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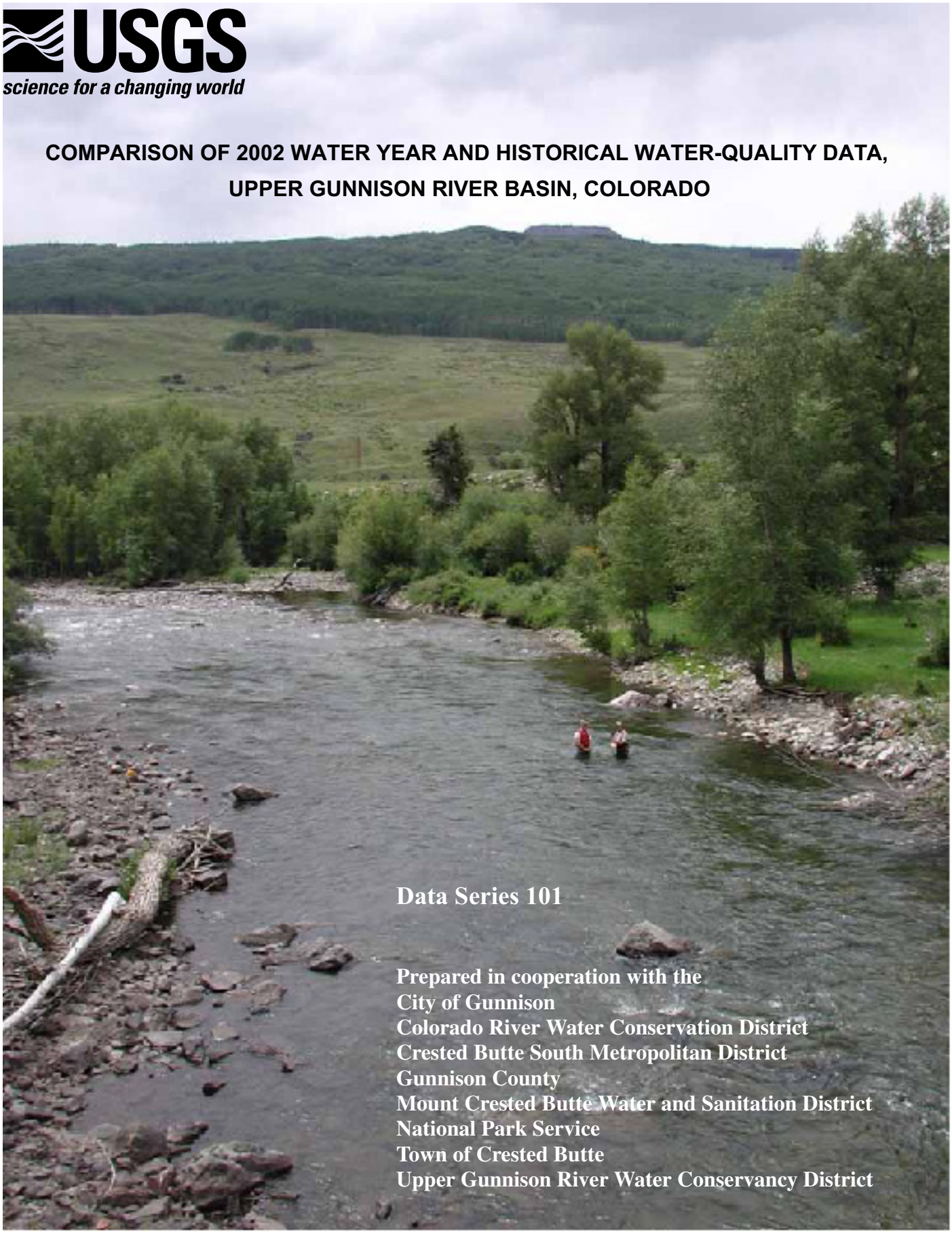
COMPARISON OF 2002 WATER YEAR AND HISTORICAL WATER-QUALITY DATA, UPPER GUNNISON RIVER BASIN, COLORADO



Data Series 101

Prepared in cooperation with the
City of Gunnison
Colorado River Water Conservation District
Crested Butte South Metropolitan District
Gunnison County
Mount Crested Butte Water and Sanitation District
National Park Service
Town of Crested Butte
Upper Gunnison River Water Conservancy District

Comparison of 2002 Water Year and Historical Water-Quality Data, Upper Gunnison River Basin, Colorado

By N.E. Spahr

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U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
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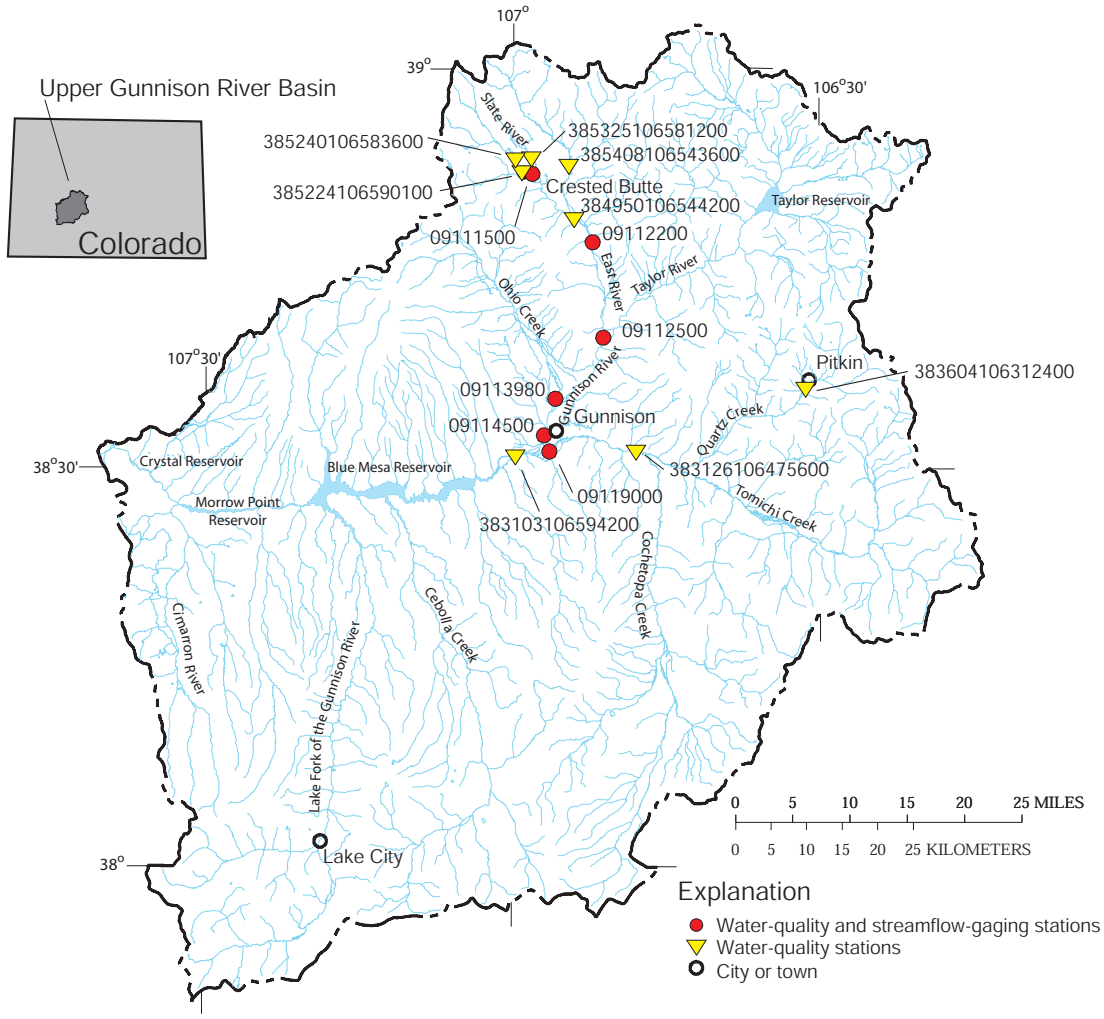
INTRODUCTION

