

## **Sampling Summary**

# MIDDLE RIO GRANDE AND TRIBUTARIES

## **Water Quality Survey**

Survey Conducted  
February 2014 – May 2015

Summary Finalized  
September 2015

Monitoring, Assessment and Standards Section  
Surface Water Quality Bureau  
New Mexico Environment Department  
P.O. Box 2610  
Santa Fe, NM 87502

[WWW.ENV.NM.GOV/SWQB/](http://WWW.ENV.NM.GOV/SWQB/)

## Abbreviations

AP	Assessment Protocol
AU	Assessment Unit
CWA	Clean Water Act
FSP	Field Sampling Plan
IR	State of New Mexico Clean Water Act §303(d)/305(b) Integrated Report
m	meter
MASS	Monitoring, Assessment and Standards Section
MRG	Middle Rio Grande
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
PSRS	Point Source Regulation Section
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
SLD	Scientific Laboratory Division
SOP	Standard Operating Procedures
SVOC	Semi-Volatile Organic Compounds
SWQB	Surface Water Quality Bureau
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
UAA	Use Attainability Analysis
USACOE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compounds
WOCC	Water Quality Control Commission
WPS	Watershed Protection Section
WQS	Water Quality Standard
WWTP	Wastewater Treatment Plant

## **Introduction**

The New Mexico Environment Department (NMED), Surface Water Quality Bureau (SWQB) conducted a water quality survey of the Middle Rio Grande basin including the mainstem of the Rio Grande between Caballo Reservoir and Cochiti Reservoir dam and selected tributaries from February 2014 through May 2015. SWQB released a draft Field Sampling Plan (FSP) for the Middle Rio Grande project for public comment in January 2014. The FSP was finalized in February 2014 and is available on the SWQB website. This summary report is a companion document to the Middle Rio Grande FSP (NMED SWQB 2014), and details completion, deviations, and a basic review of planned activities.

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

## **Personnel Roles and Responsibilities**

The SWQB Monitoring, Assessment and Standards Section primarily conducted this survey, with assistance from other SWQB sections. Individual roles and responsibilities are described in Table 1.

Table 1. Personnel Roles and Responsibilities

<b>Name</b>	<b>Position/Role</b>	<b>Responsibilities</b>
Seva Joseph 505-827-0573	Monitoring Staff	<ul style="list-style-type: none"> <li>• Planned survey</li> <li>• Collected and documented chemical, physical, and biological data</li> <li>• Provided results for watershed assessment</li> <li>• Prepared survey report</li> </ul>
Abe Franklin 505-827-2793	Watershed Protection Section (WPS) Liaison	<ul style="list-style-type: none"> <li>• Provided information and data needs pertaining to restoration projects and nonpoint sources of pollution located within the study area</li> </ul>
Bruce Yurdin 505-827-2793	Point Source Regulation Section (PSRS) Liaison	<ul style="list-style-type: none"> <li>• Provided information and data needs pertaining to point source discharges located within the study area</li> <li>• Assisted with development of final survey report</li> </ul>
Heidi Henderson 505-827-2901	Total Maximum Daily Load (TMDL) Liaison	<ul style="list-style-type: none"> <li>• Provided information and data needs pertaining to TMDL development in the study area</li> <li>• Assisted with development of final survey report; develop TMDLs as needed</li> </ul>

## Objectives

Because the data generated must serve the needs of all sections within the SWQB, this survey had several objectives, as outlined in Table 2.

Table 2. Survey Objectives

	<b>Intended use of data</b>	<b>Question to be answered</b>	<b>Products/ Outcomes</b>	<b>Decision Criteria</b>
<b>Primary Objective</b>	Assess designated use attainment for the New Mexico Clean Water Act §303(d)/305(b) <i>Integrated Report</i> and provide information to the public on the condition of surface waters in New Mexico	Are sampled waterbodies meeting water quality standards (WQS) criteria?	Integrated Report and Survey Report	WQS as interpreted by the SWQB Assessment Protocols (APs)
<b>Secondary Objectives</b>	Develop load and waste load allocations for TMDLs	What is the maximum pollutant load a waterbody can receive and still meet the WQS?	TMDL loading calculations and National Pollutant Discharge Elimination System (NPDES) permit limits	WQS as interpreted by the APs
	Evaluate restoration and mitigation measures implemented to control Nonpoint Source (NPS) pollution	Have watershed restoration activities and mitigation measures improved water quality?	Project Summary Reports, NPS Annual Report, Integrated Report ( <i>De-Listing</i> )	WQS as interpreted by the APs and comparison of water quality data over time (trend analysis)
	Develop or refine surface WQS	Are the existing or designated uses appropriate for the waterbody?	Use Attainability Analyses (UAA), Amendments to WQS	Are data sufficient to support a petition to the Water Quality Control Commission (WQCC) to revise WQS?

