# Chapter 9 San Juan River Basin Plan (Regulations 34 and 35)



Ecoregions (Level IV): <sup>1</sup>	20. Colorado Plateaus (a-d)	Surface Area: <sup>2</sup>	10,169 square miles
	21. Southern Rockies (a-g)	Stream Length: <sup>3</sup>	5,805 miles
Threatened and Endangered	Threatened: 7	Major Land Cover: <sup>2</sup>	Forest and Shrubland
Species (federal and state): <sup>2</sup>	Endangered: 10		
	State Species of Concern: 16		
Counties:	Archuleta (portion), Conejos	No. of Assessed	11
	(portion), Dolores, Hinsdale	Lakes/Reservoirs: <sup>4, 5</sup>	
	(portion), La Plata, Mesa	Corresponding Acres:	15,969.16
	(portion), Mineral (portion),		
	Montezuma, Montrose (portion),		
	Rio Grande (portion), San Miguel,		
	San Juan (portion)		
Population: 6	126,299	No. of Groundwater Aquifers: <sup>2</sup>	3
Major Population Centers: <sup>2</sup>	Durango and Cortez	Approximate No. of Publicly	
		Owned Treatment Works: <sup>7</sup>	60
Water Quality Planning Regions		Known Primary Water Quality	Aquatic life use, cadmium,
(in total or in part): <sup>8</sup>	9,10, and 11	Stressors: <sup>4</sup>	copper, zinc, Escherichia coli,
			iron, lead, manganese, mercury,
			sediment
<sup>1</sup> See appendix B for a description of	of key ecoregional characteristics.		

<sup>2</sup> CWCB 2004.

<sup>3</sup> WQCD 2002.

<sup>4</sup> WQCC 2010c; WQCD 2010a.

<sup>5</sup> The number of lakes/reservoirs and the corresponding acres only include the lakes that have been assessed by the Water Quality Control Division and do not reflect all of the lakes/reservoirs present in the basin.

<sup>6</sup> CWCB 2010.

<sup>7</sup> USEPA 2010a, 2010c, WQCC 2010c; WQCD 2010a.

<sup>8</sup> See exhibit 2.2 in chapter 2 for the names of the Water Quality Planning Regions and counties covered.

This basin chapter and the SWQMP as a whole are primarily water quality documents. They are based on readily available, peer reviewed water quality information, particularly the 2010 Integrated Water Quality Monitoring and Assessment Report (2010 Integrated Report or Clean Water Act (CWA) section 305(b) report).<sup>1</sup> Both the Water Quality Control Commission (WQCC) and the Water Quality Control Division (WQCD) are aware of many other water quality data sources. Organizations and other parties with water quality data are encouraged to get involved in "calls for data" for the biennially completed CWA section 305(b) reports. The data sources that are used in forthcoming CWA section 305(b) reports will subsequently be used in future iterations of the SWQMP. Other key water quality regulations and policies used in the chapter are tabulated in Appendix A.

# 9.1 System Description

## 9.1.1 Location and Physical Setting

The San Juan River Basin is in the southwest corner of Colorado and covers an area of approximately 10,169 square miles. The flow of the San Juan River is generally to the west, flowing into the Colorado River in southeast Utah. Major tributaries to the San Juan River include the Piedra, Los Piños, Animas, Florida, La Plata, and Mancos Rivers and McElmo Creek. In the southern portion of the basin, the Upper San Juan River and its tributaries flow through two Native American reservations, the Ute Mountain Ute Reservation and the Southern Ute Indian Reservation (CWCB 2004).

A portion of the Dolores River is also located within the San Juan River Basin; it flows to the west and northwest, where it eventually joins the Colorado River in eastern Utah. The major tributary to the Dolores River within the San Juan River Basin is the San Miguel River, located downstream of McPhee Reservoir.

Elevations in the San Juan River system range from greater than 14,000 feet in headwater areas of the Animas and Los Piños rivers down to 4,500 feet, where the Mancos River exits the state just east of the Four Corners into New Mexico (CWCB 2004). The largest cities within the San Juan River Basin are Durango and Cortez. The river basin is also home to five ski areas— Telluride, Wolf Creek, Ski Hesperus, Silverton Mountain, and Durango Mountain Resort. A map of the basin showing the San Juan River and its major tributaries is provided as exhibit 9-3 (at end of chapter).

## 9.1.2 Ecology

The boundaries of the San Juan River Basin fall within two distinct level III ecoregions (Chapman et al. 2006). The San Juan Basin is characterized by rugged terrain, including mesas, terraces, escarpments, canyons, dry washes (arroyos), and mountains (CWCB 2004). Approximately 52% of the basin falls within the Southern Rockies Ecoregion, and the remainder

<sup>&</sup>lt;sup>1</sup> The Integrated Reports are prepared by the WQCD on a biennial basis and are approved by the WQCC as Regulation No. 93: *Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List*, 5 CCR 1002-93 (WQCC 2010b; WQCD 2010a).

falls within the Colorado Plateaus Ecoregion (exhibit 9-4 at end of chapter). Key characteristics of these and the more specific level IV ecoregions, such as physical characteristics, elevation, land cover, climate, geology, and soil types, are provided in appendix B.

The San Juan River Basin contains several endangered and threatened species, several species of state concern, and one federal candidate species, as summarized in exhibit 9-5 (at end of chapter). There are 10 federal and/or state-listed endangered species (one fish, three bird, four mammalian, and two plant species) and seven federal and/or state-listed threatened species (one fish, three bird, two mammalian, and one plant species). An additional plant species is a federal candidate for listing. Finally, Colorado has 16 species of concern in the San Juan River Basin (one fish, one amphibian, three reptilian, eight bird, and three mammalian species) (CDOW 2010c; CWCB 2004).

Exhibit 9-6 (at end of chapter) shows the locations of environmental and recreational uses (i.e., nonconsumptive uses) in the San Juan River Basin.<sup>2</sup> The use categories include environmental focus areas, environmental and recreational focus areas, and recreational focus areas (CWCB 2009). The nonconsumptive uses shown are only meant to provide information on environmental and recreational uses in the basin and not to dictate future actions or impact any water rights (CWCB 2009).

A portion of the Animas River south of Durango is designated as a gold medal fishery and is considered an area of high recreational value. Other high value recreational areas in the San Juan River Basin include numerous reaches for whitewater rafting (CWCB 2004).

## 9.1.3 Climate

The San Juan River Basin is located in the semiarid high desert, which is typified by fairly cold winters, dry springs, late summer monsoons, and pleasant autumns. Temperatures in Pagosa Springs range from -3 to 82 degrees Fahrenheit (°F). Precipitation occurs mostly in the form of rain during localized but intense summer thunderstorms and snowfall in the mountains. Average annual precipitation ranges from greater than 40 inches per year in the San Juan Mountains to less than 13 inches per year near the Colorado-Utah state line (CWCB 2004). Exhibit 9-7 (at end of chapter) shows a contour (isohyetal) plot of the average annual precipitation throughout the basin.

# 9.1.4 Land Ownership and Land Cover/Use

The federal government owns 63% of the land in the San Juan River Basin. The remaining land ownership in the basin is private (18%), tribal (17%), and state (2%). Exhibit 9-8 (at end of chapter) is a map of land ownership by basin.