Population growth and changes in land-use practices have the potential to affect water quality and quantity in the upper Gunnison River basin. In 1995, the U.S. Geological Survey (USGS), in cooperation with local sponsors—City of Gunnison, Colorado River Water Conservation District, Crested Butte South Metropolitan District, Gunnison County, Mount Crested Butte Water and Sanitation District, National Park Service, Town of Crested Butte, and Upper Gunnison River Water Conservancy District—established a water-quality monitoring program in the upper Gunnison River basin to characterize current water-quality conditions and to assess the effects of increased urban development and other land-use changes on water quality. The monitoring network has evolved into two groups of stations—stations that are considered as long term and stations that are rotational. The long-term stations are monitored to assist in defining temporal changes in water quality (how conditions have changed over time). The rotational stations are monitored to assist in the spatial definition of water-quality conditions (how conditions differ throughout the basin) and to address local and short term concerns. Another group of stations (rotational group 2) will be chosen and sampled beginning in water year 2004. Annual summaries of the water-quality data from the monitoring network provide a point of reference for discussions regarding water-quality sampling in the upper Gunnison River basin.

This summary includes data collected during water year 2002. The introduction provides a map of the sampling locations, definitions of terms, and a one-page summary of selected water-quality conditions at the network stations. The remainder of the summary is organized around the data collected at individual stations. Data collected during water year 2002 are compared to historical data (data collected for this network since 1995), state water-quality standards, and federal water-quality guidelines. Data were collected during water year 2002 following USGS protocols (U.S. Geological Survey, variously dated).



Long-term stations		Rotating stations, group 1	
Station number	Station name	Station number	Station name
09111500	Slate River near Crested Butte	385240106583600	Slate River above Coal Creek near Crested Butte
09112200	East River below Cement Creek	385224106590100	Coal Creek at mouth near Crested Butte
09112500	East River at Almont	385325106581200	Washington Gulch below Woods Creek at Mount Crested Butte
09113980	Ohio Creek above mouth near Gunnison	385408106543600	East River above Crested Butte
09119000	Tomichi Creek at Gunnison	384950106544200	East River above Slate River near Crested Butte
383103106594200	Gunnison River at County Road 32 below Gunnison	09114500	Gunnison River near Gunnison
		383604106312400	Quartz Creek below Pitkin
		383126106475600	Tomichi Creek below Cochetopa Creek

Figure 1. Location of sampling stations.

DEFINITION OF TERMS

Constituents results for which the State of Colorado has adopted a "chronic instream standard," or in the absence of that, for which the U. S. Environmental Protection Agency (USEPA) has published a "recommended level," are reported in terms of "concern levels" as defined below:

Low Concern: The majority (85th percentile) of samples for a given site are below one-half the instream standard or recommended level. For example, if a constituent had a standard of 200 and the 85th percentile was less than 100 it would be listed as low concern.

Concern: The 85th percentile of the data is between the instream standard and one-half the standard. This means that 15 percent or more of the data for a given site are nearing or are greater the standard.

High Concern: The 85th percentile of the data is above the instream standard or recommended level.

Cannot Classify: The data cannot be placed into one of the three concern levels due to detection limits, no instream standard, or lack of samples.

The geometric mean is used for coliform rather than the 85th percentile.
If a measured constituent is not listed with a concern level, it can be assumed that it is low concern.

The concern levels are consistent with the methods used by the State of Colorado to assess whether stream water-quality standards are being attained. The following is from the Unified Assessment Methodology, Water Quality Control Division, accessed at http://www.cdphe.state.co.us/wq/Assessment/assessment_practices_and_methods.htm:

> "1. Attainment of chronic chemical standards, in both lotic (streams and rivers) and limnic (lakes and reservoirs) systems, is based upon the 85th percentile of the ranked data, except as otherwise noted below. Percentile values are calculated by ranking individual data points in order of magnitude. Hardness based metal standards are evaluated by comparing the 85th percentile against the assigned hardness based equation using either the mean hardness at low flow or, when available, paired hardness and flow data. Total recoverable iron is evaluated against the median value, or the 50th percentile. Dissolved oxygen is evaluated at the 15th percentile. Minima pH is evaluated against the 15th percentile, maxima at the 85th.
>
> 2. Acute standards are evaluated by comparison of raw values against the standard.
>
> 3. Sample data that are below detection limits will, in general, be treated as zeroes for assessment of attainment of chronic standards.
>
> 4. Attainment of coliform standards is assessed using the geometric mean. Notwithstanding the criterion at item 3. above, coliform data which is reported as less than detect will be treated as a value of one to allow calculation of a geometric mean."

State standards for dissolved oxygen are based on minima, and for pH, they are based on a range. The concern levels are defined below:

Dissolved Oxygen Concern Levels:
Low Concern: above 7 mg/L
Concern: between 6 and 7 mg/L
High Concern: below 6 mg/L (below State instream standard)

pH Concern Levels:

Low Concern: between 7 and 8.5
Concern: between 6.5 and 7 or 8.5 and 9.0
High Concern: outside the range of 6.5 - 9.0 (outside of state standards)

Total-Phosphorus Concern Levels are based on the USEPA recommendations of 0.1 milligrams per liter (mg/L) for water not directly flowing into a lake or reservoir.

Hardness definitions (based on Durfor and Besker, 1964, p. 27 as cited in Hem, 1992):

Soft: 0 - 60 mg/L
Moderately Hard: 61- 120 mg/L
Hard: 121 - 180 mg/L
Very Hard: greater than 180 mg/L

HUC-Hydrologic Unit Code-A geographic area representing part of all of a surface drainage basin or distinct hydrologic feature. Each hydrologic unit is identified by an 8-digit number.

Censored value-A value reported as less than a laboratory reporting level, for example <0.05. When a censored value is displayed on a graph the value is plotted at the laboratory reporting level.

Laboratory Reporting Level (LRL) generally is equal to twice the yearly determined long-term method detection level (LT-MDL). The LRL controls false-negative error. The probability of falsely reporting a nondetection for a sample that contained an analyte at a concentration equal to or greater than the LRL is predicted to be less than or equal to 1 percent. The value of the LRL will be reported with a “less than” (<) remark code for samples in which the analyte was not detected. The USGS National Water Quality Laboratory collects quality-control data from selected analytical methods on a continuing basis to determine LT-MDLs and to establish LRLs. These values are reevaluated annually based on the most current quality-control data and therefore may change. (Note: Previously, the LRL has been called the nondetection value or NDV—a term which is no longer used.)