## Schedule

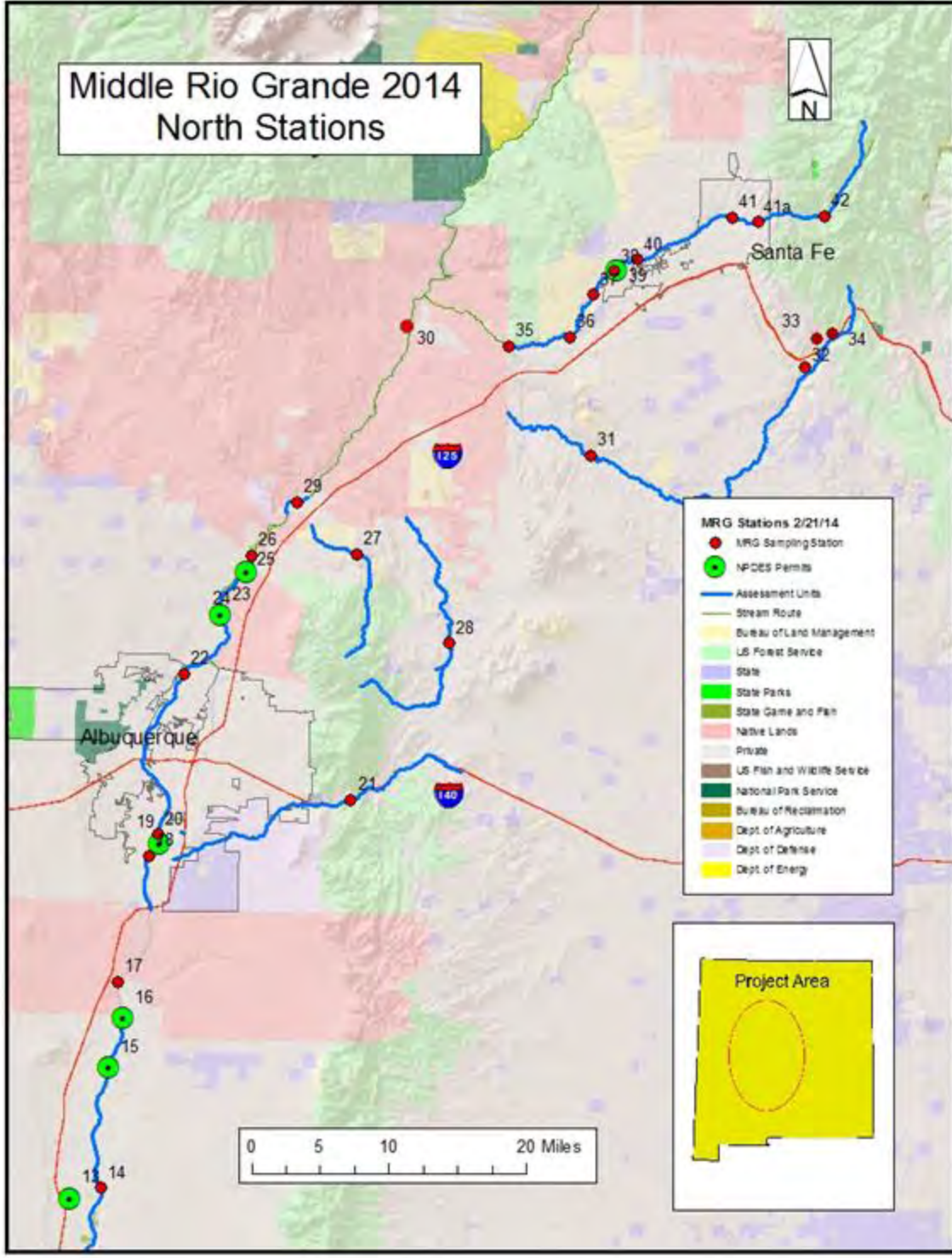
This survey consisted of many components, beginning with planning and ending with the generation of this summary report and update to the State of New Mexico Clean Water Act (CWA) Section 303(d)/305(b) Integrated Report (IR). As part of the survey planning process, a public meeting was held on January 29, 2014 in Albuquerque, NM to answer questions and solicit input for the survey. Completion of this water quality survey, excluding the IR update and TMDL stages, took two years (Table 3). Total Maximum Daily Loads (TMDLs), if necessary, will be completed before 2022 based on SWQB's §303(d) prioritization framework and long-term vision for water quality in New Mexico.

