WATER QUALITY SURVEY SUMMARY

FOR THE

SAN JUAN RIVER WATERSHED

2002

Prepared by

Surface Water Quality Bureau
New Mexico Environment Department

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Executive Summary

During 2002, the Surface Water Quality Bureau (SWQB) of the New Mexico Environment Department conducted water quality and biological assessments of the San Juan, Animas, and La Plata rivers, with additional stations at Gallegos Canyon, Navajo Reservoir, Farmington Reservoir, and Jackson Lake, plus limited sampling at the Farmington, Bloomfield, and Aztec wastewater treatment plants (WWTP). Sampling was conducted from April 2002 through November 2002, using methods in accordance with the *Quality Assurance Project Plan for Water Quality Management Programs* (NMED 2002). This work was partially funded by a grant from the U.S. Environmental Protection Agency and it fulfilled commitments of the *FY 2002 Section 106 Work Program for Water Quality Management*.

The study design is outlined under "Sampling Plan", below. The water chemistry generally included total nutrients, total and dissolved metals, major ions, total dissolved solids, hardness, and alkalinity. Many stations were also sampled for radionuclides, synthetic organics, and bacteria. Other occasional analyses included pharmaceuticals and ambient toxicity. This report summarizes analytical results, specifically related to violations of applicable water quality standards (described below). Complete data are available upon request.

Two stations on the La Plata River went dry during the course of the survey, and the Gallegos Canyon station only flowed in response to storms. The lower reaches of the Animas River had periods of interrupted flow during the study.

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1.0 Introduction

Lands along the San Juan River have many pre-historic Puebloan archeological features. Navajos migrated to the area about 500 years ago, and the large Navajo Reservation is located immediately downstream of the subject study area.

Hispanic explorers visited the area in the 1500s, bestowing today's names on many of the local rivers and mountains. These early explorers were involved in mining (especially in the La Plata Mountains) and seeking trade routes to California. However, well-established Hispanic communities did not appear until the early 1800s. These first European settlers relied primarily on farming and raising sheep. Substantial diversion of irrigation water began in the 1870s, reducing flows especially in the summer.

Anglo Americans also began moving to the area in the late 1880's, generally in pursuit of ranching and mining (especially oil and gas production). About 50 years ago, large coal mines were developed in San Juan County. More recently, large-scale irrigation projects (especially the Navajo Indian Irrigation Project) have resulted in a dramatic increase in farmland acreage.

Figure 1: Looking northward over the confluence of the Animas and San Juan rivers.

The San Juan River drainage includes portions of the Four Corners states: Utah, Colorado, New Mexico, and Arizona. The subject study was conducted in San Juan County, New Mexico, excluding reaches located within the Navajo Reservation (which is outside the jurisdiction of the New Mexico Environment Department).

The river's headwaters arise among 14,000-foot peaks of southwestern Colorado. Near the Colorado-New Mexico state line, the San Juan River enters the Navajo Reservoir. Completed in 1962, this large in-channel reservoir effectively attenuates changes in downstream discharge, halts the transport of large-grained sediments washing from the Colorado Mountains, and it decreases the river's water temperature (this is a bottom-release dam).

Until recently, the dam was operated to conserve water and mitigate flooding. However, during this study efforts were underway to mimic a more natural hydrologic regime, largely to benefit downstream restoration of the endangered Colorado pikeminnow and razorback sucker (warmwater fish).

Near the Colorado-New Mexico border, the San Juan, Animas, and La Plata rivers pass from an area of crystalline, igneous, or metamorphic lithology into one consisting primarily of fine-grained sedimentary rocks. This results in badlands and canyon-plateau landforms, as found throughout the study area. Even a short distance below the Navajo Dam, large ephemeral washes episodically contribute large quantities of fine-grained sediment to the San Juan River. One of these tributaries, Largo Canyon, enters the San Juan River about ten miles below Navajo Dam. This is the largest "dry-wash system" in North America (the Largo Canyon watershed comprises about 1700 square miles), and during storm events it may contribute

over a thousand tons of sediment per day. Thus, the San Juan River often displays a multi-threaded channel with associated bank erosion, and in the regulated flow regime the bedload generally consists of sand (coarser-grained substrate is often found near the banks rather than in the thalweg).

The watershed presently has many arroyos, and these ephemeral channels exist both as narrow gullies and as wide, shallow washes. Among the ephemeral channels, unstable stream banks are common; but the banks of the perennial streams are often armored with invasive woody vegetation. The watershed is characterized by numerous unpaved roads and low-water crossings, and significant soil erosion appears to be common throughout the watershed.

The San Juan River below Navajo Dam is considered a “world-class” trout fishery, and it supports active tourism. As mentioned, endangered warmwater fish are being restored to river reaches below Farmington. About 200 species of birds, including bald eagles and peregrine falcons, are at least partially dependent on the river’s riparian and other wetland areas.

2.0 Water Quality Assessment

The following summarizes information regarding water quality, biological integrity, and sediment conditions of the subject surface waters. This section outlines the applicable water quality standards, summarizes previous SWQB findings, and outlines development of the subject sampling plan. The following section ("Water Quality Criteria Exceedences") summarizes the findings developed during the subject study.

2.1 Water Quality Standards

This section summarizes the applicable water quality standards, the "New Mexico Standards for Interstate and Intrastate Waters", which is available at:

http://www.nmcpr.state.nm.us/nmac/parts/title20/20.006.0004.pdf

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20.6.4.401 SAN JUAN RIVER BASIN – The main stem of the San Juan river from the point where the San Juan leaves New Mexico and enters Colorado upstream to U.S. highway 64 at Blanco, and any flow which enters the San Juan river from the Mancos and Chaco rivers.

A. Designated Uses: municipal and industrial water supply, irrigation, livestock watering, wildlife habitat, secondary contact, marginal coldwater fishery, and warmwater fishery.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0, and temperature shall not exceed 32.2°C (90°F). The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

Figure 2: People swimming in the San Juan River at the Highway 550 bridge crossing, Bloomfield, July 16, 2002.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 cfu/mL; no single sample shall exceed 400/100 cfu/mL (see Subsection B of 20.6.4.13 NMAC).

20.6.4.402 SAN JUAN RIVER BASIN – La Plata river from its confluence with the San Juan river upstream to the New Mexico-Colorado line.