<sup>&</sup>lt;sup>2</sup> In 2005, the Colorado legislature established the Water for the 21<sup>st</sup> Century Act, which established an Interbasin Compact Process that provides a permanent forum for broad-based water discussions in the state. The law created two new structures: the Interbasin Compact Committee (IBCC) and the Basin Roundtables. As part of the IBCC, the Basin Roundtables are required to complete basin-wide needs assessments; an assessment of consumptive water needs and an assessment of nonconsumptive water needs. In 2009, the Colorado Water Conservation Board released a draft report entitled, *Nonconsumptive Needs Assessment Focus Mapping*. The focus mapping described in the report is part of the Basin Roundtables' assessment of nonconsumptive water needs.

Land cover in the San Juan River Basin (exhibit 9-9 at end of chapter) is summarized in exhibit 9-10. Forest and shrubland are the predominant land cover types, covering approximately 50% and 31% of the basin, respectively (CWCB 2004). Montezuma and La Plata Counties, in the southern portion of the basin, are dominated by agriculture, grasslands, and forests, whereas at the lower elevations of Dolores, San Miguel, and Montrose Counties, in the northern portion of the basin, agriculture and ranching dominate the landscape (CWCB 2004).

	Basin	-wide	Statewide		
Land Cover	Area (sq. miles)	Percent of Total	Area (sq. miles)	Percent of Total	
Grassland	1,118	11.0%	41,051	39.5%	
Forest	5,122	50.4%	29,577	28.4%	
Shrubland	3,192	31.4%	16,883	16.2%	
Planted/cultivated	496	4.9%	13,737	13.2%	
Barren	192	1.9%	1,219	1.2%	
Wetland	1	0.01%	80	0.08%	
Open water	32	0.3%	590	0.6%	
Developed	16	0.2%	923	0.9%	
TOTAL	10,169		104,067		

### Exhibit 9-10. San Juan River Basin<sup>1</sup> Land Cover Data

<sup>1</sup>Source: CWCB 2004. The CWCB Southwest Basin area of analysis for land cover differs slightly from the SWQMP San Juan River Basin area of analysis. The CWCB Southwest Basin includes a portion of the Westwater Canyon 8-digit Hydrologic Unit Code (HUC) watershed, which is not part of the SWQMP San Juan River Basin. The data presented here is the land cover data for the CWCB area of analysis.

There are numerous and significant archaeological sites in the southwestern San Juan Basin. Ancient Puebloan ancestors occupied the area from approximately A.D. 1 to A.D. 1300 and left remarkable remains, thereby creating an important historic preservation region that includes Mesa Verde National Park, the Ute Mountain Ute Tribal Park, Chimney Rock, Canyons of the Ancients National Monument, and a portion of Hovenweep National Monument. The presence of the archaeological resources might require mitigation efforts in the development of water resources within the San Juan River Basin (CWCB 2004).

# 9.1.5 Demographic and Socioeconomic Conditions

The general socioeconomic conditions of the San Juan River Basin can be characterized by increasing populations in most counties between 2008 and 2050, especially in the counties with urban areas, and with increasing employment in all sectors except mining, which is expected to experience a decline of 23%. The greatest rates of growth are expected in the household basic and tourism sectors.

The population in the San Juan River Basin is projected to increase 114% between 2009 and 2050 under medium economic development assumptions, from 126,299 to 270,160 people. La Plata County is projected to account for much of the population growth in the basin; population will remain relatively flat in Dolores County and the portion of Montrose County in the basin during the same period (CWCB 2010). Exhibit 9-11 (at end of chapter) shows the population projections for the San Juan River Basin.

As shown in exhibit 9-12, tourism was the largest basic employment sector in the San Juan Basin in 2007, followed by household basic jobs and regional and national service jobs. Household basic sector jobs are expected to grow at the fastest rate between 2007 and 2050, but tourism is expected to remain the largest source of employment in 2050. Mining jobs in the San Juan Basin are projected to decrease by 23% between 2007 and 2050 (CWCB 2010). Exhibit 9-12 shows employment projections for the San Juan River Basin.

Sector	2007	2050
Agribusiness Jobs	3,200	4,500
% of Total Jobs	4.9%	3.6%
Total % Growth	NA	41%
Mining Jobs	1,300	1,000
% of Total Jobs	2.0%	0.8%
Total % Growth	NA	-23%
Manufacturing Jobs	900	1,300
% of Total Jobs	1.4%	1.0%
Total % Growth	NA	44%
Government Jobs	3,100	4,600
% of Total Jobs	4.7%	3.7%
Total % Growth	NA	48%
Regional/National Service Jobs	6,800	10,700
% of Total Jobs	10.4%	8.5%
Total % Growth	NA	57%
Tourism Jobs	14,500	32,400
% of Total Jobs	22.1%	25.9%
Total % Growth	NA	123%
Household Basic Jobs	8,800	27,000
% of Total Jobs	13.4%	21.5%
Total % Growth	NA	207%
Total Basic Jobs	38,500	81,500
% of Total Jobs	58.8%	65%
Total % Growth NA 11		112%
Resident Service Jobs	27,000	43,800
% of Total Jobs	41.2%	35.0%
Total % Growth	NA	62%
Total Jobs	65,500	125,300
% of Total Jobs	100%	100%
Total % Growth	NA	91%

#### Exhibit 9-12. San Juan River Basin 2050 Employment Projections, Medium Growth Scenario<sup>1</sup>

<sup>1</sup> Source: CWCB 2010. The CWCB Southwest Basin area of analysis for the employment projections differs slightly from the SWQMP San Juan River Basin area of analysis. The CWCB Southwest Basin includes a portion of the Westwater Canyon 8-digit Hydrologic Unit Code (HUC) watershed, which is not part of the SWQMP San Juan River Basin. The data presented here are the employment projections for the CWCB area of analysis.

# 9.1.6 Water Withdrawals

Water quantity and quality issues are intertwined, particularly in arid western states where water can be scarce (CFWE 2003). Water quantity issues tend to be more contentious than quality issues. Water rights are protected under Colorado's constitution and several state statutes, including the Colorado Water Quality Control Act. Colorado water law establishes water use rights for a variety of purposes including farming, drinking, manufacturing, recreation, protection of the environment, and all of the use categories listed in exhibit 9-13 below (CFWE 2003). Public and private entities involved in watershed protection in Colorado have grown to appreciate that the two worlds of water quality and quantity are inexplicably linked and are working together more frequently to combat water quality/quantity problems.

In 2005, the U.S. Geological Survey (USGS), in cooperation with the Colorado Water Conservation Board (CWCB), estimated total surface water and groundwater use in the San Juan River Basin to be 968.97 million gallons per day (Mgal/d). Use was estimated for the following categories: irrigation for crops, irrigation for golf courses, public supply, domestic, industrial, livestock, mining, and thermoelectric.<sup>3</sup> Exhibit 9-13 shows the total water withdrawals in the basin and the state as a whole for these categories. The predominant uses of water in the basin were for agriculture at 944.84 Mgal/d (98%), followed by public supply at 12.78 Mgal/d (1%), and thermoelectric at 6.75 Mgal/d (1%).