Stream segment (from Colorado Department of Public Health and Environment Water Quality Control Commission Regulation number 31)

> “(a) For purposes of adopting site-specific classifications and water quality standards, the streams and other surface water bodies shall be identified according to river basin and/or subbasin and specific water segments.
>
> (b) Segments may constitute a specified stretch of a river mainstem, a specific tributary, a specific lake or reservoir, or a generally defined grouping of waters within the basin (e.g., a specific mainstem segment and all tributaries flowing into that mainstem segment.
>
> (c) Segments shall generally be delineated according to the points at which the use, physical characteristics or water quality characteristics of a watercourse are determined to change significantly enough to require a change in use classifications and/or water quality standards. In many cases, such transition points can be specifically identified from available water quality data. In other cases, however, the delineation of segments shall be based upon best judgments of where instream changes in uses, physical characteristics or water quality occur, based upon upstream and downstream data.”

Water supply standard refers to waters with a water supply classification, Colorado Department of Public Health and Environment, Water Quality Control Commission Regulation number 31.11 (6).

303 (d): (from Colorado Department of Public Health and Environment, Colorado's Section 303(d) Listing Methodology, September 9, 2003, accessed at http://www.cdphe.state.co.us/op/wqcc/SpecialTopics/303(d)/303dtmdlpro.html)
"Section 303(d) of the federal Clean Water Act requires states to identify waters where effluent limitations mandated by Section 301(b)(1)(A) and Section 301(b)(1)(B) are not stringent enough to attain water quality standards. These waters are compiled into the Section 303(d) list of impaired waters. The Colorado Section 303(d) List identifies those water bodies, which are impaired by one or more pollutants."

Dissolved and total: Constituent concentrations listed in the accompanying figures and tables refer to dissolved concentrations unless specifically stated otherwise.

Table 1. Summary of individual station results

[Alk, Alkalinity; BOD, Biochemical Oxygen Demand; Ca, Calcium; Cd, Cadmium; Cl, chloride; Conductance, specific conductance; Cu, Copper; DO, Dissolved Oxygen; *E. Coli*, *Escherichia Coli*; Fe, iron; Mg, magnesium; Mn, Manganese; Ortho, Orthophosphate; SO_4, sulfate; Zn, Zinc]

Station name and number from figure 1	Nutrients[1]	Metals / Trace Elements	pH, Dissolved Oxygen	BOD	*E. Coli*.	Trend
Slate River above Coal Creek near Crested Butte 385240106583600	Low Concern	Low Concern	Low Concern	No Data	Low Concern	Conductance, calcium, magnesium: None DO, pH, Nitrite + Nitrate: Down
Coal Creek at mouth near Crested Butte 385224106590100	Low Concern	High Concern: Cd, Al Concern: Cu, Zn	Low Concern	No Data	Low Concern	Insufficient Data
Washington Gulch below Woods Creek at Mount Crested Butte 385325106581200	High Concern: Total Phosphorus Concern: Nitrate	No Data	Low Concern	No Data	Low Concern	Insufficient Data
Slate River near Crested Butte 09115500	Concern: Total Phosphorus	Concern: Zn and Mn if water-supply standard used	Low Concern	Low Concern	Low Concern	pH, Ammonia, Ammonia + organic, dissolved Phosphorus, Ortho: None DO, nitrite + nitrate: Down Total Phosphorus and conductance: Up
East River above Crested Butte 385408106543600	Low Concern	No Data	Low Concern	No Data	Low Concern	pH, Conductance: None Nitrite + Nitrate, DO: Down
East River above Slate River near Crested Butte 384950106544200	Low Concern	No Data	Low Concern	Low Concern	Low Concern	DO, pH, Conductance: None Nitrite + Nitrate: Down
East River below Cement Creek 09112200	Low Concern	No data in water year 02	Low Concern	No Data	Low Concern	DO, pH, Conductance, Sediment, Alk, SO_4: None Nitrite + Nitrate: Down Cl: Up
East River at Almont 09112500	Low Concern	No Data	Low Concern	Low Concern	Low Concern	pH: None; DO, Nitrite + nitrate: Down Conductance: Up
Ohio Creek above mouth near Gunnison 09113980	High Concern: Total Phosphorus	No Data	Low Concern	Low Concern	Low Concern	pH, Conductance, Ortho, Total Phosphorus: None DO: Down
Gunnison River at Gunnison 09114500	Low Concern	No Data	Low Concern	Low Concern	Low Concern	pH, BOD: None DO: down; Conductance: Up
Quartz Creek below Pitkin 383604106312400	Low Concern	Low Concern	Low Concern	Low Concern	Low Concern	Insufficient Data
Tomichi Creek below Cochetopa Creek 383126106475600	Concern: Total Phosphorus	Low Concern	Low Concern	Low Concern	Low Concern	Insufficient Data
Tomichi Creek at Gunnison 09119000	Concern: Total Phosphorus	Concern : Mn if water-supply standard used	Low Concern	Low Concern	Low Concern	pH, Conductance, Phosphorus, Ortho, Total Phosphorus: None; DO: Down
Gunnison River at County Road 32 below Gunnison 383103106594200	Concern: Total Phosphorus	Low Concern	Low Concern	Low Concern	Low Concern	DO, pH, Total Phosphorus, Fe, Mn,: None Conductance, hardness, Ca, Mg: Up

[1]Toal phosphorus concern levels are based on the USEPA recommendations of 0.1 milligrams per liter (mg/L) for water not directly flowing into a lake or reservoir.

385240106583600 SLATE RIVER ABOVE COAL CREEK, NEAR CRESTED BUTTE, CO

Current Reason for Inclusion: This station identifies water quality upstream from Crested Butte and is part of Rotation Group 1.
Historic Reasons for Inclusion: This station marks the beginning of the segment on the 303(d) list for 1998 and proposed for 2000. The station also identifies water quality upstream from Crested Butte.

General Station Information:
Location: 2.9 mi upstream from confluence with Coal Creek.