A. Designated Uses: irrigation, limited warmwater fishery, marginal coldwater fishery, livestock watering, wildlife habitat, and secondary contact.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0 and temperature shall not exceed 32.2°C (90°F). The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 cfu/mL; no single sample shall exceed 400/100 cfu/mL (see Subsection B of 20.6.4.13 NMAC).

20.6.4.403 SAN JUAN RIVER BASIN – The Animas river from its confluence with the San Juan upstream to U.S. highway 550 at Aztec.

A. Designated Uses: municipal and industrial water supply, irrigation, livestock watering, wildlife habitat, marginal coldwater fishery, secondary contact, and warmwater fishery.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 9.0, and temperature shall not exceed 27°C (80.6°F). The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 cfu/mL; no single sample shall exceed 400/100 cfu/mL (see Subsection B of 20.6.4.13 NMAC).

20.6.4.404 SAN JUAN RIVER BASIN – The Animas river from U.S. highway 550 at Aztec upstream to the New Mexico-Colorado line.

A. Designated Uses: coldwater fishery, irrigation, livestock watering, wildlife habitat, municipal and industrial water supply, and secondary contact.

B. Standards:

(1) In any single sample: pH shall be within the range of 6.6 to 8.8, temperature shall not exceed 20°C (68°F), and total phosphorus (as P) shall not exceed 0.l mg/L. The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 200/100 cfu/mL; no single sample shall exceed 400/100 cfu/mL (see Subsection B of 20.6.4.13 NMAC).

20.6.4.405 SAN JUAN RIVER BASIN – The main stem of the San Juan river from U.S. highway 64 at Blanco upstream to the Navajo dam.

Figure 3: Discharge measurement in the San Juan River near Soaring Eagle Lodge.

A. Designated Uses: high quality coldwater fishery, irrigation, livestock watering, wildlife habitat, municipal and industrial water supply, and secondary contact.

B. Standards:

(1) In any single sample: conductivity shall not exceed 400 µmhos/cm (at 25°C), pH shall be within the range of 6.6 to 8.8, temperature shall not exceed 20°C (68°F), and turbidity shall not exceed 10 NTU. The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 100/100 cfu/mL; no single sample shall exceed 200/100 cfu/mL (see Subsection B of 20.6.4.13 NMAC).

20.6.4.406 SAN JUAN RIVER BASIN – Navajo reservoir in New Mexico.

A. Designated Uses: coldwater fishery, warmwater fishery, irrigation storage, livestock watering, wildlife habitat, municipal and industrial water storage, and primary contact.

B. Standards:

(1) At any sampling site: pH shall be within the range of 6.6 to 8.8, temperature shall not exceed 20°C (68°F), total phosphorus (as P) shall not exceed 0.l mg/L, and turbidity shall not exceed 25 NTU. The use-specific numeric standards set forth in 20.6.4.900 NMAC are applicable to the designated uses listed above in Subsection A of this section.

(2) The monthly geometric mean of fecal coliform bacteria shall not exceed 100/100 cfu/mL; no single sample shall exceed 200/100 cfu/mL (see Subsection B of 20.6.4.13 NMAC).

A history of previous impairment determinations prior to the 2002 survey is housed in the "Record of Decision" (ROD) for the Clean Water Act Integrated §303(d)/§305(b) List. The ROD is available through:
http://www.nmenv.state.nm.us/wqcc/303d-305b/2004/AppendixB/2004-2006ROD.pdf.

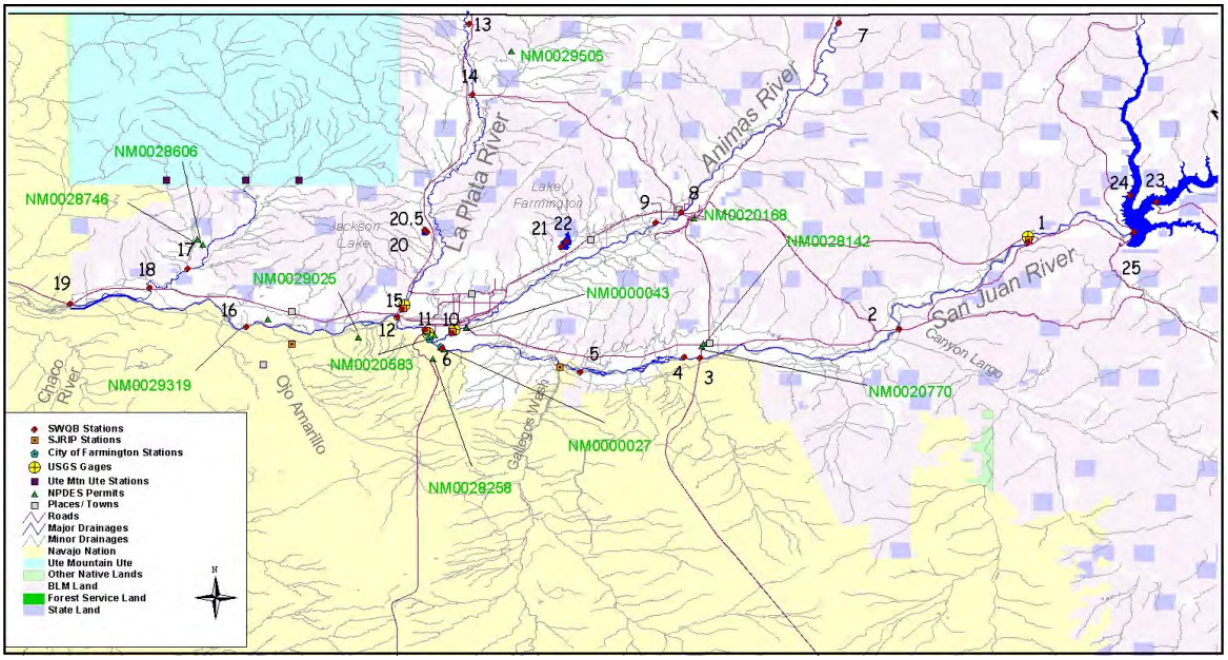

Figure 4. 2002 Study Area Map and Sampling Stations

2.2 Sampling Plan

This section briefly outlines the development of the subject sampling plan. The primary purpose of these SWQB studies is to assess compliance with the applicable water quality standards listed above. Sampling stations are often located downstream from potential sources of contamination, and the SWQB uses a range of information sources to identify these potential sources including review of previous studies and existing data, location of NPDES permitted outfalls, review of maps and aerial photographs, reconnaissance, interviews, and fact-finding public meetings. On February 28, 2002, the SWQB conducted a pre-monitoring public outreach meeting which was well attended by persons having local knowledge of the watershed. Additionally, SWQB sampling plans may be influenced by acceptable data collection efforts conducted by others and by the locations of stream gages (especially important on larger rivers like the San Juan). The following section summarizes

concerns and potential contamination sources and other issues that were raised with the SWQB during sampling plan development:

- San Juan River (Navajo Hogback to Animas River). Potential inputs: municipal (Farmington WWTP, former landfill), industrial (oil field, dry cleaners), stormwater, coal mines, power plants, agricultural lands, subdivisions, and septic tanks.
- San Juan at Hogback: Below coal mines, San Juan Generating Station and Shumway Arroyo, Four Corners Power Plant, agricultural lands, small septic systems in alluvium. Above Chaco Wash. Bottom of reach and study.
- San Juan near Kirtland: Below Harper Valley subdivision (WWTP outfall), oil field and other industrial activities west of Farmington, agricultural lands, and septic tanks.
- San Juan above La Plata Confluence: Below former landfill. Above Harper Valley subdivision.
- San Juan at Bisti Bridge: Below Farmington WWTP. Above Harper Valley subdivision. United States Geological Survey (USGS) gage.

- San Juan River (Animas River to Cañon Largo). Industrial (three refineries with documented groundwater contamination), agricultural lands, and septic tanks. Hammond Canal heads here. Cañon Largo and other such fine-sediment sources. The cold waters from Navajo Reservoir gradually become warmer through this reach. Special concern that low discharge from Navajo Reservoir (proposed management regime) might result in insufficient dilution of permitted coliforms (WWTPs).
- San Juan at Bolack Bridge near Farmington: Below old Giant Refinery and Lee Acres Superfund site. Below new San Juan County WWTP outfall. Above Farmington WWTP and old landfill.
- San Juan River at Jeff Blagg property: Below Bloomfield WWTP and Thriftway Refinery (Coots Canyon) with OCD-documented groundwater contamination. Above Lee Acres Superfund site, former Giant refinery, and new SJC outfall.
- San Juan at Bloomfield Bridge: Below new Giant Refinery and Cañon Largo. Above Bloomfield WWTP and former Thriftway Refinery. Estrogen-like compound found in ambient San Juan River at this station, perhaps associated with illegal dumping of septage ("honey dippers") into the river upstream.

- San Juan River (Cañon Largo to Navajo Reservoir). The San Juan River above the Animas River is low-gradient, probably has numerous bedrock controls, and sediment transport is probably dominated by low-flow sand bedload. The cold waters from Navajo Reservoir gradually become warmer through this reach. Low discharge from Navajo Reservoir (proposed management regime) might result in insufficient dilution of permitted coliforms from WWTPs.
- San Juan at Bridge near Blanco: About 7 miles above "new" Giant Refinery. Many river diversions between Navajo Reservoir and Blanco. Bottom of this reach. Limited room to work from bridge (need traffic cones and vests).
- San Juan River at Soaring Eagle Lodge: This is not an SWQB sampling station. We are supporting volunteer monitoring here, including installing a staff gage and modeling a rating table.
- San Juan below gage station at Archuleta: Metals and other data available from RIP/USGS.

- Navajo Reservoir.
- Navajo Lake At Sims Mesa Marina: Active marina, Pine River arm.
- Navajo Reservoir At Gooseneck: San Juan arm.
- Navajo Reservoir At Pine Site Marina: Active marina.
- Navajo Reservoir Towards The Dam: In-channel contaminant sink. Estrogen-like compound found in ambient San Juan River (sampled at Bloomfield Bridge), perhaps from Navajo Reservoir (source upstream).

- Shumway Arroyo (San Juan River to headwaters).
- Shumway at Hwy 64 bridge: Downstream of Hunt property on Shumway Arroyo.
- Shumway above County Road 6800: Allegations of unknown toxicity, metals, and/or that former PNM NPDES discharge left residual sulfate in the channel sediments.

- Gallegos Canyon. Concerns about agricultural chemicals or metals from recently developed and irrigated agricultural lands on mesa.

- Animas River (San Juan River to Estes Arroyo).
- Animas at Farmington: Below oil field and other industrial activities along Hwy 550 between Farmington and Aztec. Above Farmington WWTP and former landfill. Channel disturbance near station. Low-level volatile organochlorines detected in groundwater at several locations in this part of Farmington.
- Animas River near Flora Vista: Below Aztec WWTP

- Animas River (Estes Arroyo to CO border). Known methane outseeps in Animas channel.
- Animas at Hwy 550 Bridge in Aztec: Below potential produced-water or other mining impacts. Above Aztec WWTP.
- Animas at Colorado State Line: USGS gage. Top of New Mexico watershed. Below former vanadium mine (reclaimed) in Durango, potential produced-water or other petroleum impacts, and Colorado hardrock mining impacts. Former controversial NPDES in Colorado. Baseline data pre-ALP.
- Animas River at Hwy 550 crossing about five miles north of Aztec: Oil Conservation Division concerns about potential contamination from natural gas condensate.

- Lake Farmington (Beeline Reservoir). Drinking water supply for Farmington. Off-channel, potential contaminant sink.

- La Plata River. Small stream with significant irrigation withdrawals and return flows.
- La Plata near Farmington: Below rapidly urbanizing area having many new septic tanks, below historic feedlots. Baseline data pre-Animas/La Plata project.
- La Plata at Colorado State Line: background data.
- La Plata at La Plata: Near lower end of perennial reach. Below La Plata coal mine (local concern that blasting may disturb surface water/ground water interactions). Above historic feedlots.

- Jackson Lake. Hg concerns in nearby (CO) lakes. Bald eagle at lake on 1/24/02.

Table 1 summarizes the number and kinds of samples collected at the various stations in this study. This table describes only the data collected by the SWQB, and the total number includes any duplicate samples.