		Withdrawals by Use Category	
Use Category	Withdrawals (Mgal/d) (percent of total basin withdrawals)	Total Withdrawals All of Colorado (Mgal/d)	Withdrawals in San Juan River Basin as Percent of Total Withdrawals in State
Agriculture (crop irrigation & livestock)	944.84 (97.51%)	12,354.91	7.65%
Irrigation (golf course)	1.76 <i>(0.18%)</i>	40.64	4.32%
Public Supply <sup>2</sup>	12.78 (1.32%)	864.17	1.48%
Domestic <sup>3</sup>	1.26 (0.13%)	34.43	3.65%
Industrial	0.93 (0.10%)	142.44	0.65%
Mining	0.66 (0.07%)	21.42	3.10%
Thermoelectric	6.75 <i>(0.70%)</i>	123.21	5.47%
Totals	<b>968.97</b> (or 1,086.22 thousand acre-feet per year)	<b>13,581.22</b> (or 15,224.55 thousand acre-feet per year)	7.13%

### Exhibit 9-13. San Juan River Basin<sup>1</sup> Total Water Withdrawals in Colorado, 2005

The CWCB Southwest Basin area of analysis for water withdrawals differs slightly from the SWQMP San Juan River Basin area of analysis. The CWCB Southwest Basin includes a portion of the Westwater Canyon 8-digit Hydrologic Unit Code (HUC) watershed, which is not part of the SWQMP San Juan River Basin. The data presented here is the water withdrawal data for the CWCB area of analysis.

<sup>&</sup>lt;sup>3</sup> The term "public supply" refers to "community water systems" as that term is defined under the federal Safe Drinking Water Act. Community water systems (CWSs) are any water system that serves drinking water to at least 25 people for at least 60 days of the calendar year or has at least 15 service connections. In addition to providing water to domestic customers, CWSs also deliver water to commercial, industrial, and thermoelectric power users. The term "domestic" refers to the portion of the population not served by a "public supply" (USGS 2010).

<sup>2</sup> The term "public supply" is water supplied by a publicly or privately owned water system for public distribution, sometimes also known as a "municipal-supply system" or "community water system" (CWS). Any water system that serves drinking water to at least 25 people for at least 60 days of the calendar year or has at least 15 service connections is considered a public supply system. In addition to providing water to domestic customers, CWSs also deliver water to commercial, industrial, and thermoelectric power users (USGS 2010).

<sup>3</sup> The term "domestic" refers to water used for household purposes, such as washing clothes, cleaning dishes, drinking, food preparation, bathing, flushing toilets, and watering lawns and gardens that are not served by public-supply systems (USGS 2010).
Source: USGS 2010.

The CWCB recently completed a projection of municipal and industrial (M&I) surface water use needs to the year 2050 for the state.<sup>4</sup> The projections will provide relevant parties with a basis for discussing and addressing the state's future M&I water needs. In its report, the CWCB estimated M&I water demand in the San Juan River Basin to be at 22,000 acre-feet per year (AFY) (19.6 Mgal/day) in 2008 and at 47,000 AFY (41.9 Mgal/day) for 2050 under medium economic assumptions, if passive conservation is employed (CWCB 2010)<sup>5</sup>.

Archuleta, La Plata, and Montezuma Counties currently have the highest M&I water demands in the basin. Overall, M&I demands in the San Juan River Basin are projected to more than double in the next 40 years.

The largest self-supplied industrial (SSI) water demand sector in the basin in 2008 was thermoelectric power accounting for 1,900 AFY of the total 2,300 AFY SSI water demands in the basin. SSI demands are expected to increase for thermoelectric power, while demands for snowmaking are expected to hold steady from 2008 to 2050 under all growth scenarios (CWCB 2010).

## 9.1.7 Hydrography and Hydrology

### 9.1.7.1 Surface Geology

As a result of glaciation in the upper valleys, outwash terrace deposits are present along most of the San Juan River tributaries. The deposits do not typically exceed 30 feet in thickness (CWCB 2004). The sedimentary rocks in the region include pockets of coal, oil, and uranium. Historically, the area was also mined for gold, silver, and copper. It should also be noted that

<sup>&</sup>lt;sup>4</sup> In 2003, the Colorado General Assembly authorized the CWCB to implement the Statewide Water Supply Initiative (SWSI), an 18-month basin-by-basin investigation of the state's existing and future water needs. As part of that effort, the CWCB assembled water users (farmers, ranchers, municipalities, industrial users, recreationalists, and environmentalists) to plan for the future. That effort resulted in completion of the *Statewide Water Supply Initiative* Phase I Report in November 2004 and a Phase II report in November 2007. Both reports focus on all water uses, not just M&I. Since that time, the CWCB has undertaken another investigation to project M&I surface water use needs to the year 2050 for the state. The result of that investigation is reported in the document *State of Colorado 2050 Municipal and Industrial Water Use Projections*, dated July 2010. The report is part of the Basin Roundtables' assessment of consumptive water needs in the state as required by the Water for the 21st Century Act, which was passed by the Colorado legislature in 2005.

<sup>&</sup>lt;sup>5</sup> Passive conservation accounts for retrofits of existing housing and commercial construction with high-efficiency toilets, clothes washers, dishwashers, etc. as implementation of the baseline efficiency standards established under the 1992 National Energy Policy Act take place (CWCB 2010).

soils derived from the various shallow geologies and deposited materials are a prime consideration in water quality planning.<sup>6</sup>

### 9.1.7.2 Surface Water

The San Juan River Basin, located in southwestern Colorado, includes both the San Juan River and the Dolores River both of which are tributary to the Colorado River. The headwaters of the San Juan and Dolores Rivers are in the San Juan Mountains, approximately 13,000 feet above sea level. The San Juan River flows generally westward, passing through the Southern Ute Indian Reservation before crossing into New Mexico. The Dolores River flows west and northwest before joining with the Colorado River in eastern Utah.

Numerous USGS stream flow gauges are maintained in the San Juan River Basin to enable stream flow to be monitored. Exhibit 9-14 summarizes the mean annual stream flow, period of record, and drainage area for five drainages, all of which were recently selected by the CWCB to summarize historical flows in the basin across a broad spatial scale. As indicated in the exhibit, mean annual flows are highest in the upstream reaches of the Animas River near Durango and the San Juan River near Carracas. The locations of the selected gauges are shown in exhibit 9-15 (at end of chapter). Also shown are major surface water diversions and segments with decreased instream flow.

Site Name	USGS Site Number	Mean Annual Stream Flow (AFY)	Mean Annual Stream Flow (cfs) <sup>1</sup>	Period of Record (years)	Drainage (square miles)
Animas River at Durango	09361500	566,571	783	1887-2002	692
San Juan River near Carracas	09346400	457,983	633	1961-2002	1,230
Los Pinos River at La Boca	09354500	173,947	240	1951-2002	520
McElmo Creek near Colorado- Utah State Line	09372000	37,647	52	1951-2002	346
Dolores River near Bedrock	09171100	299,576	414	1971-2002	2,145

#### Exhibit 9-14. San Juan River Basin Summary of Selected USGS Stream Gauges

<sup>1</sup> cfs = cubic feet per second.

Source: CWCB 2004.

In addition, it should be noted that mountain snowpack can have significant impacts and can cause variations in surface water quality and quantity on an annual basis. The Natural Resources Conservation Service (NRCS) Snow Survey Program provides mountain snowpack data and streamflow forecasts for the western United States. Common applications of snow survey data include water supply management, flood control, climate modeling, recreation, and conservation planning. Additional information on the NRCS snow survey program can be found at <a href="http://www.co.nrcs.usda.gov/snow/">http://www.co.nrcs.usda.gov/snow/</a>.

<sup>&</sup>lt;sup>6</sup> Soil variations occur on a local and regional scale and should be taken into consideration when addressing water quality problems. Information on soil conditions can be found through the Natural Resources Conservation Service (NRCS) Web Soil Survey at <u>http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm</u>. The website can be used to access soil maps and soil descriptions, interpretations, and characteristics. The information can be used at a relatively broad scale as well as on a site-specific basis.