Table 3. Project Schedule

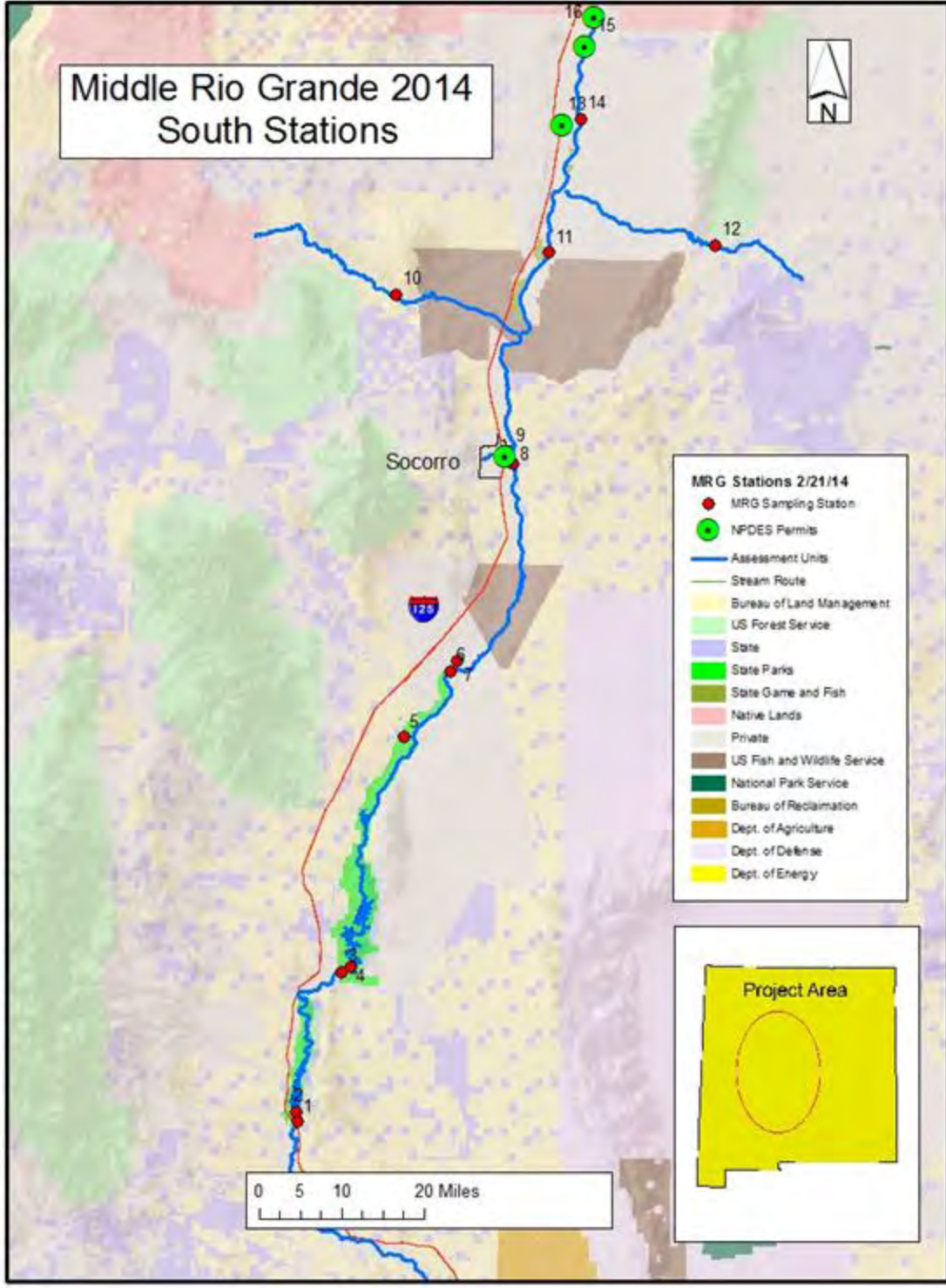
Activity	Winter '13-14	Spring '14	Summer '14	Fall '14	Winter '14-15	Spring '15	Summer '15	Fall '15	Ongoing
Survey Planning, Site Reconnaissance, and Public Input Period	=====▶								
Data Collection & Submittal of WQ Samples to SLD		=====▶							
Final Data Verification & Validation Procedures, Assessment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

## Sampling plan

The survey included monthly collection of chemical water quality samples between February 2014 and November 2014 with additional data collection in 2015, biological sampling within the index period (August 15 - November 15, 2014), and physical habitat measurements during periods of base flow. Data were collected according to SWQB standard operating procedures (SOPs; NMED/SWQB 2013-2015) and the field sampling plan (FSP) developed for this survey. The monitoring stations and station rationales are presented in Figures 1a and 1b and Table 4.