Table 1. Water Chemistry Sampling Stations

Station	Field Data	Ions (with TDS/TSS)	TDS/TSS	Nutrients (includes total and diss.)	Total metals (full suite)	Total metals (Hg and Se only)	Dissolved metals	Coliform bacteria (fecals and *E. coli*)	Cyanide	Radionuclides	Organics (all kinds)
San Juan River at Hogback	7	6	5	11	7	4	11	7	0	0	1
San Juan River near Kirtland	8	0	8	8	0	0	0	7	0	0	0
San Juan River above La Plata River Confluence	0	0	0	0	0	0	0	0	0	0	4
San Juan River at Bisti Bridge	1	0	0	0	0	0	0	4	0	0	0
San Juan River at Bolack Bridge near Farmington	8	4	5	10	4	5	9	7	0	0	1
San Juan River at Jeff Blagg Property	8	3	5	8	0	0	0	15	0	0	4
San Juan River at Bloomfield Bridge	8	3	5	8	0	1	1	15	0	0	4
San Juan River at Bridge near Blanco	8	3	5	8	1	5	6	7	0	0	2
San Juan River at Soaring Eagle Lodge	3	0	0	0	0	0	0	0	0	0	0
San Juan River below Gage Station (Archuleta)	5	4	0	8	4	0	4	4	0	0	1
Shumway Arroyo at Hwy 64 Bridge	3	0	3	3	0	0	0	0	0	0	0
Shumway Arroyo above CR 6800	3	2	1	3	1	2	3	0	0	0	0
La Plata River near Farmington	8	4	4	9	1	5	6	6	0	0	0
La Plata River at La Plata, New Mexico	7	2	4	7	0	2	2	5	0	0	0
La Plata River at New Mexico-Colorado State Line	8	3	5	8	0	1	1	1	0	0	0
Jackson Lake at Dam	1	2	0	4	2	0	2	0	2	2	1
Jackson Lake Shallow	1	0	0	0	0	0	0	1	0	0	0
Farmington Wastewater Plant	0	0	0	0	0	0	0	0	0	0	1
Animas River at Farmington	8	4	5	19	4	3	7	5	0	0	7
Animas River near Flora Vista	10	3	5	12	0	0	0	7	0	0	0
Animas River at Aztec at Hwy 550 Bridge	9	3	5	12	0	0	0	7	0	0	0
Animas River at Hwy 550 Crossing about 5 Miles North of Aztec	0	0	0	0	0	0	0	0	0	0	1
Animas River at Colorado State Line	8	10	0	15	4	7	11	7	3	3	3
Lake Farmington Deep	1	1	0	2	1	0	1	0	1	1	1
Lake Farmington Shallow	1	1	0	2	1	1	0	1	0	0	0
Aztec WWTP	0	0	0	0	0	0	0	0	0	0	1
Gallegos Canyon at San Juan River	1	0	1	1	1	0	1	0	0	0	1
City Of Bloomfield WWTP Outfall	0	0	0	0	0	0	0	0	0	0	1
Navajo Reservoir towards the Dam	3	3	0	6	3	0	3	0	1	1	1
Navajo Reservoir at Pine Site Marina	0	0	0	0	0	0	0	3	0	0	0
Navajo Reservoir at Gooseneck	3	3	0	6	3	0	3	0	1	0	0
Navajo Lake at Sims Mesa Marina	3	3	0	7	3	0	3	0	0	0	0

Additionally, the following sediment samples were analyzed (see discussion under Ambient Toxicity, below):

- Animas River at Colorado State Line, for volatile and semi-volatile organics and for metals.
- San Juan River at Bridge near Blanco, for volatile and semi-volatile organics and for metals.

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3.0 Water Quality Criteria Exceedences

This section summarizes the findings developed during the subject study.

For many water quality parameters, the State of New Mexico has specific numeric criteria. However, for several parameters (e.g., plant nutrients, stream bottom deposits), only narrative criteria exist. Data were assessed for designated use attainment status for both numeric and narrative water quality criteria by application of the *Assessment Protocol* (NMED/SWQB, 2004a).

http://www.nmenv.state.nm.us/swqb/protocols/index.html

The following discussion includes information pertaining to all exceedences of water quality criteria found during the intensive watershed survey. The purpose of this section of the report is to summarize the location and degree of any water-quality criteria exceedences discovered during this study. These exceedences are used to determine whether the associated designated uses are impaired. Final assessment determinations depend on the overall amount and type of data available during the assessment process. Note that for this analysis, the SWQB used outside sources of data (those meeting SWQB quality assurance requirements, as provided for in the referenced *Assessment Protocol*).

The SWQB keeps final designated use impairment determinations in the Assessment Database (ADB). These findings are reported in *Appendix B* of the *Integrated Clean Water Act §303(d)/ §305(b) Report* (NMED/SWQB, 2004).

http://www.nmenv.state.nm.us/wqcc/303d-305b/2004/AppendixB/index.html

3.1 Physicochemical Water Quality Criteria Exceedences

This section lists physicochemical water quality criteria exceedences; and other kinds of criteria exceedences are described in subsequent sections. The following outline is generated from the SWQB's in-house water quality database, and it is organized by reach, designated use, analyte, and sampling station. The following outline does not include data from continuous monitoring devices (sondes and thermographs), nor does it explicitly list data provided by others. However, these data are referenced below, and they are publicly available. Persons requiring a complete data set should contact the SWQB at:

http://www.nmenv.state.nm.us/swqb.

It should be noted that an exceedence of a given criterion might not automatically generate a violation of applicable standards. Actual listings are developed through application of the referenced *Assessment Protocol*. These findings are described in the "Study Conclusions" section, below.

Animas River (Aztec to CO border)
segment specific criteria

Temperature

Animas at Hwy 550 Bridge in Aztec

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	21.84	20	C	5/28/2002
Yes	Temperature	No	26.2	20	C	6/18/2002
Yes	Temperature	No	24.93	20	C	7/15/2002
Yes	Temperature	No	26.65	20	C	8/20/2002

Animas at Colorado State Line

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	22.19	20	C	6/18/2002
Yes	Temperature	No	22.35	20	C	7/15/2002

Animas River (San Juan River to Aztec)

segment specific criteria

Fecal coliform, single sample

Animas near Flora Vista

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	460	400	/100 mL	5/20/2002
Yes	fecals	No	460	400	/100 mL	8/21/2002

Temperature

Animas at Farmington

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	30.5	27	C	7/16/2002
Yes	Temperature	No	33	27	C	7/18/2002
Yes	Temperature	No	28.95	27	C	8/19/2002