## 9.1.7.3 Groundwater

Groundwater in the San Juan River Basin is predominately located within the following three aquifers: Alluvial, Paradox, and San Juan Basin.

Exhibit 9-16 (at end of chapter) shows the aquifers, in two groups: Alluvial Aquifer and Bedrock Aquifer (Paradox and San Juan Basin aquifers). Also shown in the exhibit is the location of wells in the San Juan River Basin with a permitted or decreed yield of 500 gallons per minute (gpm) or higher (CGS 2003).

The San Juan River Basin contains numerous aquifers throughout its stratigraphic sequence. Significant aquifers in the basin include the Quaternary alluvium, Tertiary Animas Formation, Cretaceous Mesa Verde Group and Dakota Sandstone, and sandstones of the Jurassic Morrison Formation. Compared to other regions in Colorado, there is relatively little groundwater use in the San Juan River Basin (CWCB 2004; CGS 2003). As a result, most municipalities obtain their water from surface water sources. Many homeowner associations and campgrounds, however, use groundwater as their primary supply. Generally, domestic water supply is the primary use of groundwater in San Miguel and Dolores Counties, whereas agriculture is the primary use of groundwater in Montrose and Mesa Counties (CGS 2003).

# 9.2 Water Quality Classifications and Standards

## 9.2.1 Surface Water

## 9.2.1.1 Use Classifications

The San Juan River Basin contains a total of 80 waterbody segments covering approximately 5,805 stream miles (Exhibit 9-17 at end of chapter). The WQCC has specified the classified uses for each of these segments in Regulation No. 34: *Classifications and Numeric Standards for the San Juan and Dolores River Basin* (5 CCR 1002-34) and Regulation No. 35: *Classifications and Numeric Standards for the Gunnison and Lower Dolores River Basins* (5 CCR 1002-35) (WQCC 2010a and WQCC 2010b). These uses are summarized in exhibits 9-18 and 9-19 (at end of chapter). These exhibits show that WQCC has classified the majority of segments in the San Juan River Basin with the uses of agriculture (97%) and existing recreation (91%). Those uses are followed by water supply (57%), aquatic life cold water 1 (53%), aquatic life warm water 2 (21%), and potential recreation (8%). The stream miles associated with these uses are shown in exhibit 9-20.

Classified Uses	Number of Streams	Stream Miles	Percent of Total Stream Miles (n=10,150.03 miles)
Agriculture	111	9,446.50	93%
Existing Recreational Uses <sup>1</sup>	104	8,718.33	86%
Water Supply	65	5,186.95	51%
Aquatic Life Warm 2	20	4,087.36	40%
Aquatic Life Cold 1	60	3,519.36	35%

#### Exhibit 9-20. Number of Streams and Stream Miles by Classified Use

Classified Uses	Number of Streams	Stream Miles	Percent of Total Stream Miles (n=10,150.03 miles)
Not Suitable for Recreation <sup>1</sup>	19	2,081.21	21%
Aquatic Life Cold 2	19	1,835.02	18%
Potential Recreational Uses <sup>1</sup>	9	1,072.20	11%
Aquatic Life Warm 1	11	659.56	7%
Total Streams	114	10,150.03	

<sup>1</sup> Some segments in this basin have different recreational uses depending on the time of year (existing, not suitable, potential, and undetermined). This exhibit reflects all of the classified uses for all segments in the basin even if some are only applicable at certain times of the year.

Sources: WQCC 2010a, 2010b; WQCD 2010a.

In its latest assessment cycle, the WQCD presented information for 11 lakes in the San Juan River Basin, covering approximately 15,969 acres. <sup>7</sup> Exhibit 9-21 shows the classified uses for each of these lakes/reservoirs and the corresponding lake acres.

Classified Uses	Number of Lakes	Lake Acres	Percent of Total Lake Acres (n=15,969.16 acres)
Agriculture	11	15,969.16	100%
Existing Recreational Uses <sup>1</sup>	11	15,969.16	100%
Water Supply	10	15,590.56	98%
Aquatic Life Cold 1	8	8,838.20	55%
Aquatic Life Warm 1	3	7,130.96	45%
Not Suitable for Recreation <sup>1</sup>	2	147.60	1%
Total Lakes:	11	15,969.16	

Exhibit 9-21. Number of Lakes/Reservoirs and Corresponding Acres by Classified Use

<sup>1</sup> Some segments in this basin have different recreational uses depending on the time of year (existing, not suitable, potential, and undetermined). This exhibit reflects all of the classified uses for all segments in the basin even if some are only applicable at certain times of the year.

Sources: WQCC 2010a, 2010b; WQCD 2010a.

### 9.2.1.2 Designations

As further shown in exhibits 9-18 and 9-19 (at end of chapter), the WQCC has designated a total of eight segments as *Outstanding Waters*. The WQCC has designated a total of 21 segments as *Use Protected*. The meaning of these two designations is provided in section 2.2.3.1 of chapter 2, "Water Quality Planning and Management in Colorado."

<sup>&</sup>lt;sup>7</sup> Lakes are presented in WQCC's surface water quality classifications and standards regulations in several ways. A lake may be present alone as its own segment, as a combination of several lakes grouped into a segment, or as part of a segment that includes streams, lakes, and wetlands. The WQCD presented only those lakes/reservoirs it assessed during its latest monitoring cycle in appendix B of the 2010 Integrated Report. The entire universe of lakes/reservoirs in the state is not explicitly denoted in the WQCC regulations, nor are the lakes/reservoirs fully denoted in WQCD's biennial Integrated Reports. Each biennial cycle, the WQCD assesses and presents information for only a subset of lakes/reservoirs in the state.

## 9.2.1.3 Standards

Numeric standards for the San Juan River Basin are provided in the "Stream Classifications and Water Quality Standards" tables attached to Regulation Nos. 34 and 35. Because new standards are often developed and existing standards are periodically revised, the standards are not summarized here. Readers should consult the actual regulations for specific details; they are available at <a href="http://www.cdphe.state.co.us/regulations/wqccregs">http://www.cdphe.state.co.us/regulations/wqccregs</a>.

## 9.2.2 Lakes

## 9.2.2.1 Trophic Status

From July 2007 to July 2009, the WQCD monitored a total of 50 lakes and reservoirs across the state to evaluate their trophic status and to assess whether they were attaining their respective water quality standards. Of the 50 lakes and reservoirs assessed, five are in the San Juan River Basin. During the period from 1999 to 2006, however, the Division monitored other sets of lakes and reservoirs across the state to assess their trophic status and determine whether water quality standards were being met. Of the total lakes and reservoirs assessed during the period, one is in the San Juan River Basin (see exhibit 9-22).

The *trophic state* is a means of classifying lakes on the basis of their level of biological productivity (especially algae) and nutrient status. Commonly used indicators of nutrient status and productivity include the amount of algae as measured by chlorophyll *a*, water transparency as measured by Secchi disk depth, and in-lake epilimnetic total phosphorus concentration. The WQCD broadly defines the various trophic states for the purposes of its analyses as follows:

- Oligotrophic. Lakes with few available nutrients and a low level of biological productivity. They are characterized by clear water, and they often support cold-water fish species.
- **Mesotrophic.** Lakes with moderate nutrient levels and biological productivity between oligotrophic and eutrophic. These lakes usually support warm-water fish species.
- **Eutrophic.** Lakes with high nutrient levels and a high level of productivity. These lakes typically support only warm-water fish species.
- Hypereutrophic. Lakes in an advanced eutrophic state.