**Figure 1a.** Location of the northern half of the Middle Rio Grande basin and sample locations in New Mexico. Station numbers relate to Table 4.



**Figure 1b.** Location of the southern half of the Middle Rio Grande basin and sample locations in New Mexico. Station numbers relate to Table 4.



**Table 4.** SWQB Water Quality Stations in Middle Rio Grande project

#	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 Albuquerque WWTP, and South AMAFCA Channel
19	NM0022250-A	Albuquerque WWTP effluent	NPDES discharge
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

#	Station ID	Station Name	Station Rationale
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	NPDES discharge
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
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

## Chemical Sampling

Generally speaking, only one chemical sampling station was planned near the lower end of each AU, access permitting. Additional stations were located to document the condition downstream of potential pollution sources and where AU or water quality standards revisions are recommended. Stations from previous surveys were used whenever possible to evaluate trends. Water samples for chemical analyses were submitted to the New Mexico Scientific Laboratory Division (SLD). *E.coli* samples were processed in the SWQB laboratory or with mobile equipment. Water quality analytes and their sampling frequencies are outlined in Table 5. In addition to the analytes listed in Table 5, field measurements (temperature, specific conductance, dissolved oxygen (DO) concentration, DO percent saturation, pH, and turbidity) were taken during each sampling visit.

Table 5. Summary of Completed/Planned Chemical Samples for the MRG project

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P) <sup>1</sup>	Total Metals (Hg, Se, Al)	Dissolved Metals <sup>2</sup>	<i>E. coli</i>	Volatile Organic Compounds <sup>3</sup>	Semi-volatile Organics <sup>3</sup>	Radionuclides <sup>4</sup>
1	Rio Grande Blw Caballo Dam, NM	Rio Grande (one mile below Percha Dam to Caballo Reservoir)		3/4	3/4	3/4	3/4	3/4	2/2	2/2	0/2
2	CABALLO LAKE AT DAM DEEP	Caballo Reservoir		4/4	4/4	4/4	4/4	4/4	2/2	2/2	2/2
3	RIO GRANDE BELOW E. BUTTE DAM AT USGS GAGE	Rio Grande (Caballo Reservoir to Elephant Butte Reservoir)		6/8	6/8	5/4	5/4	6/8	2/2	2/2	1/2
4	Elephant Butte Lake AT DAM DEEP	Elephant Butte Reservoir		4/4	4/4	4/4	4/4	4/4	2/2	2/2	2/2
5 <sup>A</sup>	Rio Grande blw Confl Conveyance Channel and River	Rio Grande (Elephant Butte Rsvr to San Marcial at USGS)		6/8	6/8	4/4	4/4	6/8	2/2	2/2	1/2
6	Rio Grande at USGS gage near San Marcia	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8/8	8/8	4/4	4/4	8/8	2/2	2/2	2/2
7	Rio Grande Conveyance Channel at San Marcial near USGS gage 0858300	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8/8	8/8	5/4	5/4	8/8			
8	Rio Grande at Socorro	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8/8	8/8	4/4	4/4	8/8			
9	Socorro WWTP effluent	Rio Grande (San Marcial at USGS gage to Rio Puerco)		8/8	8/8	4/4	4/4	8/8			