Animas near Flora Vista

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	27.88	27	C	8/20/2002

Gallegos Canyon

wildlife habitat

Total recoverable selenium

Gallegos Canyon at San Juan River

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	selenium	No	0.008	0.005	mg/L	10/24/02

Jackson Lake

coldwater fishery

Temperature

Jackson Lake at Dam

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	23.06	20	C	7/17/2002

La Plata River

fishery (chronic)

Total recoverable selenium

La Plata near Farmington

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	selenium	No	0.006	0.005	mg/L	4/16/2002

marginal coldwater aquatic life

Dissolved oxygen

La Plata near Farmington

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Diss. oxygen	No	5.17	6	mg/L	7/16/2002

La Plata at La Plata

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Diss. oxygen	No	3.16	6	mg/L	7/16/2002

segment specific criteria

Fecal coliform, single sample

La Plata near Farmington

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	1100	400	/100 mL	5/22/2002
Yes	fecals	No	2400	400	/100 mL	7/16/2002

La Plata at La Plata

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	1100	400	/100 mL	5/22/2002
Yes	fecals	No	1500	400	/100 mL	5/29/2002
Yes	fecals	No	1100	400	/100 mL	6/17/2002
Yes	fecals	No	1600	400	/100 mL	7/16/2002

wildlife habitat

Total recoverable selenium

La Plata near Farmington

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	selenium	No	0.006	0.005	mg/L	4/16/2002

Navajo Reservoir

segment specific criteria

Temperature

Sims Mesa Marina

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	24.08	20	C	7/16/2002

Gooseneck

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	25.52	20	C	7/16/2002

Navajo Reservoir toward the Dam

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Temperature	No	24.09	20	C	7/16/2002

San Juan River (Animas River to Cañon Largo)

segment specific criteria

Fecal coliform, single sample

San Juan at Bloomfield Bridge

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	460	400	/100 mL	8/21/2002
Yes	fecals	No	4600	400	/100mL	10/29/02

San Juan at Bolack Bridge near Farmington

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	1100	400	/100 mL	7/16/2002
Yes	fecals	No	460	400	/100 mL	9/16/2002
Yes	fecals	No	1100	400	/100 mL	10/29/02

San Juan River at Jeff Blagg property

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	460	400	/100 mL	8/12/2002
Yes	fecals	No	460	400	/100 mL	8/13/2002
Yes	fecals	No	460	400	/100 mL	8/21/2002
Yes	fecals	No	1100	400	/100 mL	10/28/02
Yes	fecals	No	1100	400	/100 mL	10/29/02

San Juan River (Cañon Largo to Navajo Reservoir)

fishery (chronic)

Dissolved aluminum

San Juan at Bridge near Blanco

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	aluminum	No	0.11	0.087	mg/L	10/29/02

segment specific criteria

Fecal coliform, single sample

San Juan at Bridge near Blanco

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	240	200	/100 mL	8/13/2002

San Juan below Gage Station at Angostura

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	12000	200	/100 mL	3/18/2002

Turbidity

San Juan at Bridge near Blanco

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Turbidity	No	12	10	ntu	10/21/02
Yes	Turbidity	No	127	10	ntu	10/29/02

San Juan River at Soaring Eagle Lodge

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	Turbidity	No	12.4	10	ntu	8/19/2002
Yes	Turbidity	No	12.6	10	ntu	9/16/2002

San Juan River (Navajo boundary at Hogback to Animas River)

segment specific criteria

Fecal coliform, single sample

San Juan at Hogback

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	2400	400	/100 mL	7/16/2002
Yes	fecals	No	460	400	/100 mL	8/13/2002
Yes	fecals	No	1100	400	/100 mL	9/16/2002

San Juan at Bisti Bridge

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	62000	400	/100 mL	5/14/2002
Yes	fecals	No	1100	400	/100 mL	9/16/2002

San Juan near Kirtland

Exceeds:	Analyte:	LessThan:	Result:	Standard:	Units:	Sampling
Yes	fecals	No	1500	400	/100 mL	7/16/2002
Yes	fecals	No	1100	400	/100 mL	9/16/2002

3.2 Pesticides, Pharmaceuticals and Xenobiotics

During this study, a total of five water samples and four sediment samples were analyzed for semi-volatile organics (EPA Method 8270). None of these samples reported exceedences of any applicable water quality criterion or any other obvious evidence of river contamination. The referenced analytical method targets a wide range of analytes, including some that are commonly associated with oil-field activities. Several of these samples were part of follow-up investigations into unidentified toxic conditions (see "Ambient Toxicity", below). Samples collected at the San Juan River above the La Plata River confluence were collected in response to concerns about potential contamination from the old Farmington landfill.

Additionally, seventeen water samples were analyzed for volatile organics (EPA Method 8260). None of these samples reported any exceedence of applicable criteria, and most reported no detections of any kind. None of these samples reported exceedences of any applicable water quality criterion, however four samples collected near Farmington reported low levels of methyl-tertiary butyl ether (MTBE): A sample collected on October 23, 2002 reported 0.4 ug/L MTBE. Follow-up samples were collected on December 12, 2002 from three locations on the Animas River (one at the sampling station and two more a few hundred yards upstream). All three of these samples reported MTBE at concentrations ranging from 0.4 to 0.7 ug/L. The SWQB suspects that this MTBE may be a contamination remnant from a leaking underground storage tank or other gasoline spill that may have occurred near the Animas River in Farmington. This information was referred to the New Mexico Petroleum Storage Tank Bureau.

Water samples were also collected from the San Juan River (Hogback, Bloomfield Bridge, Blanco Bridge, and Archuleta) and from the effluent troughs of the Aztec, Farmington (two samples), and Bloomfield wastewater treatment plants. These were analyzed for a suite of pharmaceuticals and personal care products, some of which have hormonal effects on aquatic biota. With a detection limit of 10 ng/L, the only reported detections were for cholesterol:

- Aztec WWTP (cholesterol 10000 ng/L),
- Bloomfield WWTP (cholesterol 17000 ng/L),
- Farmington WWTP (cholesterol 17000 ng/L),
- San Juan River at Bloomfield, above the WWTP outfall (cholesterol 500 ng/L), and
- San Juan River at the Bisti Bridge, below all three WWTPs (cholesterol 600 ng/L).