Lake	Narraguinnep Reservoir	Echo Canyon Reservoir	Groundhog Reservoir	Williams Creek Reservoir	Miramonte Reservoir	McPhee Reservoir
Segment ID No.	COSJLP11	COSJSJ6a	COSJDO05	COSJPI05	COGUSM11	COSJDO4b
Elevation (feet)	NA <sup>1</sup>	7,237	8,725	8,247	7,702	NA
Surface Acres	NA	118	670	508	420	NA
Chlorophyll <i>a</i> (µg/L)	1.0	1.59	1.08	25.30	0.53	1.9
Chlorophyll Trophic Status Index <sup>2</sup>	31	35	31	62	24	37

#### Exhibit 9-22. San Juan River Basin Trophic Status of Lakes and Reservoirs as Measured by WOCD During the Period 1999 to 2009

Lake	Narraguinnep Reservoir	Echo Canyon Reservoir	Groundhog Reservoir	Williams Creek Reservoir	Miramonte Reservoir	McPhee Reservoir
Secchi Depth (meters)	2.1	5.65	3.10	1.10	2.30	3.1
Estimated Trophic Status	Oligotrophic	Oligotrophic	Oligotrophic	Eutrophic	Oligotrophic	Mesotrophic
Year Monitored	1999	2008	2008	2008	2008	1999

<sup>1</sup> NA = Not Available

<sup>2</sup> Chlorophyll Trophic Status Index (TSI) quantifies the relationship between lake clarity measured in terms of Secchi disk transparency and algal biomass measured in terms of chlorophyll a. Lakes with the following TSI values are estimated to have the following trophic status: TSI 0-40, Oligotrophic; TSI 41-50, Mesotrophic; TSI 51-70, Eutrophic; and TSI greater than 70, Hypereutrophic.

Source: WQCC 2010c; WQCD 2002, 2010a.

As presented in exhibit 9-22, four of the assessed lakes and reservoirs in the San Juan River Basin were identified as being oligotrophic, while the remaining two were identified as either eutrophic and mesotrophic.

## 9.2.2.2 Fish Tissue Studies

As part of its overall monitoring efforts, the WQCD also investigates fish tissues for the presence of contaminants that can be harmful to humans if ingested. The WQCD uses the monitoring data to issue fish consumption advisories (FCAs) to the public as warranted. During the period July 2007 to July 2009, WQCD evaluated fish tissues from more than 112 waterbodies. Of this number, one waterbody was assessed in the San Juan River Basin for mercury, selenium, and arsenic. Echo Canyon Reservoir was issued an FCA as a result of this assessment effort. The lakes/reservoirs and fish species evaluated in the San Juan River Basin are shown in exhibit 9-23.

### Exhibit 9-23. San Juan River Basin Lakes and Reservoirs Assessed for Mercury, Selenium, and Arsenic during the Period 2007 to 2009

Lake (Segment ID No.)	Species Tested
Echo Canyon Reservoir (COSJSJ06a)	Largemouth bass, yellow perch, black crappie, channel catfish, white sucker, and green sunfish

Sources: WQCC 2010c; WQCD 2010a.

The WQCD chose to test for the presence of mercury, selenium, and arsenic in fish tissue because of the harmful human health effects that may occur if these parameters are ingested. In particular, mercury adversely affects wildlife and humans, especially children and women of childbearing age. It is also the leading cause of impairment in the nation's estuaries and lakes. Mercury was cited in nearly 80% of FCAs reported by the states in the 2000 National Listing of Fish and Wildlife Advisories. Although arsenic generally bio-accumulates in fish in its less toxic organic form, human exposure is still harmful. The U.S. Department of Health and Human Services (DHHS) has determined that arsenic is a known carcinogen, and human exposure can occur by ingesting water, soil, or air contaminated by the substance. Selenium is an essential dietary element that prevents damage to tissues by oxygen. However, when consumed in amounts higher than the recommended daily allowance, it is toxic to both humans and animals, and excessive ingestion or exposure should be minimized (WQCD 2005).

Any waterbody that is issued an FCA is listed on the state's CWA section 303(d) list of impaired waters with aquatic life impairment. Total maximum daily loads (TMDLs) must be completed for all impairments. Between 1993 and 2010, WQCD issued an FCA for mercury for six waterbodies in the San Juan River Basin (exhibit 9-24). In 2003, Phase 1 of the mercury TMDLs for both the Narraguinnep Reservoir and the McPhee Reservoir were finished and public comments were received. The remaining four TMDLs also remain to be completed (WQCD 2006b, 2010a).

Lake (Segment ID No.)	Pollutant	Species Tested	Year FCA issued	
Echo Canyon Reservoir (COSJSJ06a)	Mercury	Largemouth bass, yellow perch, and black crappie	2007	
Narraguinnep Reservoir (COSJLP11)	Mercury	Northern pike, walleye, and smallmouth bass	1993	
Navajo Reservoir (COSJSJ08)	Mercury	Northern pike and smallmouth bass	1993	
Totten Lake (COSJLP11)	Mercury	Walleye	2007	
Vallecito Reservoir (COSJPN03)	Mercury	Northern pike and walleye	2006	
McPhee Reservoir (COSJDO04b)	Mercury	Smallmouth bass, largemouth bass, black crappie	1993	

#### Exhibit 9-24. San Juan River Basin Lakes and Reservoirs in Which a Fish Consumption Advisory (FCA) Has Been Issued

Sources: WQCC 2010c; WQCD 1993a, 1993b, 1993c, 2006a, 2007a, 2007b, 2010a.

## 9.2.3 Wetlands

A map of San Juan River Basin wetlands is included as exhibit 9-25 (at end of chapter). The wetlands are those included in the U.S. Fish and Wildlife Service's (USFWS's) National Wetlands Inventory, the database the USFWS uses to periodically report to Congress on the status and trends of the nation's wetlands. Colorado's Natural Heritage Program and other entities are involved in more fully identifying and characterizing Colorado's wetlands. This information will be added when completed to future iterations of the SWQMP.

At the state level, the San Juan River Basin lies within an area supported by the Colorado Division of Wildlife's (CDOW's) Southwest Focus Area Committee.<sup>8</sup> The Committee and its partners have undertaken a number of enhancement projects, which are summarized below.

Head Lake Wetland Complex Enhancement Project. This project was completed in January 2010. Current wetland vegetation in the San Luis Lakes State Wildlife Area and in the playas west of Head Lake includes upland shrub complexes interspersed with

<sup>&</sup>lt;sup>8</sup> The CDOW created the Wetlands Wildlife Conservation Program (WWCP) to focus on preserving, restoring, enhancing, and creating wetlands throughout the state. The Program focuses on (1) protecting the role of wetlands in Colorado as important feeding, breeding, migratory, and brooding habitat for water birds, and (2) providing recreational uses, such as hunting, fishing, and bird watching, through wetlands (CDOW 2008). The CDOW has created 11 focus area committees under the WWCP. The committees provide a mechanism through which conservationists can share information on local wetlands, discuss wetland needs, and generate ideas for wetland protection and restoration projects.

sedge, rush, and grass communities. Under the enhancement project, three culverts were replaced with four new box risers upstream of San Luis Lake. The new structures will allow managers to control the timing, frequency, and duration of tailwater flows from Big Springs Creek even during drought periods. The objectives of the project included improved management capabilities, enhancement of native wetland vegetation, better spring and fall waterfowl migration habitat, improvements to wetland vegetation to promote nesting habitat, and more consistently available resources throughout the year for a variety of species. It is expected that this project will ultimately result in enhancement of approximately 877 acres of ephemeral and seasonal wetlands within the Head Lake complex. Water management will be focused on maintaining diversity of native wetland vegetation, thereby enhancing foraging, roosting, nesting, and broodrearing habitat for a variety of species (CDOW 2010b).