Station Type: USGS water quality

Latitude: 385240 Drainage Area: 33.1 mi^2 HUC: 14020001
Longitude: 1065836 Stream Segment: 7

USGS Data Summary:
Period of Record: water quality: April 1995 -September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Soft
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: Low Concern

Other constituents of concern: None

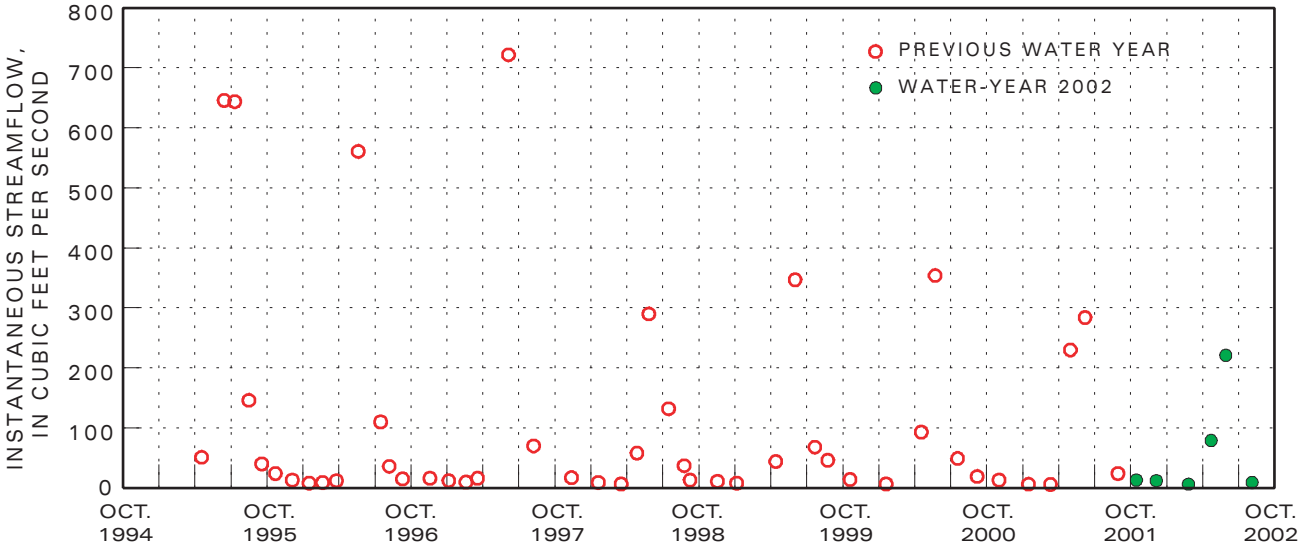


Figure 2. Time distribution and streamflow of water-quality samples for Slate River above Coal Creek near Crested Butte.

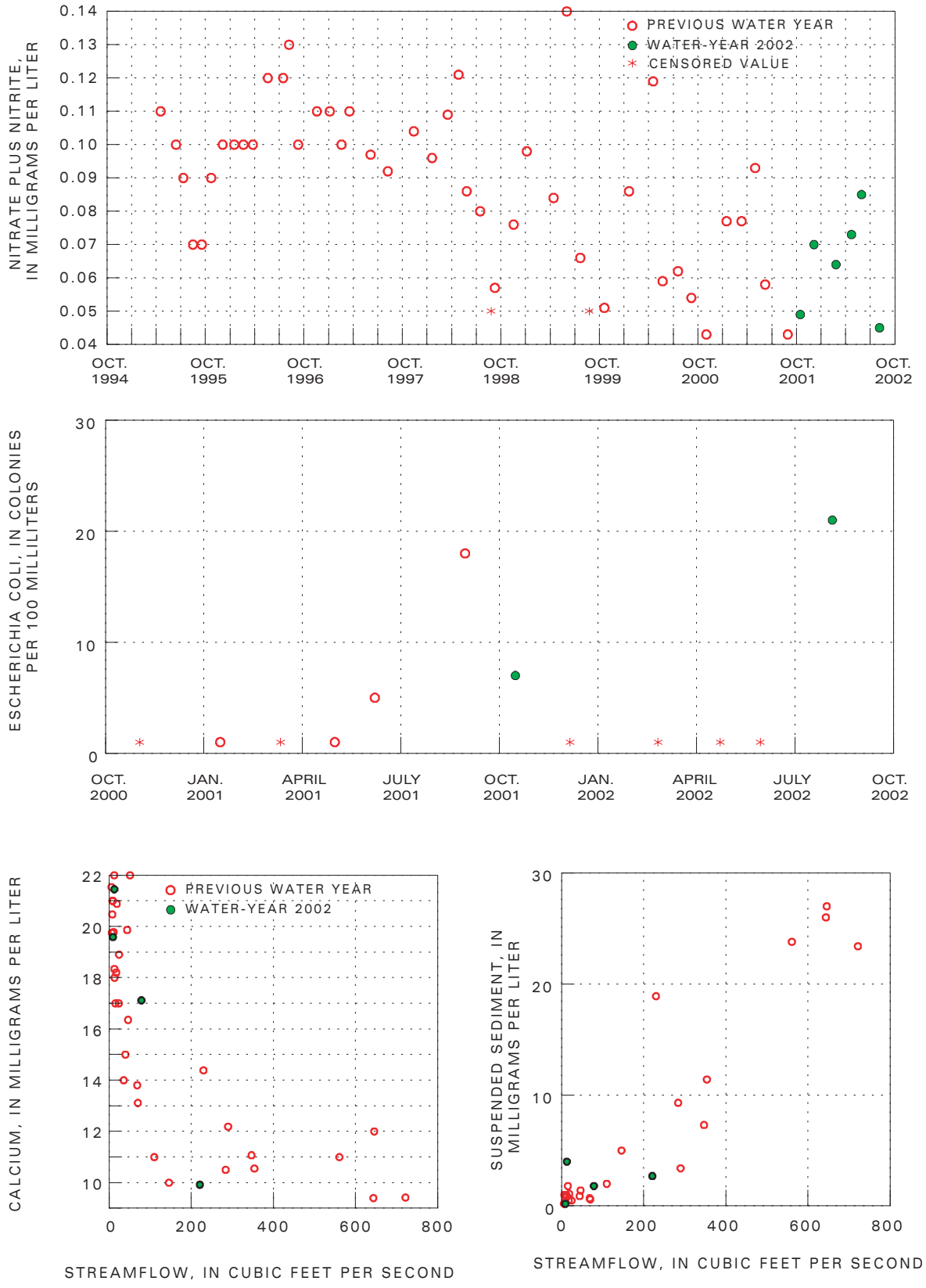


Figure 3. Distribution of selected water-quality constituents relative to time and streamflow for Slate River above Coal Creek near Crested Butte.

Table 2. Summary of measured constituents and properties for Slate River above Coal Creek near Crested Butte station 385240106583600

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	8.6	9.2	4/23/02	9.3	6	0	down	Minimum = 6.1 mg/L 15th percentile = 7.4
		1995-2001	46	0	8.6	10.6	3/26/96			0		
pH	Standard units	2002	6	0	7.4	7.7	5/30/02	7.8	6.5-9	0	down	Minimum = 7.0 15th percentile = 7.4
		1995-2001	46	0	7.6	8.2	8/7/96			0		
Specific conductance	µS/cm	2002	6	0	136	141	10/16/01	141	none	N/A	none	
		1995-2001	46	0	122	158	4/18/95			N/A		
Temperature	°C	2002	6	0	2.6	14.9	8/5/02	10.4	20	0	N/A	
		1995-2001	46	0	4.7	16.7	8/24/99			0		
Hardness (computed)	mg/L as $CaCO_3$	2002	4	0	54	64	10/16/01	64	none	N/A	(5)	
		1995-2001	32	0	50	67	4/18/95			N/A		
Calcium	mg/L	2002	4	0	18.4	21.5	10/16/01	21	none	N/A	none	
		1995-2001	32	0	16.7	22.0	[4]3/26/96			N/A		
Magnesium	mg/L	2002	4	0	2.06	2.44	10/16/01	2.62	none	N/A	none	
		1995-2001	32	0	1.91	3.00	4/18/95			N/A		
Ammonia	mg/L	2002	6	6	0	(5)	--	0.02	none	N/A	(5)	current LRL = 0.015
		1995-2001	46	29	0	0.07	5/27/98			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	6	0	(5)	--	0.00007	0.02	0	(5)	
		1995-2001	46	29	0	0.00079	5/27/98			0		
Ammonia plus organic nitrogen	mg/L	2002	6	5	0	0.07	4/23/02	0	none	N/A	(5)	current LRL = 0.1
		1995-2001	46	40	0	0.12	4/18/00			N/A		