3.3 Ambient Toxicity

During this study, the SWQB collected water and sediment samples for ambient toxicity testing. These tests expose water fleas (*Ceriodaphnia dubia*) and minnows (*Pimephales promelas*) to the river water sample or an eluent derived from the sediment sample. These tests did not use any dilutions. For more information about this testing, see http://www.epa.gov/earth1r6/6wq/ecopro/watershd/monitrng/toxnet/.

Samples collected in April 2002 reported significant mortality at the following stations:

- San Juan River at Blanco: 100% *Ceriodaphnia* mortality in water; 65% *Pimephales* in sediment.
- San Juan River at Blagg residence: 100% *Ceriodaphnia* in water.
- Animas River at the Colorado State Line: 25% *Pimephales* in sediment.
- Animas River at Farmington: 100% *Ceriodaphnia* and 12.5% *Pimephales* in sediment.

In response to these unexpected positive results, the SWQB added new chemical sampling to target toxicants (broad suites of metals and semi-volatile organic compounds) at the following locations:

- San Juan River at Blanco
- San Juan River at Blagg residence
- Animas River at the Colorado State Line
- Animas River at Farmington

As mentioned above, these additional chemical analyses reported no remarkable detections.

Other April sampling reported no significant mortality at:

- San Juan River above the La Plata River
- San Juan River at the Hogback
- Shumway Arroyo

The SWQB also conducted follow-up (confirmation) ambient toxicity sampling in the fall of 2002. These repeat samples reported significant mortality at the San Juan River at Blanco (25% *Pimephales* mortality in water), but no significant mortality at:

- San Juan River at Blagg residence
- Animas River at the Colorado State Line
- Animas River at Farmington

In response to these findings, the SWQB has listed the Animas River (San Juan River to Estes Arroyo) for sediment bioassay (acute) as a cause of non-support. However, the SWQB believes that these ambient toxicity data may be false positives based on the following:

- In no case did follow-up chemical sampling reveal evidence of a toxicant.
- There was no evidence of downstream toxicity.
- The reported Animas River toxicity failed to confirm at either site. These sediment samples reported concentrations of ammonia that could account for the observed fish mortality. The Animas River often demonstrated a substrate of fine-grained, black, sulfurous-smelling “muck”, and this material was selected for the spring sample. Such an anaerobic substrate is known to generate ammonia *in situ*, due to the anaerobic decomposition of algae that had become entrained in fine-grained sediments. However, in the fall sampling a recent scour event had greatly reduced the presence of this material. As discussed under both “Nutrient Assessment” and “Stream Bottom Deposits” (below), the SWQB believes that these conditions indicate potential impairment due to eutrification or to excessive fine-grained sediments, but not a toxic condition *per se*.
- The reported toxicity at the San Juan River (Blagg residence) failed to confirm.
- The reported toxicity at the San Juan River (Blanco) also failed to confirm—the spring sampling reported *Ceriodaphnia* mortality in water and *Pimephales* mortality in sediment, but the fall sampling reported *Pimephales* mortality in water. As discussed under “Pesticides, Pharmaceuticals and Xenobiotics” (above), the SWQB suspects that possible transient events like illegal dumping of septage may occur on the San Juan River above this Blanco station.

4.0 Thermograph Data

The Bureau of Reclamation provided thermograph data for 2000-2002 for the Texas Hole, which is located on the San Juan River (Cañon Largo to Navajo Reservoir) reach. In 1992, a thermograph was deployed in the San Juan River near the Archuleta USGS gage as part of the San Juan Recovery Implementation Plan (SJRIP) study. In 1999, a second thermograph was deployed near the dam. The maximum temperature for the available period of record was 22.81 °C on 7/12/01 at the Archuleta site. A thermograph was deployed by SWQB at Soaring Eagle Lodge 5/22/02 – 9/26/02. The maximum temperature was 21.17 °C. According to the SWQB Temperature Protocol, the San Juan River (the Cañon Largo to Navajo Reservoir reach) has no temperature impairment.

Figure 5: Lush riparian vegetation along a reach of the San Juan River, about 4 miles downstream from Bloomfield, August 12, 2002.

In 1992, a thermograph was deployed near the "San Juan River at Farmington" USGS gage as part of the SJRIP study. The maximum temperature for the available period of record did not exceed the criterion of 32.2° C. Thus, the San Juan River (Navajo boundary at the Hogback to Animas River) has no temperature impairment.

At the Animas River (Estes Arroyo to Colorado border), a thermograph deployed at Cedar Hill in 2003 recorded several temperatures greater than 23 °C (maximum temperature of 27.0 °C on 7/11/03). An additional thermograph deployed at Aztec had a maximum temperature of 29.79 °C on 7/19/03. This reach is impaired by excessive water temperature.

In 1992, a thermograph was deployed near the "Animas at Farmington" USGS gage as part of the SJRIP study. The daily maximum temperature exceeded the criterion of 27° C 154 of 3384 (4.6%) total records during the full period of record and 111 of 1364 (8.1%) between 7/8/99 and 4/1/03. According to the Assessment Protocol in place at the tiime, this reach was in full support of temperature because the exceedence rate was < 15%. However, during the 2002 study, instantaneous temperature measurements demonstrated numerous exceedences: one sample of eleven at Flora Vista but four samples of thirty at Farmington (this includes USGS data). Thus, this reach exceeds segment-specific criteria for water temperature, but these temperature exceedences occurred during periods of low flow in the river.

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5.0 Nutrient Assessment

During this 2002 study, conditions on the Animas River indicating impairment due to nutrient enrichment. These included:

- Excessive algal growth, as documented in photographs and field notes.
- Thick black sediments with a sulfurous odor, indicating widespread and significant formation of anaerobic, reducing conditions in the hyporheic zone.
- Sediments that yielded ammonia in concentrations that were acutely lethal to fish (see discussion in Ambient Toxicity, above). This ammonia was not observed in repeat samples collected just after a scour event, during which the anaerobic sediments were washed away.
- Elevated fecal coliforms in the Animas River, as discussed under Bacteriological Investigations, above.

Figure 6: Algae in Animas River, October 24, 2002.

Figure 7: Algae on bar of Animas River, October 24, 2002.

The Southern Ute Indian Tribe (SUIT), Environmental office expressed similar concerns, citing algal blooms observed below the South Durango Wastewater Treatment Plant. As with the bacteriological investigations described above, the SWQB presented these nutrient concerns to the San Juan Watershed Group. These nutrient concerns were also shared with entities in Colorado, including the Colorado Department of Fish and Wildlife and the SUIT. These discussions led to the formation of a smaller, informal workgroup consisting of aquatic biologists from SWQB, various Colorado agencies, and the SUIT, as well as support from local private citizens.