Stollsteimer Restoration Project Phase II. This project is under way. Funds include \$100,000 to the San Juan Conservation District from the CDOW and \$142,222 from the District and other partners, including the Natural Resources Conservation Service (NRCS) and private landowners. The goal of the Stollsteimer Restoration Project is to improve 339 acres of riparian areas along Stollsteimer Creek and the Piedra River through fencing, native vegetation plantings, and instream rock structures. The project is expected to benefit numerous water birds and waterfowl native to the area (CDOW 2010a).

# 9.2.4 Groundwater

## 9.2.4.1 Interim Narrative Standard

The Interim Narrative Standard found in section 41.5(C)(6)(b)(i) of Regulation No. 41: *The Basic Standards for Groundwater* (5 CCR 1002-41) (WQCC 2009) is applicable to all groundwater for which the WQCC has not already assigned standards, with the exception of those groundwaters where the total dissolved solids are equal to or exceed 10,000 milligrams per liter (mg/L). The Interim Narrative Standard is independent of and in addition to the statewide groundwater standards for radioactive materials and organic pollutants.

Until such time as use classifications and numeric standards are adopted for groundwater on a site-specific basis, the following standards apply for each parameter at whichever of the following levels is the least restrictive:

- Existing ambient quality as of January 31, 1994, or
- That quality which meets the most stringent criteria set forth in tables 1 through 4 of Regulation No. 41: *The Basic Standards for Groundwater*.

The four tables from Regulation No. 41: *The Basic Standards for Groundwater* can be viewed online at <u>http://www.cdphe.state.co.us/regulations/wqccregs</u> for the following classified uses: Table 1: Domestic Water Supply - Human Health Standards; Table 2: Domestic Water Supply - Drinking Water Standards; Table 3: Agricultural Standards; and Table 4: Total Dissolved Solids Water Quality Standards.

## 9.2.4.2 Site-Specific Classifications and Standards

The WQCC has not established any site-specific groundwater classifications for the San Juan River Basin. All groundwater quality standards found in Regulation No. 41: *The Basic Standards for Ground Water* (5 CCR 1002-41) also apply to groundwaters in the San Juan River Basin.

## 9.2.4.3 Groundwater Quality

The Paradox Valley is filled with salt formations, which has raised concerns about salinity loadings to the Dolores River, one of the tributaries in the San Juan River Basin. The Dolores River picks up an estimated 205,000 tons of salt annually as it crosses the Paradox Valley before reaching the mainstem of the Colorado River, primarily from the surfacing of natural brine groundwater. The 1974 Colorado River Basin Salinity Control Act, Public Law 93-320, authorized the construction, operation, and maintenance of works in the Colorado River Basin, including the Dolores River and other tributaries to the Colorado River, to control the salinity of water delivered to Mexico. In the 1980s, construction began on the Paradox Valley Unit (PVU) as part of the Colorado River Basin Salinity Control Project. Because the Dolores River is a main contributor of salt to the Colorado River, the Dolores River is directly affected by the 1974 Colorado River Basin Salinity Control Act. The PVU is located within the San Juan River Basin near Bedrock, Colorado, about 10 miles east of the Colorado-Utah state line and about halfway between Grand Junction and Cortez, Colorado (CWCB 2004). The PVU, which became operational in 1996, is designed to prevent this natural salt load from entering the river and degrading the water quality of the mainstem of the Colorado River. The unit intercepts the brine groundwater before it enters the river and disposes of the brine through deep well injection. Major project facilities include a brine production well field; a brine surface treatment facility; an injection facility; a 15,932 foot deep injection well; and associated roads, pipelines, and electrical facilities. Under normal operation, the PVU averages the injection of about 14 million to 14.5 million gallons of brine per month, resulting in the disposal of about 10.2 to 10.6 thousand tons of salt per month or up to about 128 thousand tons of salt per year (BuRec 2009).

# 9.3 Surface Water Quality Stressors and Sources

This section of the San Juan River Basin Plan summarizes data provided in the 2010 Integrated Report developed by the WQCD and approved by the WQCC. It is important to note that the data on water quality impairments and pollutant sources, as well as segments listed for further monitoring and evaluation, are based on information that is available to WQCD today. Moreover, the data are limited to those parameters for which assessments are performed.

## 9.3.1 Impairments

Exhibits 9-26 and 9-27 (at end of chapter) provide a summary of the impairments for stream and lake/reservoir segments, respectively, in the San Juan River Basin. A map of these impairments is provided as exhibit 9-28 (at end of chapter).

As shown in exhibit 9-26, the WQCD identified four impaired stream segments in the San Juan River Basin during its latest monitoring cycle, which represents 13% and 3% of the total segments and stream miles in the basin, respectively. Three of the four segments are impaired by iron, while one is impaired by copper.

The 2010 Integrated Report identified four lake and reservoir segments as impaired (exhibit 9-27 at end of chapter). These four segments represent 36% of the total assessed lakes and 53% of total assessed lake acres, respectively. Mercury is the cause of all four. Additional segment level detail is provided in exhibits 9-29 and 9-30 (at end of chapter).

## 9.3.2 Segments Listed for Further Monitoring and Evaluation

During each monitoring cycle, the WQCD typically identifies parameters with elevated concentrations in some segments within a basin. The sample results or other factors are such that WQCD is unable to make a determination as to whether the classified use in question is being attained. These segments are subsequently placed on the state's Monitoring and Evaluation (M&E) List. In its latest monitoring cycle, the WQCD identified 8 of the 114 segments (7%) with elevated concentrations of one parameter or more. Cadmium was identified in four segments while iron, sediment, *Escherichia coli* (*E. coli*), manganese, copper, and lead were each identified in one segment. In addition aquatic life use was identified on the M&E List in the Navajo Reservoir (COSJSJ08). See exhibit 9-31 (at end of chapter) for details.

## 9.3.3 Known Sources of Stressors

Exhibit 9-32 provides a synopsis of the identified sources of stressors to the San Juan River Basin based on parameters causing impairments per the 2010 Integrated Report. Note that similar but even more detailed information is provided in exhibits 9-26 through 9-30 (at end of chapter). The San Juan River Basin has a total of 17 impaired waterbody segments that require development of a TMDL. Mercury and iron account for the greatest number of impaired segments with four and three segments, respectively.