Table 2. Summary of measured constituents and properties for Slate River above Coal Creek near Crested Butte station 385240106583600 —Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Ammonia plus organic nitrogen, total	mg/L	2002	6	4	0	0.07	[4]4/23/02	008	none	N/A	(5)	current LRL = 0.1
		1995-2001	46	32	0	0.2	5/1/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	0	0.07	0.08	5/30/02	0.11	[6]10	0	down	
		1995-2001	46	2	0.09	0.14	6/2/99			0		
Nitrite	mg/L	2002	6	6	0	(5)	--	0	0.05	0	(5)	current LRL = 0.002
		1995-2001	46	39	0	0.015	5/27/98			0		
Phosphorus	mg/L	2002	6	6	0	(5)	--	0.001	none	N/A	(5)	current LRL = 0.004
		1995-2001	46	38	0	0.02	[4]3/26/96			N/A		
Orthophosphate	mg/L	2002	6	6	0	(5)	--	0.005	none	N/A	(5)	current LRL = 0.007
		1995-2001	46	36	0	0.02	9/18/95			N/A		
Phosphorus, total	mg/L	2002	6	3	0.001	0.009	5/30/02	0.012	0.1	0	(5)	current LRL = 0.004
		1995-2001	46	32	0	0.03	9/18/95			0		
Aluminum	µg/L	2002	4	2	5	19	5/30/02	20	87 (ch)	0	(5)	current LRL = 15
		1995-2001	21	10	9	60	7/11/95			0		
Cadmium	µg/L	2002	4	0	0.2	0.4	5/30/02	0.3	1.5 (ch)	0	(5)	
		1995-2001	21	15	0	0.4	8/30/01			0		
Copper	µg/L	2002	4	1	0.7	1.1	5/30/02	1.3	5.6 (ch)	0	(5)	current LRL = 1
		1995-2001	21	12	0	2	7/11/95			0		
Iron	µg/L	2002	4	0	15	17	8/5/02	35	300	0	(5)	
		1995-2001	19	1	17	69	4/18/95			0		

Table 2. Summary of measured constituents and properties for Slate River above Coal Creek near Crested Butte station 385240106583600 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Lead	μg/L	2002	4	2	0.4	1.3	8/5/02	1.0	1.4 (ch)	0	(5)	current LRL = 1
		1995-2001	21	16	0	1.0	[4]7/11/95			0		
Manganese	μg/L	2002	4	0	7.8	8.3	5/30/01	12.0	50	0	(5)	
		1995-2001	19	0	9.2	39	4/18/95			0		
Silver	μg/L	2002	4	4	0	(5)	--	0	0.12 (ch)	0	(5)	current LRL = 0.1
		1995-2001	12	12	0	(5)	--			0		
Zinc	μg/L	2002	4	1	31	40	5/3/02	40	74	0	(5)	current LRL = 24
		1995-2001	21	1	28	49	6/7/01			0		
Suspended sediment	mg/L	2002	4	0	2.2	4	10/16/01	19	none	N/A	(5)	
		1995-2001	24	0	1.6	27	6/14/95			N/A		
Turbidity	NTU	2002	3	0	1.7	4.8	8/5/02	4.8	none	N/A	(5)	
		2001	4	0	3.1	41	5/1/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	6	4	1	21	8/5/02	18	126	0	(5)	Geometric mean = 2.2
		2001	6	2	1	18	8/30/01			0		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

385224106590100 COAL CREEK AT MOUTH NEAR CRESTED BUTTE, CO

Current Reason for Inclusion: Rotational Group 1

General Station Information:
Location: Pedestrian bridge on Butte Avenue, Crested Butte

Station Type: USGS water quality

Latitude: 385224 Drainage Area: Not determined HUC: 14020001
Longitude: 1065901 Stream Segment: 12

USGS Data Summary:
Period of Record: water quality: November 2000 - September 2002

General Chemistry: Water type: Insufficient major-ion data
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: High Concern: Cadmium and aluminum (based on limited data)
Concern: Copper, and Zinc

Other constituents of concern: None

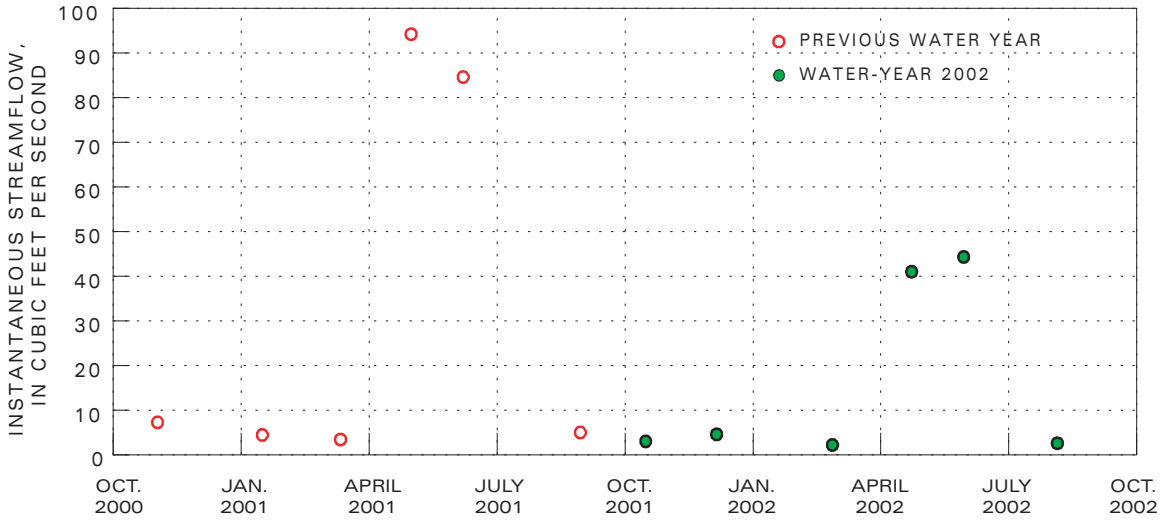


Figure 4. Time distribution and streamflow of water-quality samples for Coal Creek at mouth near Crested Butte.