The Animas River (Estes Arroyo to Colorado border) – The potential for excessive nutrients on this reach was noted through visual observation during the 2002 study. To address this concern, a workgroup was formed comprised of state and tribal environmental specialists and concerned citizens. A nutrient survey was performed on 8/26/03 at the site on the Colorado/New Mexico border. Total phosphorus values were above the ecoregion criterion of 0.07 mg/L in >15% of the samples, and the percent dissolved oxygen saturation was greater

than 120%. A nutrient survey was performed on 10/07/03 at the site in Aztec just above the Hwy 516 bridge. The dissolved oxygen saturation was greater than 120%. Since three or more indicators were not present at either site, this assessment unit was determined to be full support for nutrients.

Animas River (San Juan River to Estes Arroyo) – The potential for excessive nutrients in the Animas was noted through visual observation during the 2002 study. To address this concern, a workgroup was formed comprised of state and tribal environmental specialists, as well as concerned citizens. A nutrient survey was performed on 8/25/03 at the site approximately one mile above the San Juan River at Boyd Park. Total nitrogen values were above the ecoregion criteria of 0.42 mg/L in >15% of the samples, the percent dissolved oxygen saturation was greater than 120%, and the ash free dry mass of algal sampling was greater than 5 mg/cm^2. A nutrient survey was also performed on 8/25/03 at the Flora Vista site. The chlorophyll a concentration was greater than 10 ug/cm^2, the percent dissolved oxygen saturation was greater than 120%, and the ash free dry mass of algal sampling was greater than 5 mg/cm^2. Since three or more indicators were present at both sites, nutrients will be added as a cause of non-support.

La Plata River(McDermott Arroyo to Colorado Border) – This reach was determined not to be nutrient enriched following the level two nutrient assessment analysis. A summary of the nutrient assessment is in the administrative record. Plant nutrients were removed as a cause of non-support. The dissolved oxygen criterion of 6.0 mg/L was not achieved 62% of the time based on a sonde deployed under the bridge near La Plata. Therefore, dissolved oxygen will be added as a cause of non-support.

La Plata River (San Juan River to McDermott Arroyo) – This reach was determined not to be nutrient enriched following the level two nutrient assessment analysis. A summary of the nutrient assessment is in the administrative record. Plant nutrients were removed as a cause of non-support.

6.0 Stream Bottom Deposits

SWQB and the USDA National Sedimentation Lab (NSL) implemented a special study to determine whether the San Juan or Animas rivers were impaired due to excessive sedimentation (i.e., stream bottom deposits). Percent fines data were the primary data used to determine whether the narrative stream bottom deposits criterion was attained. In this study, the distribution of the percent fines was determined to be log-normal, so medians and quartiles were used to define the central tendencies of the data. The fine sediment benchmark used to determine impairment was the 75th percentile of the percent fines measured at reference sites in the San Juan and Animas Rivers (29.5 percent fines). The median value for percent fines was determined for each reach (i.e., assessment unit) of concern. If the value (point or median depending on data availability) for percent fines for the study reach was below the fine sediment benchmark (i.e., the 75th percentile of the reference condition), the reach was listed as Fully Supporting for Sedimentation/Siltation (stream bottom deposits). If the median value for percent fines for the reach was above the 75th percentile of the reference condition, the reach was listed as Non Supporting for Sedimentation/Siltation (stream bottom deposits).

The following bullets summarize SWQB findings; and more-detailed information is available at:
www.nmenv.state.nm.us/swqb/Projects/SanJuan/SBD/DRAFT-SJR_SBD_Protocol09_14_04.pdf

- At the San Juan River (Animas River to Cañon Largo), the bed material and fluvial geomorphology data indicated potential impairment due to sedimentation (stream bottom deposits) due to large episodic sediment inputs from Cañon Largo and other ephemeral drainages. These conditions may be associated with the loss of spring flows because of Navajo Dam operations. This problem is noted in the results of the SJRIP and is incorporated into the "preferred alternative" in the preliminary final environmental impact statement (June 2003) to modify dam operations. Following the recommendations of the SJRIP Biology Committee, Navajo Dam was operated from 1992 – 2001 to mimic the natural stream flow hydrograph to provide high spring releases at or near the maximum channel capacity below Navajo Dam for the purpose of providing flows to flush sediment for the purpose of cleaning cobble bars and secondary channels in the San Juan River. Spring releases were timed to occur with the high spring flows of the Animas River to provide the maximum flushing effect in the San Juan River below its confluence with the Animas River. According to the decision matrix, there were no high spring releases in during 2002 and 2003. Fieldwork for the USDA National Sedimentation Study occurred October and November 2003. Bed material characteristics measured during this time may

Figure 8: Gallegos Canyon, October 24, 2002

have been impacted by drought conditions and the absence of high spring releases in the two prior springs.

- The median percent fines for the San Juan River (Cañon Largo to Navajo Dam) was 12%. Therefore, this reach is not impaired by sedimentation/siltation (stream bottom deposits).
- The Animas River (Estes Arroyo to Colorado border) reported a median percent fines of 23%, indicating that this reach is not impaired by sedimentation/siltation (stream bottom deposits).
- Similarly, the Animas River (San Juan River to Estes Arroyo) demonstrated of 26% median percent fines, and it also is not impaired by sedimentation/siltation (stream bottom deposits).Finally, the San Juan River (Navajo boundary at the Hogback to Animas River) had a median percent fines of 23% and is not impaired by sedimentation/siltation (stream bottom deposits).
- At the La Plata River (San Juan River to McDermott Arroyo), benthic macroinvertebrates were collected and pebble counts were performed at three stations. According to SWQB's current Stream Bottom Deposit Assessment Protocol: immediately above the bridge at La Plata (reference) and near the USGS gage near Farmington demonstrated a 1000% change in percent fines (3% at the reference site vs. 30% at the study site). The biological score was 46% of reference. Therefore, this reach is impaired due to Sedimentation/Siltation.