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P) <sup>1</sup>	Total Metals (Hg, Se, Al)	Dissolved Metals <sup>2</sup>	E. coli	Volatile Organic Compounds <sup>3</sup>	Semi-volatile Organics <sup>3</sup>	Radionuclides <sup>4</sup>
10	Rio Salado 1 mile above The Box	Rio Salado (Rio Grande to Alamo Navajo bnd)		4/4	4/4	4/4	4/4	4/4	0/2	0/2	0/2
11	Rio Grande at US 60 near Bernardo	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8/8	8/8	4/4	4/4	8/8	2/2	2/2	2/2
12	Abo Arroyo blw Hwy 60	Abo Arroyo (Rio Grande to headwaters)		7/4	7/4	4/4	4/4	7/4	2/2	2/2	1/2
13	Belen WWTP effluent	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8/8	8/8	4/4	4/4	8/8			
14	RIO GRANDE AT BELEN (309 BRIDGE)	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8/8	8/8	4/4	4/4	8/8			
15	Los Lunas WWTP effluent	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		6/8	6/8	4/4	4/4	6/8			
16	Bosque Farms WWTP effluent	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8/8	8/8	4/4	4/4	8/8			
17	Rio Grande abv Bosque Farms WWTP	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		8/8	8/8	4/4	4/4	8/8			
18	Rio Grande at Los Padillas	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		9/8	10/8	6/4	6/4	10/8	2/2	2/2	2/2
19	Albuquerque WWTP effluent	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		8/8	8/8	5/4	5/4	8/8			
20	Rio Grande above Rio Bravo Bridge	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)		8/8	8/8	5/4	5/4	8/8			
21 <sup>B</sup>	Tijeras Arroyo blw Deadmans Curve	Tijeras Arroyo (Four Hills Bridge to headwaters)	7/4	1/4	8/8	6/4	6/4	8/8	2/2	2/2	3/2
22	Rio Grande above Alameda Bridge	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8/8	9/8	4/4	4/4	8/8	2/2	2/2	2/2
23	Rio Rancho #2 WWTP	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8/8	8/8	4/4	4/4	8/8			
24	Rio Grande above Rio Rancho WWTF #2	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		8/8	8/8	4/4	4/4	8/8			
25	Bernalillo WWTP effluent	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		3/8	3/8	2/4	2/4	3/8			

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P) <sup>1</sup>	Total Metals (Hg, Se, Al)	Dissolved Metals <sup>2</sup>	E. coli	Volatile Organic Compounds <sup>3</sup>	Semi-volatile Organics <sup>3</sup>	Radionuclides <sup>4</sup>
26	Rio Grande abv Hwy 550 Bridge	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)		8/8	9/8	4/4	4/4	8/8	2/2	2/2	2/2
27	Las Huertas Creek at Tres Amigos Rd	Las Huertas Ck (Perennial prt Santa Ana Pueblo bnd to hws)	4/4	3/4	7/8	4/4	4/4	6/8			
28	San Pedro Creek at Conservation Easement	San Pedro Creek (San Felipe bnd to headwaters)	7/4	1/4	8/8	3/4	3/4	7/8			
29	Rio Grande Below Angostura Diversion Works	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)	2/8	6/0	8/8	4/4	4/4	8/8	0/2	0/2	0/2
30	Rio Grande at Pena Blanca	Rio Grande (non-pueblo Angostura Div to Cochiti Rsrv)	7/4		7/4	6/4	6/4	7/4	2/2	2/2	2/2
31	Galisteo Creek at Hwy 14 near Cerrillos	Galisteo Ck (Perennial prt Kewa bnd to 2.2 mi abv Lamy)	7/8		8/8	5/4	5/4	8/8	2/2	2/2	2/2
32	Galisteo Creek at Spirit Valley Rd in Canoncito	Galisteo Ck (Perennial prt 2.2 mi abv Lamy to hdwts)	6/8		8/8	5/4	5/4	8/8			
33	Apache Canyon	Apache Canyon (Galisteo Creek to Hdwt)	3/8		3/8	2/4	2/4	3/8			
34	Deer Creek above I25	Deer Ck (perennial prt Galisteo Ck to hdwts)	3/8		3/8	1/4	1/4	3/8			
35 <sup>C</sup>	SANTA FE RIVER above Cochiti AT USGS GAGE 08317200	Santa Fe River (Cochiti Pueblo bnd to Paseo del Canon)		7/8	8/8	3/4	3/4	8/8	2/2	2/2	4/2
36 <sup>D</sup>	CIENEGA CREEK NE 90 FT ABV MOUTH ON SF RIV	Cienega Creek (Santa Fe River to headwaters)	7/8		8/8	2/4	2/4	8/8	0/2	0/2	2/2
37	Santa Fe River above CRd 56 d/s of river preserve	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	9/8		9/8	5/4	5/4	9/8			
38	Upper Santa Fe River at Upper Preserve below WWTP	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	8/8		8/8			8/8	0/2	0/2	0/2
39	Santa Fe WWTP effluent channel outfall	Santa Fe River (Paseo del Canon to Santa Fe WWTP)	7/8		8/8	4/4	4/4	8/8	0/2	0/2	0/2
40	Santa Fe River above Hwy 599	Santa Fe River (Santa Fe WWTP to Guadalupe St)	3/8		3/8	3/4	3/4	3/8			
41	Santa Fe River ~75m u/s of Sandoval St	Santa Fe River (Guadalupe St to Nichols Reservoir)	7/8		8/8	8/4	8/4	8/8	4/2	4/2	1/2