Sub-Basin and Watershed	Number of Impaired Segments	Impairment	Number of Affected Segments	Source of Pollutants	Number of Affected Segments	Num Segn Priori Low	ber of Aff nents by 1 ty Develo Status Med	ected IMDL pment High
Mainstem and	7	Mercury	1	Unknown	1	0	0	1
tributaries	/	Subtotal	1	Total No. TMDLs	1	0	0	1
	1	Mercury	1	Unknown	1	0	0	1
Los Pinos River	Ţ	Subtotal	1	Total No. TMDLs	1	0	0	1
	3	Iron	1	Unknown	1	0	0	1
La Plata River, Mancos Biyor, McElmo Crook		Copper	1	Unknown	1	0	0	1
and San Juan River		Mercury	1	Unknown	1	0	0	1
		Subtotal	Iron     1     Unknown       Copper     1     Unknown       Mercury     1     Unknown       Subtotal     3     Total No. TMDLs       Mercury     1     Unknown	Total No. TMDLs	3	0	0	3
Dolores River	2	Mercury	1	Unknown	1	0	0	1
Dolores Rivel		Subtotal	1	Total No. TMDLs	1	0	0	1
Lower Deleres Piver	4	Iron	2	Unknown	2	0	0	2
Lower Dolores Niver		Subtotal	2	Total No. TMDLs	2	0	0	2
Basin-wide Totals								
Con Iven Diven Bosin		Mercury	4	Unknown	4	0	0	4
	17	Iron	3	Unknown	3	0	0	3
San Juan Alver Dasin	17	Copper	1	Unknown	1	0	0	1
		Total	8	Total No. TMDLs	8	0	0	8

<sup>1</sup>The term "waterbodies" is used because the regulations identify some segments as containing streams, lakes, wetlands, or some combination thereof. In other instances, the regulations identify some segments as "lake-only." In this exhibit, all relevant segments are shown.

Sources: WQCC 2010c; WQCD 2010a, appendices A to D.

# 9.4 TMDLs as Water Protection Strategies

## 9.4.1 TMDL Basics

As noted previously in chapter 2, "Water Quality Management and Planning in Colorado," CWA section 303(d) requires states to periodically submit to EPA a list of waterbodies that are impaired, meaning that the segment is not meeting the standards for its assigned use classification. The list of impaired waterbodies is referred to as the CWA section 303(d) list. The WQCD prepares the list in conjunction with its biennial Integrated Reports. The WQCC approves and adopts the list as Regulation No. 93: *Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List* (5 CCR 1002-93) (WQCC 2010c).

TMDLs must be developed for waterbodies on the CWA section 303(d) list. A TMDL is the maximum amount of a pollutant that a waterbody can receive and still maintain water quality standards. The TMDL is the sum of the waste load allocation (WLA), which is the load from point source



discharges; the load allocation (LA), which is the load attributed to natural background and/or nonpoint sources; and a margin of safety (MOS).

An important aspect of the TMDL development process includes the identification of the sources of pollutants causing impairments in the waterbody. Both point sources and nonpoint sources are identified.

# 9.4.2 TMDLs Required to be Developed

Exhibit 9-33 summarizes the number of TMDLs that must be developed based on the waterbodies (streams and lake-only segments) included on the 2010 CWA section 303(d) list, which is also encompassed in the 2010 Integrated Report. The first section of the exhibit shows that a total of 8 impairments occurred in 19 distinct waterbody segments for the basin as a whole. A total of four TMDLs must be developed for mercury (50% of the total). The WQCD has assigned a high priority to developing all eight of the TMDLs (100%).

Total Number Distinct Segment Impaired	Total Affected Number of Distinct Segments		ected Segments	Affected Lake-Only Segments		Impairment	Number of Impaired Segments	Number of Affected Segments and TMDL Priority Status by Pollutant		
	Impaired <sup>1</sup>	No. (n=114)	<b>Miles</b> (n=10,150)	<b>No.</b> (n=11)	<b>Acres</b> (n=15,969)		by Pollutant <sup>1</sup>	Low	Medium	High
	<b>19</b> 15 346				Mercury	4	0	0	4	
			15 346	4	8,387	Iron	3	0	0	3
		15				Copper	1	0	0	1
					Total No. TMDLs to Be Developed	8	0	0	8	
Impaired Segments as Percent of Total Segments and Miles/Acres in Basin		13%	3%	36%	53%	Affected Segments of TMDL Priorit	as Percent y Status	0%	0%	100%

Exhibit 9-33. San Juan River Basin Summary of Impairments, Affected Waterbody Segments, and TMDL Priority Development Status

<sup>1</sup> When the total number of TMDLs to be developed is greater than the total number of distinct segments impaired, it typically means that one or more of the impaired individual segment s is impaired by more than one pollutant. When the total number of TMDLs to be developed is less than the total number of distinct segments impaired, it typically means that one or more individual segments were identified as impaired in a previous CWA section 303(d) listing cycle. However, in the latest monitoring cycle the segments showed that they are not meeting the standard(s) for one or more assigned use classifications. Sources: WQCC 2010c; WQCD 2010a, appendices A to D.

## 9.4.3 TMDLs Completed to Date

During any given assessment cycles segments are likely to be identified as impaired for which a TMDL has already been developed. This indicates that the TMDL has not yet been implemented or the benefits of TMDL implementation have yet to be realized. The previous exhibit identifies segments in these circumstances and the applicable pollutant(s), while also showing newly identified impaired segments.

To date, the WQCD has completed and had approved TMDLs for 13 segments in the San Juan River Basin (exhibit 9-34).

	Segment Data	Was Use Attained in the	Devenuetor
Segment	Description of affected Segment Portion <sup>1</sup>	Latest WQCD Assessment?	Parameter
COSJLP04	Box Canyon Creek	No <sup>2</sup>	Sediment
COSJLP08	Narraguinnepp Reservoir, Mercury TMDL – Phase 1 <sup>3</sup>	No	Mercury
		No	Aluminum
		No	Cadmium
COSJAF02	Animas River and tributaries, Denver Lake to Maggie Gulch	No	Copper
		No	Iron
		No	Lead
		Yes	Aluminum
		Yes	Cadmium
COSJAF03B	Animas River, Cement Creek to Mineral Creek	Yes	Copper
		Yes	Iron
		Yes	Lead
		No	рН
CO514504a	Animas Diver, Mineral Creek to Deer Dark Creek	No	Copper
COSJAF04a	Animas River, Mineral Creek to Deer Park Creek	No	Iron
		No	Zinc
COSJAF04b	Animas River, Deer Park Creek to Bakers Bridge	No	Zinc
		No	Aluminum
		No	Cadmium
COSJAF07	Cement Creek, source to Animas River	No	Copper
		No	Iron
		No	Lead
		No	Aluminum
		No	Cadmium
COSJAF08	Mineral Creek, source to South Mineral Creek	No	Copper
		No	Iron
		No	Lead
		No	рН
COSIAFOOD	Minaral Crook South Minaral Crook to Animas Piver	No	Copper
COSIAFU9D	Wineral Creek, South Wineral Creek to Animas River	No	Iron
		No	Zinc

#### Exhibit 9-34. San Juan River Basin Completed and Approved TMDLs

Segment Data		Was Use Attained in the	Devementer	
Segment	Description of affected Segment Portion <sup>1</sup>	Latest WQCD Assessment?	Parameter	
COSJDO04	McPhee Reservoir, Mercury TMDL – Phase 1 <sup>3</sup>	No	Mercury	
		No	Cadmium	
COSIDO09	Silver Creek from Rico's diversion to Dolores River	Was Use Attained in the Latest WQCD Assessment?         No         No	Zinc	
COGUSM03a	San Miguel River below Idarado	No	Zinc	
		No	Cadmium	
COGUSM03b	San Miguel River, Marshall Creek to South Fork San Miguel River	No	Zinc	
		Latest WQCD Assessment?         No	Sediment	
COGUSM06a	Ingram Creek	No	Zinc	
COGU06b	Marshall Creek	No	Zinc	

<sup>1</sup> Some segment descriptions might not precisely match the descriptions in Regulation No. 34 or 35 because segment descriptions and portions can change during subsequent reviews of the regulation, resulting in the addition of a segment or the splitting of a segment into multiple segments. The description was taken from the TMDL.

<sup>2</sup>Only copper is not listed in appendix A of the 2010 Integrated Report as a cause of impairment.