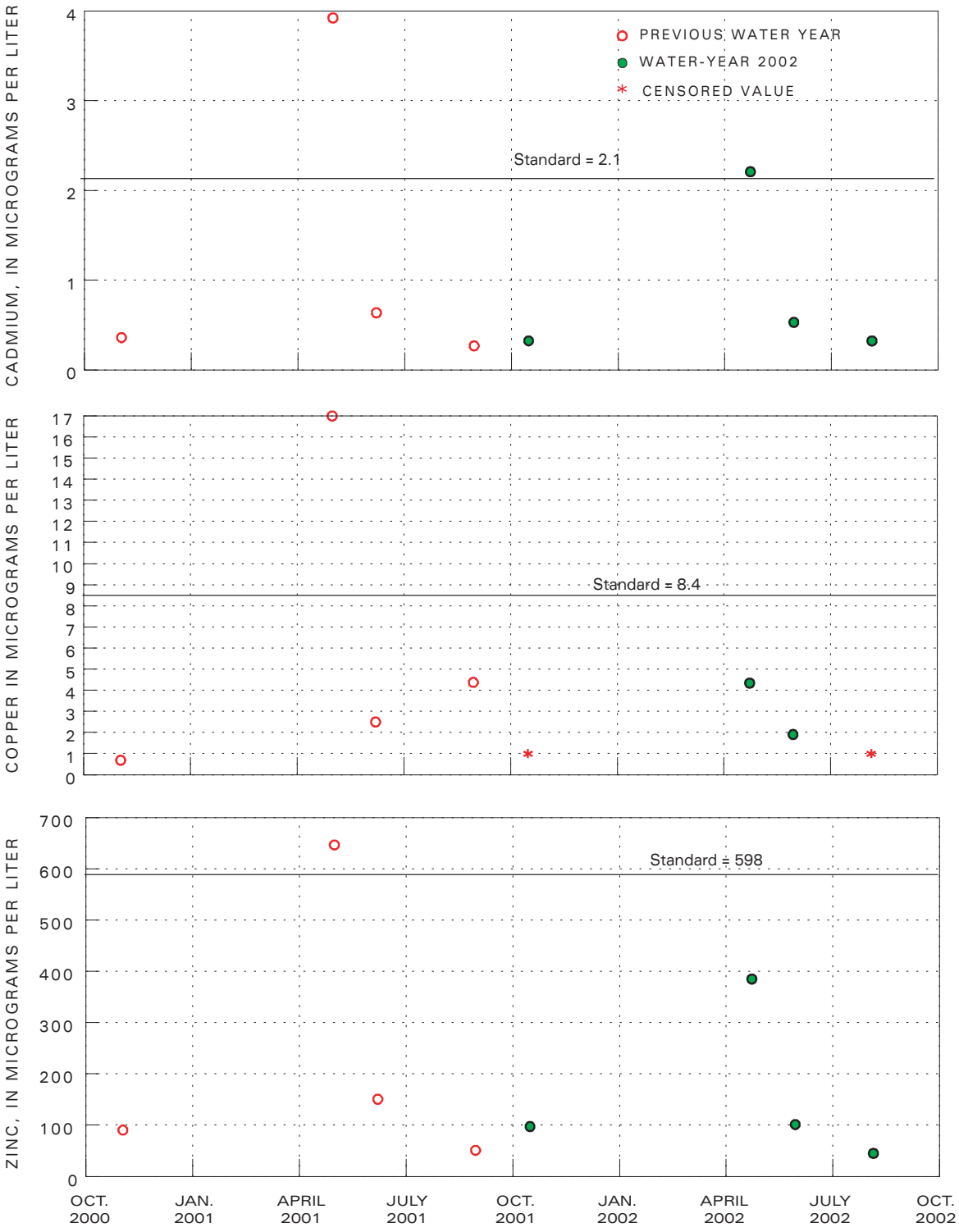


Figure 5. Distribution of selected water-quality constituents relative to time for Coal Creek at mouth near Crested Butte.

Table 3. Summary of measured constituents and properties for Coal Creek at mouth near Crested Butte station 385224106590100

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percen-tile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	9.4	10.3	2/26/02	10.2	6	0	(5)	Minimum = 7.1 mg/L 15th percentile = 7.7
		2001	6	0	9.6	10.2	1/16/01			0		
pH	Standard units	2002	6	0	7.7	8.2	8/5/02	8.0	6.5-9	0	(5)	Minimum = 7.4 15th percentile = 7.5
		2001	6	0	7.7	8.0	11/2/00			0		
Specific conductance	µS/cm	2002	6	0	204	328	8/5/02	294	none	N/A	(5)	
		2001	6	0	192	294	3/12/01			N/A		
Temperature	°C	2002	6	0	3.6	16.3	8/5/02	11.5	20	0	N/A	
		2001	6	0	2.6	11.0	8/30/01			0		
Hardness (computed)	mg/L as $CaCO_3$	2002	4	0	78	129	8/5/02	107	none	N/A	(5)	
		2001	4	0	56	79	11/2/00			N/A		
Calcium	mg/L	2002	4	0	26.5	43.6	8/5/02	35.8	none	N/A	(5)	
		2001	4	0	18.3	25.9	11/2/00			N/A		
Magnesium	mg/L	2002	4	0	2.93	4.79	8/5/02	4.20	none	N/A	(5)	
		2001	4	0	2.38	3.53	11/2/00			N/A		
Ammonia	mg/L	2002	6	6	0.00	(5)	--	0.007	none	N/A	(5)	current LRL = 0.015
		2001	6	2	0.004	0.008	5/1/01			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	6	0	(5)	--	0.00002	0.02	0	(5)	
		2001	6	2	0.00002	0.00011	8/30/01			0		

Table 3. Summary of measured constituents and properties for Coal Creek at mouth near Crested Butte station 385224106590100 —Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Ammonia plus organic nitrogen	mg/L	2002	6	1	0.06	0.13	4/23/02	0.12	none	N/A	(5)	current LRL = 0.1
		2001	6	2	0.07	0.12	5/1/01			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	1	0.09	0.14	4/23/02	0.14	none	N/A	(5)	current LRL = 0.1
		2001	6	1	0.09	0.16	5/1/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	0	0.03	0.06	2/26/02	0.06	[6]100	0	(5)	
		2001	6	0	0.04	0.10	5/1/01			0		
Nitrite	mg/L	2002	6	5	0	0.002	12/6/01	0.001	0.05	0	(5)	current LRL = 0.002
		2001	6	5	0	0.001	5/1/01			0		
Phosphorus	mg/L	2002	6	5	0	0.003	5/30/02	0.003	none	N/A	(5)	current LRL = 0.004
		2001	6	4	0	0.004	3/12/01			N/A		
Orthophosphate	mg/L	2002	6	6	0	(5)	--	0	none	N/A	(5)	current LRL = 0.007
		2001	6	6	0	(5)	--			N/A		
Phosphorus, total	mg/L	2002	6	3	0.003	0.011	4/23/02	0.012	0.1	0	(5)	current LRL = 0.004
		2001	6	0	0.005	0.021	5/1/01			0		
Aluminum	µg/L	2002	4	0	36	117	4/23/02	117	87 (ch)	1	(5)	current LRL = 15 High concern, but limited data
		2001	4	0	54	241	5/1/01			1		
Cadmium	µg/L	2002	4	0	0.4	2.2	4/23/02	2.2	2.1 (ch)	1	(5)	High concern, but number of samples is limited
		2001	4	0	0.5	3.9	5/1/01			1		
Copper	µg/L	2002	4	2	0.9	4.3	4/23/02	4.4	8.4 (ch)	0	(5)	Concern, but limited number of samples
		2001	4	0	3.4	17.0	5/1/01			1		