#	Station Name	Assessment Unit	TDS/TSS	TDS/TSS + Chloride, Sulfate	Nutrients (low P) <sup>1</sup>	Total Metals (Hg, Se, Al)	Dissolved Metals <sup>2</sup>	E. coli	Volatile Organic Compounds <sup>3</sup>	Semi-volatile Organics <sup>3</sup>	Radionuclides <sup>4</sup>
42	Santa Fe River above McClure Reservoir at gage	Santa Fe River (Nichols Reservoir to headwaters)	6/8		6/8	5/4	5/4	6/8	0/2	0/2	2/2
	QC	Field, equipment, reagent and bacterial blanks collected per QAPP.	-	-	27/16	-	25/16	29/16	8/8	-	-

<sup>1</sup> Suite includes total Kjeldahl nitrogen, nitrate+nitrite, ammonia, and total phosphorus.

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

<sup>3</sup> Refer to Appendix A for a complete list of analytes.

<sup>4</sup> A radionuclide sample will include gross alpha and gross beta and, depending on detections, may include Uranium mass and Radium 226 + 228.

<sup>A</sup> This station was moved downstream below the Rio Grande and Rio Grande Conveyance Channel confluence and renamed "Rio Grande above E Butte"

<sup>B</sup> This station was moved downstream approximately 0.5 miles downstream due to access issues. The new station is named "Tijeras Arroyo at Cripple Creek Rd near Carnuel".

<sup>C</sup> This station was moved approximately 0.25 miles upstream to US Forest Service property. The USGS gage is located on Pueblo property. The new station is named "Santa Fe River above La Bajada diversion".

<sup>D</sup> Due to access issues, this AU was sampled approximately 1 mile upstream at "Cienega Creek 0.3 miles below bridge in La Cienega" and those results are included with this station.

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

Biological indicators and physical habitat measurements give an overall indication of the integrity of the AU. The SWQB uses this data to assess waterbodies for potential impairment from sediment deposition and nutrient enrichment and to support water quality standards revisions. Stations were selected for biological and physical habitat monitoring based on their current impairment status and results of preliminary nutrient and sedimentation assessments. Resources and access issues did not allow for the collection of biological and physical habitat data in all AUs. A summary of 2014 biological and physical habitat monitoring appears below (Table 6).

Table 6. Summary of Completed/Planned Biological and Habitat Sampling for the MRG project

#	Station Name	Assessment Unit	Sonde Deployment	DO Data Logger	Thermograph	Chlorophyll a	Phytoplankton	Physical Habitat	Flow	Fish Community	Benthic Macroinvertebrates
2	CABALLO LAKE AT DAM DEEP - 41CaballoLkDam	Caballo Reservoir				4/4	4/4				
3	RIO GRANDE BELOW E. BUTTE DAM AT USGS GAGE - 41RGrand217.5	Rio Grande (Caballo Reservoir to Elephant Butte Reservoir)			0/1						
4	Elephant Butte Lake AT DAM DEEP- 40EButteReDam	Elephant Butte Reservoir				4/4	4/4				
7	Rio Grande at USGS gage near San Marcial - 32RGrand292.8	Rio Grande (San Marcial at USGS gage to Rio Puerco)	0/1		1/1	0/1		0/1			0/2
8 <sup>A</sup>	Rio Grande blw Confl Conveyance Channel and River - 40RGrand274.0	Rio Grande (Elephant Butte Rsvr to San Marcial at USGS)			1/1						
10	Rio Salado 1 mile above The Box - 38RSalad030.0	Rio Salado (Rio Grande to Alamo Navajo bnd)	0/1		1/1	1		0/1	4/8	0/1	0/1
11	Rio Grande at US 60 near Bernardo - 32RGrand391.9	Rio Grande (Rio Puerco to Isleta Pueblo bnd)	0/1		1/1	0/1		0/1			0/2
12	Abo Arroyo blw Hwy 60 - 32AboArr037.7	Abo Arroyo (Rio Grande to headwaters)	1/1		1/1	1/1		0/1	8/8	0/1	
14	RIO GRANDE AT BELEN (309 BRIDGE) - 32RGrand421.4	Rio Grande (Rio Puerco to Isleta Pueblo bnd)	0/1		1/1	0/1		0/1			
18	Rio Grande at Los Padillas - 32RGrand463.6	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)			1/1	1/0		1/0			1/2
20	Rio Grande above Rio Bravo Bridge - 32RGrand466.5	Rio Grande (Isleta Pueblo bnd to Alameda Bridge)	0/1	0/1	1/1	0/1		0/1			