<sup>3</sup>Phase I of the TMDL was drafted and public comments have been received. To date, the TMDL has not been completed or approved. Sources: WQCC 2010c; WQCD 2002, 2006b, 2008a, 2010a.

# 9.4.4 TMDL Implementation Strategies

Exhibit 9-35 at end of chapter summarizes information in the TMDL reports completed to date.<sup>9</sup> Specifically, it summarizes current and potential future strategies identified in the TMDL reports. The discussion should not be considered to be complete or exhaustive in the sense of strategies that could or should be undertaken in the basin. Moreover, the WQCD recognizes that many other entities have undertaken or are planning activities that will contribute to improvements in water quality in the basin. Finally, WQCD appreciates that the development and implementation of strategies is best undertaken in partnership with local and other stakeholders in the watersheds and basins of issue. Readers interested in understanding the array of potential strategies that could be employed in a watershed should consult chapter 4 of this document, "*Strategies for Addressing Water Quality Problems*" and appendix E.

# 9.5 Planned Point Source Treatment Upgrades

As shown in exhibit 9-36, there are a total of 60 public and private point source dischargers in the San Juan River Basin<sup>10</sup>. The point source dischargers are located in eight counties. The county with the greatest number of point source dischargers is La Plata with 34 (57%), followed by Montezuma with 10 (17%), Archuleta and Montrose with 5 each (8% each), San Miguel with 3 (5%), and Dolores, Mesa, and San Juan with 1 each (2% each).

<sup>&</sup>lt;sup>9</sup> Time and resource constraints prohibited a review of TMDLs beyond those available on WQCD's website at http://www.cdphe.state.co.us/wq/assessment/TMDL/TMDLs.html.

<sup>&</sup>lt;sup>10</sup> Point source dischargers only include those reported in the Clean Watershed Needs Survey 2008 database (USEPA 2010a), the USEPA ECHO database accessed June 24, 2010 (USEPA 2010d), and the Water Pollution Control Revolving Fund annual Intended Use Plan (WQCD 2010b).

Applicable Counties	Number of Point Sources by County
Archuleta	5
Conejos	0
Dolores	1
Hinsdale	0
La Plata	34
Mesa	1
Mineral	0
Montezuma	10
Montrose	5
San Juan	1
San Miguel	3
11	60

#### Exhibit 9-36. San Juan River Basin Summary of Point Sources by County

Sources: USEPA 2010a, 2010c; WQCD 2010b.

Congress authorized the Clean Water State Revolving Fund (CWSRF; called the Water Pollution Control Revolving Fund, or WPCRF, in Colorado) when amending the CWA in 1987. The purpose of the CWSRF is to help provide financial assistance to governmental agencies for the construction of projects that are listed in the state's annual Intended Use Plans (IUPs). The Project Eligibility List included in the IUPs is made up of projects for construction of publicly owned treatment works and projects/activities eligible for assistance under CWA sections 319 and 320. The Colorado IUP Project Eligibility List is comprised of the following six categories: (1) Category 1 includes those projects that improve or benefit public health or that will remediate a public health hazard; (2) Category 2 includes those projects that enable an entity to achieve permit compliance; (3) Category 3 includes those projects that contribute to the prevention of a public health hazard, enable an entity to maintain permit compliance, or enables an entity to address a possible future effluent limit or emerging issue; (4) Category 4 includes those projects that implement a watershed/nonpoint source management plan; (5) Category 5 includes those projects that implement a source water protection plan; and (6) Category 6 includes those projects that sought funding only under the American Recovery and Reinvestment Act of 2009 and that were not already on the state's Project Eligibility List as of January 1, 2009. For the purposes of the SWQMP, projects in categories 1 through 3 were labeled as wastewater treatment facility projects; projects in category 4 were labeled as nonpoint source projects or stormwater projects; and projects in category 5 were labeled as source water protection projects. Finally, projects in category 6 were labeled as wastewater treatment facility, nonpoint source, stormwater, or source water protection depending on the nature of the project (WQCD 2010b).

A total of 30 planned treatment projects have been identified for point source facilities in the San Juan River Basin.<sup>11</sup> Exhibit 9-37 provides a summary of the project types and includes the number of projects, the estimated costs of the projects, and the population expected to benefit.

<sup>&</sup>lt;sup>11</sup> Projects identified include only those on the state's IUP. Therefore, the list is not likely inclusive of all projects that may be occurring in the basin.

The three project types are (1) wastewater treatment facility, (2) nonpoint source, and (3) stormwater. Wastewater treatment facility projects lead the list in terms of the greatest number of scheduled projects (24 of 30, or 80%); nonpoint source projects follow with a total of 5 (17%).

Project Type	Number of Projects	Estimated Cost of Projects <sup>1</sup>	Population Expected to Benefit from Projects	Number of Projects Reporting Population Data
Wastewater Treatment Facility	24	\$85,244,278	89,906	100%
Nonpoint Source	5	\$2,850,000	14,325	100%
Stormwater	1	\$500,000	890	100%
Total All Projects	30	\$88,594,278	105,121	

Exhibit 9-37.	San Juan	<b>River Basin</b>	Summary o	of Scheduled	<b>Point Source</b>	Improvements

<sup>1</sup> Dollar amounts listed are those reported in WPCRF project applications only, as reported in the IUP. They likely are not inclusive of all projects that may be occurring in the basin. Sources: USEPA 2010a, 2010c; WQCD 2010b.

The total estimated cost of the 30 projects in the San Juan River Basin is \$88,594,278. Of this amount, wastewater treatment facility improvements account for 96% or \$85,244,278. This is followed by nonpoint source projects at \$2,850,000 and stormwater projects at \$500,000 (3% and 1%, respectively, of total estimated project costs).

Exhibit 9-38 (at end of chapter) provides additional details. In addition to project information, these exhibits also summarize NPDES permit information. It should be noted that funding gaps exist nationwide in the CWSRF for wastewater treatment projects.<sup>12</sup> Total funding has also not increased significantly under section 319 in spite of nonpoint sources being the leading source of water pollution nationwide.

# 9.6 Nonpoint Source Management

Exhibit 9-39 (at end of chapter) summarizes CWA section 319 nonpoint source grant projects in Colorado for the past 5 years. A total of six projects were identified for the San Juan River Basin. The primary focus of four of the projects was resource extraction or agriculture. The remaining projects focused on hydromodification and stream bank stabilization. The total cumulative budget for the six grant projects was \$928,371. Approximately 60% of this amount (\$552,753) was provided through CWA section 319 grant funds. The remaining portion included funds from other sources and represented the grant recipients' cost-share agreements with the WQCD.

<sup>&</sup>lt;sup>12</sup> It is well recognized that the nation's infrastructure is aging and that the funds to replace this infrastructure are severely lacking. EPA recently completed its 2008 Report to Congress summarizing the results of its Clean Watersheds Needs Survey. The report presents a comprehensive analysis of capital investments necessary to meet the nation's wastewater and stormwater treatment and collection needs over the next 20 years. The report documents a total need of \$299.1 billion as of January 1, 2008. This total includes capital needs for publicly owned wastewater treatment pipes and treatment facilities (\$192.2 billion), combined sewer overflow correction (\$63.6 billion), and stormwater management (\$42.3 billion) (USEPA 2010b).

# References

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### Exhibit 9-15: San Juan River Basin Key Diversions and Streamflow Gauges

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### Exhibit 9-17: San Juan River Basin Classified Waterbody Segments

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