGS GAGE 08317200	Santa Fe River (Cochiti Pueblo bnd to Paseo del Canon)		8	8	4	4	8	2	2	2
36	CIENEGA CREEK NE 90 FT ABV MOUTH ON SF RIV	Cienega Creek (Santa Fe River to headwaters)	8		8	4	4	8	2	2	2
37	Santa Fe River above CRd 56 d/s of river preserve	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	8		8	4	4	8			

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P)[1]	Total Metals (Hg, Se, Al)	Dissolved Metals[2]	*E. coli*	Volatile Organic Compounds[3]	Semi-volatile Organics[3]	Radionuclides[4]
38	Upper Santa Fe River at Upper Preserve below WWTP	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	8		8			8	2	2	2
39	Santa Fe WWTP effluent channel outfall	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	8		8	4	4	8	2	2	2
40	Santa Fe River above Hwy 599	Santa Fe River (Santa Fe WWTP to Guadalupe St)	8		8	4	4	8			
41	Santa Fe River ~75m u/s of Sandoval St	Santa Fe River (Guadalupe St to Nichols Reservoir)	8		8	4	4	8	2	2	2
42	Santa Fe River above McClure Reservoir at gage	Santa Fe River (Nichols Reservoir to headwaters)	8		8	4	4	8	2	2	2
	QC	Field, equipment, reagent and bacterial blanks collected per QAPP.	-	-	16	-	16	16	8		-
	Totals		112	200	328	164	180	328	52	44	44

All UPPERCASE indicates historic SWQB data are available for this station.

[1] Suite includes total Kjeldahl nitrogen, nitrate+nitrite, ammonia and total phosphorus.

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

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

[4] A radionuclide sample will include gross alpha and gross beta and depending on detections may include Uranium mass and Radium 226 + 228.

4.2 Biology/Habitat Sampling

Measuring biological response indicators concurrent to physical habitat and chemistry gives an overall interpretation of the biological integrity of the reach represented, and 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 degradation. SWQB is currently collecting 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 are conducted in accordance with the SOPs (NMED/SWQB 2013 or more recent if available). Benthic macroinvertebrate and fish sampling is conducted within a biological index period, August 15 through November 15, for appropriate comparability of samples and life history requirements. Chlorophyll-*a* may be collected outside of index period during periods of stable flow, at least two weeks into the growing season and four weeks since the last scour event. Sondes are deployed at select sites in the stream for 3-30 days to record field variables in at most one hour intervals to document dissolved oxygen, pH, temperature, conductivity, and turbidity fluctuations. Dissolved oxygen data loggers are deployed throughout the survey duration to capture diurnal patterns and dissolved oxygen sags. Thermographs (data logging thermometers) are deployed

from June through August at select sites throughout the survey to measure temperature fluctuations. Sites in this survey requiring biological data collection are located in the Southern Rockies and Arizona and New Mexico Mountains ecoregions (Griffith *et al*. 2006), as such they will be compared to a mountain reference condition for assessment purposes (Jacobi et al 2006) whereas those located within the Arizona and New Mexico Plateau and Chihuahuan Deserts ecoregions will be compared to an individual reference site.

Resources, such as staff and budgets, and other issues, such as property ownership do not allow for collection of biological and habitat data at all stations. Stations are selected for biological and habitat monitoring based on 1) current Integrated List status; 2) results of the Level I Nutrient Assessment; and 3) observational results of the surrounding land use including upland and riparian habitat conditions, including results of the Site Condition Class Verification & Probable Source Field Sheet and the Rapid Habitat Assessment. 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. The biological and habitat sampling that is planned for this survey is listed in Table 7.

SWQB is working with other government agencies, municipalities, Pueblos, watershed groups, and other organizations to collaboratively maximize sampling and monitoring efforts. Data sharing opportunities benefit all groups by providing larger coverage both spatially and temporally. Any data collected from outside groups are subjected to the SWQB QAPP, SOPs, and any other applicable QA/QC procedures prior to assessment. Table 7 summarizes locations requiring long term data (LTD) monitoring. These data will be either collected by SWQB or cooperating organizations.

Table 7
2014 MRG Draft Biological and Habitat Sampling Summary

#	Station Name	Assessment Unit	Sonde Deployment[1]	DO Logger[2]	Thermograph[3]	Chlorophyll a[4]	Phytoplankton	Physical Habitat[5]	Flow	Fish[6]	Benthics[7]
2	CABALLO LAKE AT DAM DEEP - 41CaballoLkDam	Caballo Reservoir				4	4				
3	RIO GRANDE BELOW E. BUTTE DAM AT USGS GAGE - 41RGrand217.5	Rio Grande (Caballo Reservoir to Elephant Butte Reservoir)			1						
4	Elephant Butte Lake AT DAM DEEP-40EButteReDam	Elephant Butte Reservoir				4	4				
7	Rio Grande at USGS gage near San Marcial - 32RGrand292.8	Rio Grande (San Marcial at USGS gage to Rio Puerco)	1		1	1		1			2
8	Rio Grande blw Confl Conveyance Channel and River - 40RGrand274.0	Rio Grande (Elephant Butte Rsvr to San Marcial at USGS)			1						
10	Rio Salado 1 mile above The Box - 38RSalad030.0	Rio Salado (Rio Grande to Alamo Navajo bnd)	1		1	1		1	8	1	1
11	Rio Grande at US 60 near Bernardo - 32RGrand391.9	Rio Grande (Rio Puerco to Isleta Pueblo bnd)	1		1	1		1			2
12	Abo Arroyo blw Hwy 60 - 32AboArr037.7	Abo Arroyo (Rio Grande to headwaters)	1		1	1		1	8	1	