#	Station Name	Assessment Unit	Sonde Deployment	DO Data Logger	Thermograph	Chlorophyll a	Phytoplankton	Physical Habitat	Flow	Fish Community	Benthic Macroinvertebrates
21 <sup>B</sup>	Tijeras Arroyo blw Deadmans Curve - 32Tijera027.2	Tijeras Arroyo (Four Hills Bridge to headwaters)	1/1		1/1	1/1		1/1	8//8	0/1	0/1
22	Rio Grande above Alameda Bridge - 32RGrand488.9	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	1/1 <sup>A</sup>		1/1	1/1		1/1			1/2
24	Rio Grande above Rio Rancho WWTF #2 - 32RGrand499.2	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		0/1							
27	Rio Grande abv Hwy 550 Bridge - 32RGrand508.0	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)	1/1 <sup>A</sup>		1/1	0/1		0/1			0/2
28	Las Huertas Creek at Tres Amigos Rd - 30LHuert010.0	Las Huertas Ck (Perennial prt Santa Ana Pueblo bnd to hws)	0/1		0/1	0/1		0/1	4/8	0/1	0/1
23	San Pedro Creek at Conservation Easement - 30SanPed011.1	San Pedro Creek (San Felipe bnd to headwaters)	1/1		1/1	1/1		1/1	8/8	0/1	0/1
29	Rio Grande Below Angostura Diversion Works 30RGrand517.3	Rio Grande (non-pueblo HWY 550 Bridge to Angostura Div)		0/1	0/1						
30	Rio Grande at Pena Blanca	Rio Grande (non-pueblo Angostura Div to Cochiti Rsrv)		1/1							0/2
31	Galisteo Creek at Hwy 14 near Cerrillos - 30Galist030.9	Galisteo Ck (Perennial prt Kewa bnd to 2.2 mi abv Lamy)	0/1		1/1	0/1		0/1	8/8		
32	Galisteo Creek at Spirit Valley Rd in Canoncito - 30Galist071.2	Galisteo Ck (Perennial prt 2.2 mi abv Lamy to hdwts)			1/1	0/1		0/1		0/1	0/1
33	Apache Canyon - 30Apache003.0	Apache Canyon (Galisteo Creek to Hdwt)			1/1			0/1	3/8	0/1	
34	Deer Creek above I25 - 30DeerCr000.7	Deer Ck (perennial prt Galisteo Ck to hdwts)			1/1			0/1	3/8	0/1	
35 <sup>C</sup>	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		0/1		0/1	0/1
36 <sup>D</sup>	CIENEGA CREEK NE 90 FT ABV MOUTH ON SF RIV - 30LaCien000.1	Cienega Creek (Santa Fe River to headwaters)	0/1		1/1	0/1		0/1	8/8	0/1	
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	0/1		0/1	8/8	0/1	0/1



#	Station Name	Assessment Unit	Sonde Deployment	DO Data Logger	Thermograph	Chlorophyll a	Phytoplankton	Physical Habitat	Flow	Fish Community	Benthic Macroinvertebrates
	30SantaF028.4										
40	Santa Fe River above Hwy 599 - 30SantaF035.9	Santa Fe River (Santa Fe WWTP to Guadalupe St)	0/1		1/1	0/1		0/1	5/8		
41	Santa Fe River ~75m u/s of Sandoval St - 30SantaF050.5	Santa Fe River (Guadalupe St to Nichols Reservoir)	0/1		1/1	0/1		0/1	9/8		0/1
42	Santa Fe River above McClure Reservoir at gage - 30SantaF061.1	Santa Fe River (Nichols Reservoir to headwaters)	0/1	0/1	1/1	0/1		0/1			
DL	Rio Grande blw RR WWTF #2 - 32RGrand498.8	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)		0/1							
DL	Rio Grande abv Los Lunas WWTP effluent - 32RGrand436.8	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		0/1							
DL	Rio Grande blw Los Lunas WWTP effluent discharge - 32RGrand431.5	Rio Grande (Rio Puerco to Isleta Pueblo bnd)		0/1							
DL	Rio Grande above North AMAFCA channel	Rio Grande (non-pueblo Alameda Bridge to HWY 550 Bridge)	0/1								

<sup>A</sup>This station was moved downstream below the Rio Grande and Rio Grande Conveyance Channel confluence and renamed "Rio Grande above E Butte"

<sup>B</sup>This station was moved downstream approximately 0.5 miles downstream due to access issues. The new station is named "Tijeras Arroyo at Cripple Creek Rd near Carnuel".

<sup>C</sup>This station was moved approximately 0.25 miles upstream to US Forest Service property. The USGS gage is located on Pueblo property. The new station is named "Santa Fe River above La Bajada diversion".