Table 3. Summary of measured constituents and properties for Coal Creek at mouth near Crested Butte station 385224106590100 —Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Iron	µg/L	2002	4	0	18	39	5/30/02	39	none	N/A	(5)	Reach not lised as water supply so no dissolved iron standard
		2001	4	0	31	70	5/1/01			N/A		
Lead	µg/L	2002	4	4	0	(5)	8/5/02	0.6	2.3(ch)	0	(5)	current LRL = 1
		2001	4	2	0.3	0.9	6/7/01			0		
Manganese	µg/L	2002	4	0	35.3	128	4/23/02	128	1610	0	(5)	
		2001	4	0	45.0	273	5/1/01			0		
Silver	µg/L	2002	4	3	0	0.06	4/23/02	0	0.28 (ch)	0	(5)	current LRL = 0.1
		2001	4	4	0	(5)	--			0		
Zinc	µg/L	2002	4	0	99	385	4/23/02	385	598	0	(5)	Concern Temporary modification for Zn standard
		2001	4	0	121	647	5/1/01			1		
Suspended sediment	mg/L	2002	4	0	2.1	5.2	10/16/01	5.2	none	N/A	(5)	
		2001	4	0	2.0	12	5/1/01			N/A		
Turbidity	NTU	2002	3	0	4.0	5.3	8/5/02	5.4	none	N/A	(5)	
		2001	4	0	2.8	43	5/1/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	6	2	1	12	8/5/02	7	126	0	(5)	Geometric mean = 1.8
		2001	6	2	1	6	8/30/01			0		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

385325106581200 WASHINGTON GULCH BELOW WOODS CREEK AT MOUNT CRESTED BUTTE,CO

Current Reason for Inclusion: To characterize nutrient concentrations. Rotational Group 1.

General Station Information:
Location: 50 feet below confluence with Woods Creek

Station Type: USGS water quality

Latitude: 385325 Drainage Area: Not determined HUC: 14020001
Longitude: 1065812 Stream Segment: 9

USGS Data Summary:

Period of Record: water quality: November 2000 - September 2002

General Chemistry: Water type: No major ion data
Hardness: No major ion data
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: High Concern: Total phosphorus
Concern: Nitrate

Trace Elements/Metals: No data

Other constituents of concern: None

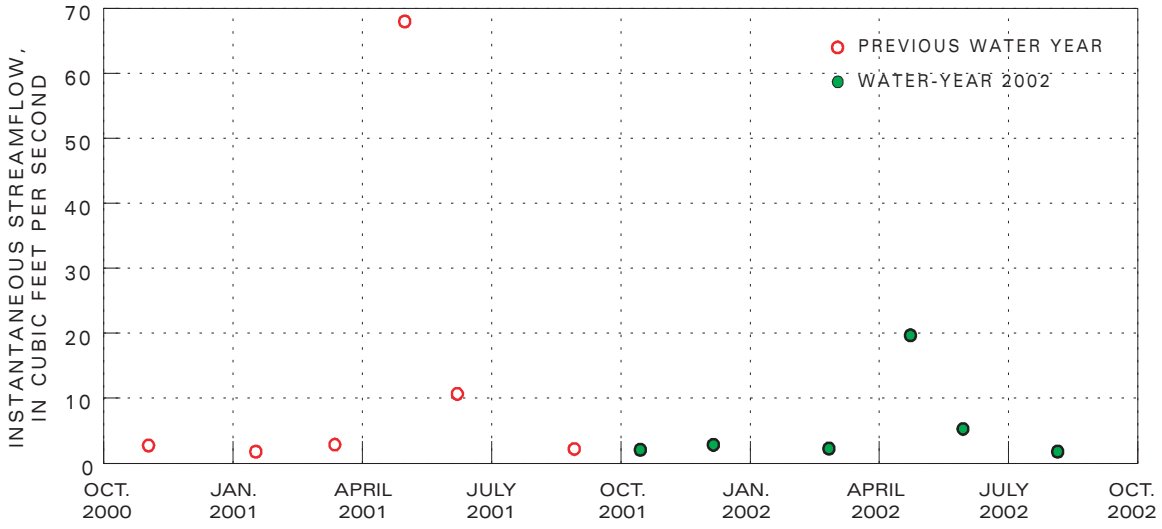


Figure 6. Time distribution and streamflow of water-quality samples for Washington Gulch below Woods Creek at Mount Crested Butte.