#	Station Name	Assessment Unit	Sonde Deployment[1]	DO Logger[2]	Thermograph[3]	Chlorophyll a[4]	Phytoplankton	Physical Habitat[5]	Flow	Fish[6]	Benthics[7]
14	RIO GRANDE AT BELEN (309 BRIDGE) - 32RGrand421.4	Rio Grande (Rio Puerco to Isleta Pueblo bnd)	1		1	1		1			
18	Rio Grande at Los Padillas - 32RGrand463.6	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		1							2
20	Rio Grande above Rio Bravo Bridge - 32RGrand466.5	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	1	1	1	1		1			
21	Tijeras Arroyo blw Deadmans Curve - 32Tijera027.2	Tijeras Arroyo (Four Hills Bridge to headwaters)	1		1	1		1	8	1	1
22	Rio Grande above Alameda Bridge - 32RGrand488.9	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	1		1	1		1			2
24	Rio Grande above Rio Rancho WWTF #2 - 32RGrand499.2	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		1							
27	Rio Grande abv Hwy 550 Bridge - 32RGrand508.0	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)	1		1	1		1			2
28	Las Huertas Creek at Tres Amigos Rd - 30LHuert010.0	Las Huertas Ck (Perennial prt Santa Ana Pueblo bnd to hws)	1		1	1		1	8	1	1
23	San Pedro Creek at Conservation Easement - 30SanPed011.1	San Pedro Creek (San Felipe bnd to headwaters)	1		1	1		1	8	1	1
29	Rio Grande Below Angostura Diversion Works 30RGrand517.3	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)		1	1						
30	Rio Grande at Pena Blanca	Rio Grande (non-pueblo Angostura Div to Cochiti Rsrv)		1							2
31	Galisteo Creek at Hwy 14 near Cerrillos - 30Galist030.9	Galisteo Ck (Perennial prt Kewa bnd to 2.2 mi abv Lamy)	1		1	1		1	8		
32	Galisteo Creek at Spirit Valley Rd in Canoncito - 30Galist071.2	Galisteo Ck (Perennial prt 2.2 mi abv Lamy to hdwts)			1	1		1		1	1
33	Apache Canyon - 30Apache003.0	Apache Canyon (Galisteo Creek to Hdwt)			1			1	8	1	
34	Deer Creek above I25 - 30DeerCr000.7	Deer Ck (perennial prt Galisteo Ck to hdwts)			1			1	8	1	
35	SANTA FE RIVER above Cochiti AT USGS GAGE 08317200 - 30SantaF012.9	Santa Fe River (Cochiti Pueblo bnd to Paseo del Canon)	1		1	1		1		1	1
36	CIENEGA CREEK NE 90 FT ABV MOUTH ON SF RIV - 30LaCien000.1	Cienega Creek (Santa Fe River to headwaters)	1		1	1		1	8	1	
37	Santa Fe River above CRd 56 d/s of river preserve -	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	1		1	1		1	8	1	1

#	Station Name	Assessment Unit	Sonde Deployment[1]	DO Logger[2]	Thermograph[3]	Chlorophyll a[4]	Phytoplankton	Physical Habitat[5]	Flow	Fish[6]	Benthics[7]
	30SantaF028.4										
40	Santa Fe River above Hwy 599 - 30SantaF035.9	Santa Fe River (Santa Fe WWTP to Guadalupe St)	1		1	1		1	8		
41	Santa Fe River ~75m u/s of Sandoval St - 30SantaF050.5	Santa Fe River (Guadalupe St to Nichols Reservoir)	1		1	1		1	8		1
42	Santa Fe River above McClure Reservoir at gage - 30SantaF061.1	Santa Fe River (Nichols Reservoir to headwaters)	1	1	1	1		1			
DL	Rio Grande blw RR WWTF #2 - 32RGrand498.8	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		1							
DL	Rio Grande abv Los Lunas WWTP effluent - 32RGrand436.8	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		1							
DL	Rio Grande blw Los Lunas WWTP effluent discharge - 32RGrand431.5	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		1							
DL	Rio Grande above North AMAFCA channel	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	1								
	QC	Field, equipment, reagent and bacterial blanks collected per QAPP.	-		-	-	0	3			2
	Totals		19	9	24	27	8	24	96	11	22

All UPPERCASE indicates historic SWQB data are available for this station.