7.0 Biota (Benthic Macroinvertebrates)

La Plata River (McDermott Arroyo to Colorado State Line) -- Benthic macroinvertebrates were collected and pebble counts were performed at two stations along the La Plata according to our current Stream Bottom Deposit (Sedimentation/siltation) assessment protocol: immediately above the bridge at La Plata (reference) and at the Colorado state line. There were 3% fines at the reference site and 2 % fines at the study site. The biological score at the Colorado border station was 53% of reference due large amount of simuliidae in the sample. Therefore, Benthic Macroinvertebrate Bioassessments (Streams) will be added as a cause of non-support.

La Plata River (San Juan River to McDermott Arroyo) -- Benthic macroinvertebrates were collected and pebble counts were performed at three stations along the La Plata according to our current Stream Bottom Deposit (Sedimentation/siltation) assessment protocol: immediately above the bridge at La Plata (reference) and near the USGS gage near Farmington. There was a 1000% change in percent fines (3% at the reference site vs. 30% at the study site). The biological score was 46% of reference. Therefore, Sedimentation/Siltation will be added as a cause of non-support.

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8.0 Study Conclusions

This section summarizes SWQB conclusions, based on the results of the subject study.

- The San Juan River (Navajo boundary at the Hogback to Animas River) exceeds segment-specific criterion for fecal coliforms, with an exceedence ratio of eight samples of thirteen at the Bisti bridge, two samples of eight at the Kirtland bridge, and three samples of seven near the Hogback. The USGS and the Bureau of Reclamation provided additional data at the Bisti station, and the City of Farmington provided additional data at the Kirtland station. These bacteria may enter the river in stormwater, however this could not be established in the 2002 study due to the artificial hydrograph (releases from Navajo Dam) and the drought conditions.
  This reach still has a fish tissue mercury impairment due to the existing fish consumption guidelines. However, it is not impaired by stream bottom deposits.
  Organics samples collected above the confluence with the La Plata River revealed no evidence of contamination due to volatile or semi-volatile compounds, such as might leach from an old landfill.
- The San Juan River (Animas River to Cañon Largo) exceeds segment-specific criterion for fecal coliforms, with an exceedence ratio of four samples of seventeen at Bloomfield, five samples of fifteen at the Blagg residence, one sample of two near Lee Acres, and three samples of seven at the Bolack property. The Bureau of Reclamation provided additional data from the Bloomfield and Lee Acres sites.
  Sedimentation/siltation (stream bottom deposits) also remains a cause of non-support, and this reach still has a fish-consumption advisory for mercury in fish tissue.
  During this study, three organic volatiles samples collected at the Bloomfield Bridge, three more collected at the Blagg property, and one collected at the Bolack property revealed no evidence of contamination due to volatile organic compounds, such as might be associated with near-stream groundwater contamination from petroleum spills.
- The San Juan River (Cañon Largo to Navajo Dam) meets all applicable criteria associated with water temperature. Likewise, this reach is not impaired by sedimentation/siltation (stream bottom deposits) or aluminum (SWQB observed one low-level aluminum exceedence in nineteen samples).
  This reach exceeds segment-specific criterion for fecal coliforms, with exceedence ratios of seven samples in ten at Archuleta (the gage station) and two samples in nine at Blanco. The lower reach of this assessment unit also exceeds segment-specific criterion for turbidity, with exceedence ratios of two samples in four at the Soaring Eagle Lodge and two samples in nine at Blanco (the Archuleta station reported no exceedences in six samples). The Bureau of Reclamation provided turbidity data at both of these stations, and the USGS provided data at the Archuleta station. Finally, this reach still has a fish-consumption advisory (mercury in fish tissue), and this remains a cause of non-support.
- Gallegos Canyon demonstrated elevated selenium in the only total metals sample collected in this ephemeral watercourse. This exceedence was greater than 1.5 times the chronic Wildlife Habitat criterion (5.0 µg/L).
- Navajo Reservoir remains on the fish consumption guidelines for mercury in fish tissue as these guidelines have not been updated since the last listing cycle. It also reported a water temperature exceedence, however the water level was extremely low during this droughty year (2002).
- Animas River (San Juan River to Estes Arroyo) has no sedimentation/siltation (stream bottom deposits) impairment. However, fecal coliform, nutrients, and sediment bioassay (acute) are causes of non-support.
  This reach exceeds segment-specific criterion for fecal coliforms, with an exceedence ratio of two samples of seven at Flora Vista and three samples of eight at Farmington. The

Farmington information includes USGS data (reporting three exceedences of seven samples during 2002) plus numerous exceedences in older data.

The lower reach of this assessment unit also exceeds the segment-specific criterion for water temperature, with an exceedence ratio of one sample of eleven at Flora Vista but four samples of thirty at Farmington (as above, the Farmington information includes USGS data). These temperature exceedences occurred during periods of low flow in the river.

This reach may have an unidentified toxic impairment.

Figure 9: Lake Farmington (Beeline Reservoir), February 28, 2002.

- The Animas River (Estes Arroyo to Colorado border) is impaired for temperature but not sedimentation/siltation (stream bottom deposits) or nutrients. This reach displayed no evidence of contamination due to volatile organic compounds, such as might be associated with nearby petroleum extraction activities.
- Lake Farmington (Beeline Reservoir) remains listed for mercury in fish tissue due to the existing fish consumption guidelines.
- The La Plata River was split into two reaches having different hydrologic conditions and attainment status. This river occasionally demonstrates selenium concentrations above the aquatic life criterion and wildlife criterion, but these excursions are insufficient to be considered causes of non-support.

Figure 10: La Plata River, receiving overflow from an irrigation ditch within a feedlot, April 16, 2002.

The upper reach (above McDermott Arroyo) has no impairment due to plant nutrients, but it fails to meet designated uses due to low dissolved oxygen, elevated fecal coliforms, and a benthic macroinvertebrate bioassessment (streams) impairment.

The lower reach also has no nutrient impairment, but it demonstrates non-support due to fecal coliforms, dissolved oxygen, and sedimentation/siltation. The SWQB believes that the lower reach may be misclassified as marginal coldwater aquatic life. The La Plata River had very low flows during 2002, going completely dry at the La Plata station for about three months.

- Jackson Lake is unclassified, but it may exceed criteria for an existing use: coldwater (the only sample collected in this reservoir reported a temperature exceedence). The lake level was very low during this droughty year.
- Ambient toxicity sampling conducted at the Shumway Arroyo reported no significant mortality, indicating the absence of toxic conditions.

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