<sup>D</sup>Due to access issues, this AU was sampled approximately 1 mile upstream at "Cienega Creek 0.3 miles below bridge in La Cienega" and those results are included with this station.

DL = Data Logger only sites

## Summary

A detailed FSP was prepared prior to beginning the survey in 2014; however, a significant number of deviations occurred over the course of the survey. The following are the primary causes for deviations from the FSP with station numbers where the specific deviation occurred in parentheses:

1. Access and logistics issues, namely at waste water treatment facilities, prevented some scheduled sampling events. SWQB will compare completed samples to Discharge Monitoring Reports and submitted data from Pueblos whenever possible. (15,25);
2. The drying of sites later in the season where there was no established access to perennial reaches in the AU. (1,33,34,40);
3. Rainstorms in the summer and fall of 2014 caused scouring flows that prevented the collection of some habitat (pebble counts and physical habitat measurements) and biological (periphyton/chlorophyll, sonde deployments) data. The SWQB SOPs state that these types of data must be collected during stable conditions and at least 6 weeks after a scouring flow. The high frequency of scouring flows prevented acceptable streambed conditions. (7,8,10,12,14,23,31,32);
4. A Program-wide project to develop and refine sampling and assessment protocols for Large Rivers was initiated in early 2014. Some sampling activities, such as physical and biological monitoring, were postponed for river sites and scheduled for a special **"large river"** sampling project to be completed in 2015 through 2017. Details of this project can be found on the SWQB website: <https://www.env.nm.gov/swqb/MAS/> (5,8,11,,18,20, ,27,29,30, all data logger only sites)

For sites that went dry during the survey, if other perennial reaches are not identified in the AU and the drying is not due to diversion, the Hydrology Protocol should be conducted along a representative reach in the AU to determine if the appropriate WQS are being applied and to aid in future survey design.

The data from the 2014 survey have been validated and verified according to SWQB standard operating procedures (SOPs; NMED/SWQB 2015). The supplemental data collected in 2015 will be validated and verified using the same procedures as the 2014 data. All of the data **will be uploaded to USEPA's STORET Data Warehouse** via The Water Quality Exchange (WQX) where they are available to the public. All of the data collected during these surveys are also available by request to the Program Manager.

To supplement data collected for this project, SWQB accepts readily available water quality data submitted from outside sources that meet SWQB QA/QC review and documentation requirements. SWQB staff worked closely with environmental staff from Sandia and Santa Ana Pueblos, USGS, USACOE, and various municipalities to ensure that data collection, analysis, and other procedures were consistent with SWQB procedures. Data from outside sources will undergo review by the SWQB QA Officer to ensure only data meeting specific requirements are used for assessment purposes.

The data from this project will be assessed to determine the impairment status of the sampled waters. The assessments are conducted in accordance with the Procedures for Assessing Water Quality Standards Attainment for the State of New Mexico Integrated Clean Water Act §303(d)/§305(b) Integrated Report which are available on the SWQB website. Assessment conclusions will be incorporated into the 2016-2018 Integrated Report, which is planned for completion in 2015 and will be posted to the SWQB website. In cases where impairments to water and habitat quality are found or confirmed, data from this survey will be used to draft TMDL planning documents.

## REFERENCES

NMED/SWQB. 2014. Field Sampling Plan for the Middle Rio Grande & Tributaries. New Mexico Environment Department, Surface Water Quality Bureau.

<https://www.env.nm.gov/swqb/MAS/sampling/MiddleRioGrande2014.pdf>

NMED/SWQB. 2015. *Data Verification and Validation Procedures*. New Mexico Environment Department, Surface Water Quality Bureau.

NMED/SWQB. 2013-2015. *Standard Operating Procedures for Sample Collection and Handling*. New Mexico Environment Department, Surface Water Quality Bureau.

NMED/SWQB. 2013. *Quality Assurance Project Plan for Water Quality Management Programs*, New Mexico Environment Department, Surface Water Quality Bureau.

**APPENDIX A.** Analytes included in Volatile (VOC) and Semi-volatile (SVOC) organic compound suites.

<b>Semi-Volatile Organic Compounds</b>	<b>Volatile Organic Compounds</b>
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

<b>Semi-Volatile Organic Compounds</b>	<b>Volatile Organic Compounds</b>
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	

<b>Semi-Volatile Organic Compounds</b>	<b>Volatile Organic Compounds</b>
Nitrobenzene	
N-nitrosodimethylamine	
N-nitroso-di-n-propylamine	
N-nitrosodiphenylamine	
Pentachlorophenol	
Phenanthrene	
Phenol	
Prometryne	
Pyrene	
Pyridine	
Simazine	
trans-Chlordane	