[1] Sondes are deployed at sites that indicate elevated turbidity or nutrient enrichment or have been previously listed for turbidity or nutrients.

[2] DO Loggers are deployed at sites that indicate dissolved oxygen supersaturation or depletion.

[3] If preliminary analysis of thermograph data indicates potential for impairment then cross-section, flow, canopy cover, and slope data required to use Stream Segment Temperature (SSTEMP) modeling software will be collected.

[4] Chlorophyll-*a* samples are collected at sites that indicate nutrient enrichment or have been previously listed for nutrients. Additional stations may be added as indicated by the preliminary nutrient assessments.

[5] If sedimentation data (pebble counts) exceed the threshold value for percent sand and fines at a site, more extensive habitat data are collected.

[6] Fish sampling will be determined by interagency cooperation and the availability of electrofishing equipment.

DL. This station is a Data Logger only station. No chemistry or physical sampling occurs at this location.

[7] Benthic Macroinvertebrate sampling requires two samples at large river stations; one sample collected using the boatable method, and another using Hester-Dendy samplers.

5.0 RESOURCE REQUIREMENTS

Sample analysis costs include work time units (WTUs) for chemical analysis performed at SLD and provided to SWQB through a Joint Powers Agreement (JPA) between these State agencies as well as analysis costs for biological samples sent to contract labs and *E. coli* analysis performed by SWQB. These estimated costs are summarized in Table 8.

A round trip for this survey is approximately 900 miles. The U.S. Energy Information Administration (EIA) estimates summer gasoline prices at $3.50 per gallon. A 2002 Chevrolet Suburban is typically used for surveys, averaging approximately 13 miles per gallon (mpg) (Table 9). Eight stream and four lake water quality sampling trips have been planned for this survey depending on conditions. Three biological and physical survey trips are required during the index period (August 15 - November 15). The stream surveys are expected to be completed in three days with water chemistry samples being delivered to SLD in Albuquerque on the return trip. Lake surveys are expected to be completed in two days. Biological and physical monitoring is expected to be completed in three, three-day trips.

Water quality sampling trips will require two staff per monthly survey to stay up to two nights out of Santa Fe. Biological survey crew maximum requirements are four staff surveying one to two sites per day. Therefore, twelve biological survey sites may take up to ten days, or over two weeks (Table 10).

Staff receives $91 per night per diem for travel costs. Costs not included below may involve general sampling supplies such as water quality sample containers and preservatives, ice, sonde calibration solutions, and periphyton, macroinvertebrate, fish, and habitat sampling/monitoring equipment. Vehicles will require standard preventative maintenance and unforeseen costs may arise at any time (Table 11).

Table 8
2014 MRG Estimated Biological and Chemical Cost Summary

Analyte	Total # Samples	Cost per Sample (WTU or $)	Total Expenditure (WTU or $)
TDS/TSS	112	24	2,688
TDS/TSS Chloride, Sulfate	200	80	16,000
Nutrients, low phosphorus	328	100	32,800
Total Metals	164	90	14,760
Dissolved Metals + Ca, Mg	180	195	35,100
10 micron Filters (est.)	59	$16.50	$980
0.45 micron Filters	180	$11.95	$2,151
E. coli (in-house)	328	$5.08	$1,666
Volatile Organic Compounds	52	150	7,800
Semi-volatile Organics	44	180	7,920
Radionuclides	44	120	5,280
Chlorophyll *a* (contract)	27	$50	$1,350
Benthic Macroinvertebrates	22	$200	$4,400
Phytoplankton	8	$165	$1,320
TOTALS		**WTU**	**122,348**
		DOLLAR $	**$11,867**

Table 9
2014 MRG Estimated Vehicle Costs

Month	Approximate Miles	Estimated MPG	EIA Projected Cost of Gasoline per Gallon	Total Fuel Costs
March	900	13	$3.50	$242
April	900	13	$3.50	$242
May	1800	13	$3.50	$485
June	900	13	$3.50	$242
July	1800	13	$3.50	$485
August	900	13	$3.50	$242
September	1800	13	$3.50	$485
October	1800	13	$3.50	$485
TOTAL				**$2,908**

Table 10
2014 MRG Estimated Per Diem Costs

Expense	Water Chemistry Surveys	Biological and Habitat Surveys	Total
Per Diem (number of nights out)	$4,368	$7,280	$11,648
Staff Days*	72	160	232

*Staff days are estimated for 2 crews of 2 going out for chemistry surveys for three days and 2 crews of 2 going out for 2 day bio/habitat surveys.

Table 11
2014 MRG Estimated Total Survey Costs

WTUs	Samples $	Fuel $	Per Diem $	Staff Field Days
122348	**$11,867**	**$2,908**	**$11,648**	**232**

6.0 REFERENCES

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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 Category5/5C	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
Atrazine	Chloroethane
Azobenzene	Chloroform

Organics (semi-volatiles)	Organics (volatiles)
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	
Methoxychlor	
Metolachlor	
Metribuzin	
Naphthalene	

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