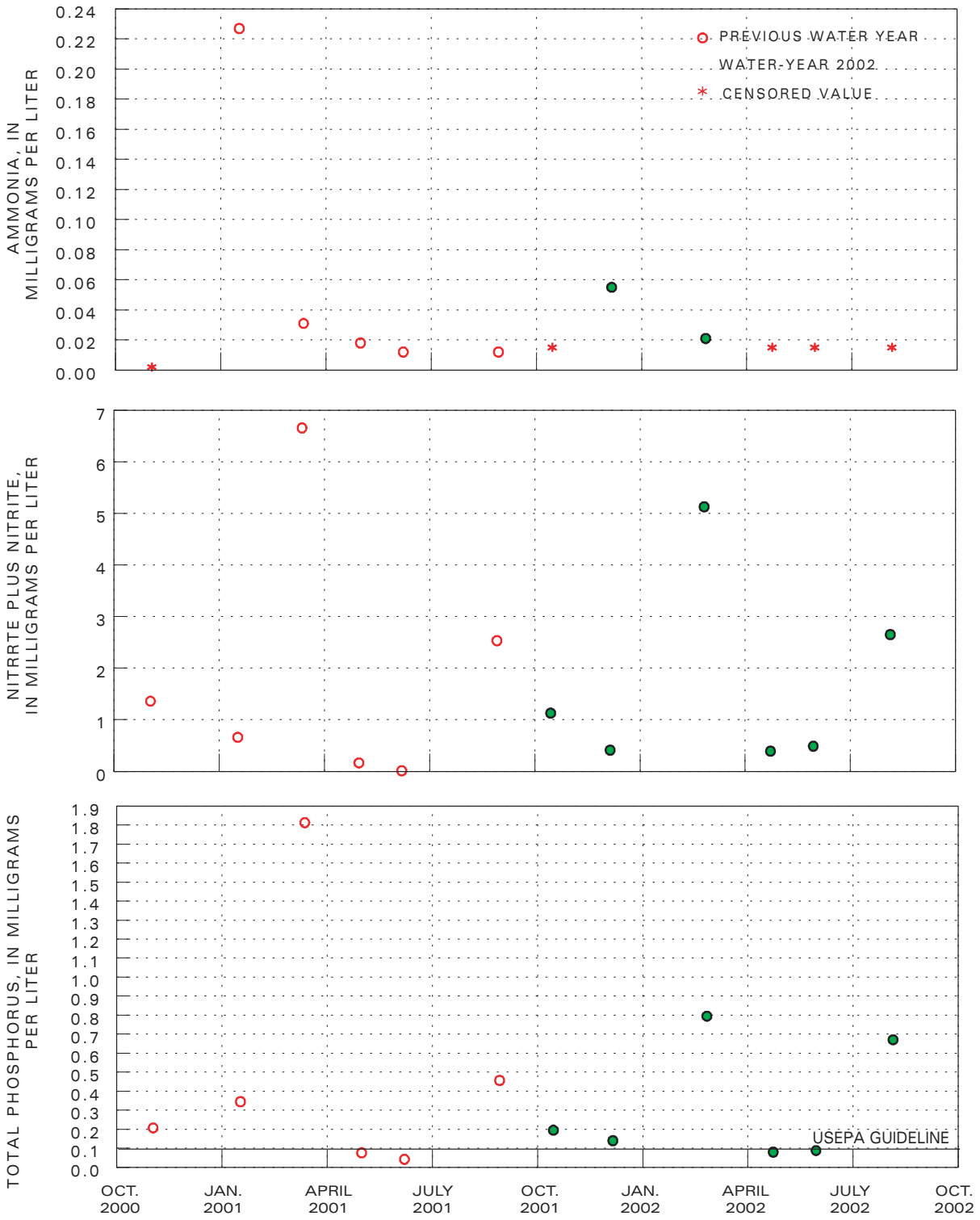


Figure 7. Distribution of selected water-quality constituents relative to time for Washington Gulch below Woods Creek at Mount Crested Butte.

Table 4. Summary of measured constituents and properties for Washington Gulch below Woods Creek at Mount Crested Butte station 385325106581200

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	8.8	9.8	[4]12/6/01	9.8	6	0	(5)	Minimum = 6.1 mg/L 15th percentile = 7.0
		2001	6	0	8.4	10.2	1/17/01			0		
pH	Standard units	2002	6	0	8.1	8.3	8/5/02	8.3	6.5-9	0	(5)	Minimum = 7.7 15th percentile = 7.8
		2001	6	0	8.0	8.4	11/2/00			0		
Specific conductance	µS/cm	2002	6	0	233	285	2/25/02	285	none	N/A	(5)	
		2001	6	0	245	361	3/13/01			N/A		
Temperature	°C	2002	6	0	6.2	18.0	8/5/02	17.1	20	0	N/A	
		2001	6	0	7.4	17.1	6/7/01			0		
Ammonia	mg/L	2002	6	4	0.00	0.055	12/6/01	0.055	none	N/A	(5)	current LRL = 0.015
		2001	6	1	0.015	0.227	1/17/01			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	4	0	0.0006	12/6/01	0.0006	0.02	0	(5)	
		2001	6	1	0.0031	0.0022	1/17/01			0		
Ammonia plus organic nitrogen	mg/L	2002	6	0	0.24	0.38	2/25/02	0.48	none	N/A	(5)	
		2001	6	0	0.28	0.48	3/13/01			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	0	0.37	0.48	8/5/02	0.68	none	N/A	(5)	
		2001	6	0	0.42	2.48	3/13/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	0	0.81	5.13	2/25/02	5.13	[6]10	0	(5)	Concern
		2001	6	0	1.01	6.66	3/13/01			0		
Nitrite	mg/L	2002	6	0	0.008	0.021	8/5/02	0.021	0.05	0	(5)	
		2001	6	0	0.003	0.033	1/17/01			0		

Table 4. Summary of measured constituents and properties for Washington Gulch below Woods Creek at Mount Crested Butte station 385325106581200 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Phosphorus	mg/L	2002	6	0	0.14	0.81	2/25/02	0.81	none	N/A	(5)	
		2001	6	0	0.22	1.34	3/13/01			N/A		
Orthophosphate	mg/L	2002	6	0	0.14	0.74	2/25/02	0.74	none	N/A	(5)	
		2001	6	0	0.23	1.14	3/13/01			N/A		
Phosphorus, total	mg/L	2002	6	0	0.17	0.80	2/25/02	0.80	0.1	4	(5)	High concern
		2001	6	0	0.28	1.81	3/13/01			4		
Escherichia Coli	Colonies per 100 mL	2002	6	2	26	800	8/5/02	800	126	2	(5)	Geometric mean = 36
		2001	6	0	52	1285	3/13/01			2		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

09111500 SLATE RIVER NEAR CRESTED BUTTE, CO

Current Reason for Inclusion: Long-term monitoring. This station identifies water quality downstream from Crested Butte.
Historic Reasons for Inclusion: This station is in the segment on the 303(d) list for 1998 and proposed for 2000. Long-term monitoring. The station also identifies water quality downstream from Crested Butte.

General Station Information:
Location: 400 feet downstream from Washington Gulch (1 mile east of Crested Butte and 6.3 miles upstream from mouth).

Station Type: USGS water quality and streamflow gaging

Latitude: 385211 Drainage Area: 68.9 mi^2 HUC: 14020001
Longitude: 1065808 Stream Segment: 7

USGS Data Summary:
Period of Record: USGS water quality: March 1995 - September 2002
USGS streamflow-gaging: April 1940-September 1951
October 1993-September 2002

General Chemistry: Water type: calcium carbonate
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Concern: Total phosphorus

Trace Elements/Metals: Concern: Zinc
Concern: Manganese if water supply standard used

Other constituents of concern: None

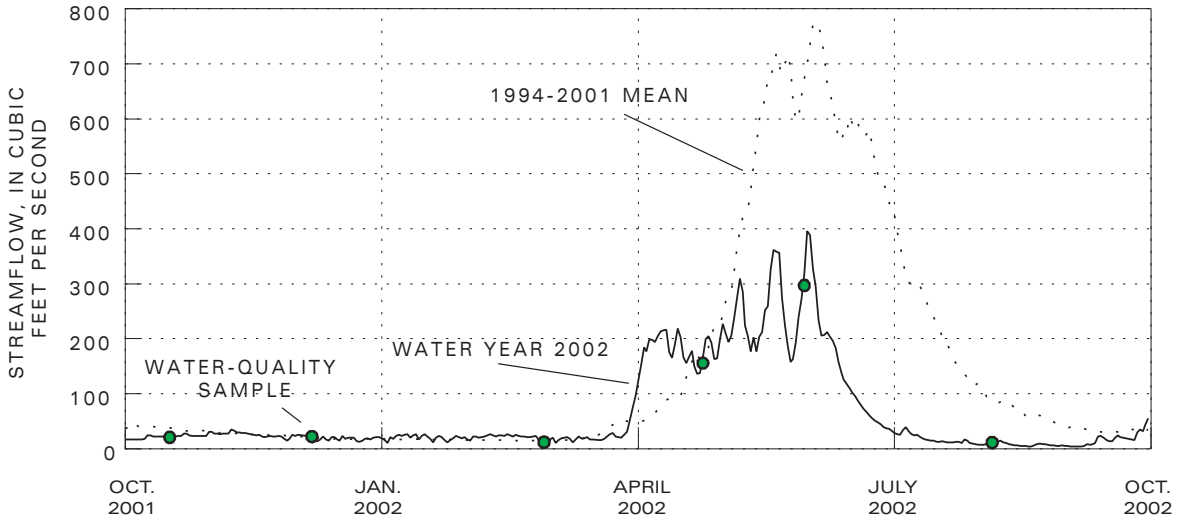


Figure 8. Daily mean streamflow and time distribution of water-quality samples for Slate River near Crested Butte.

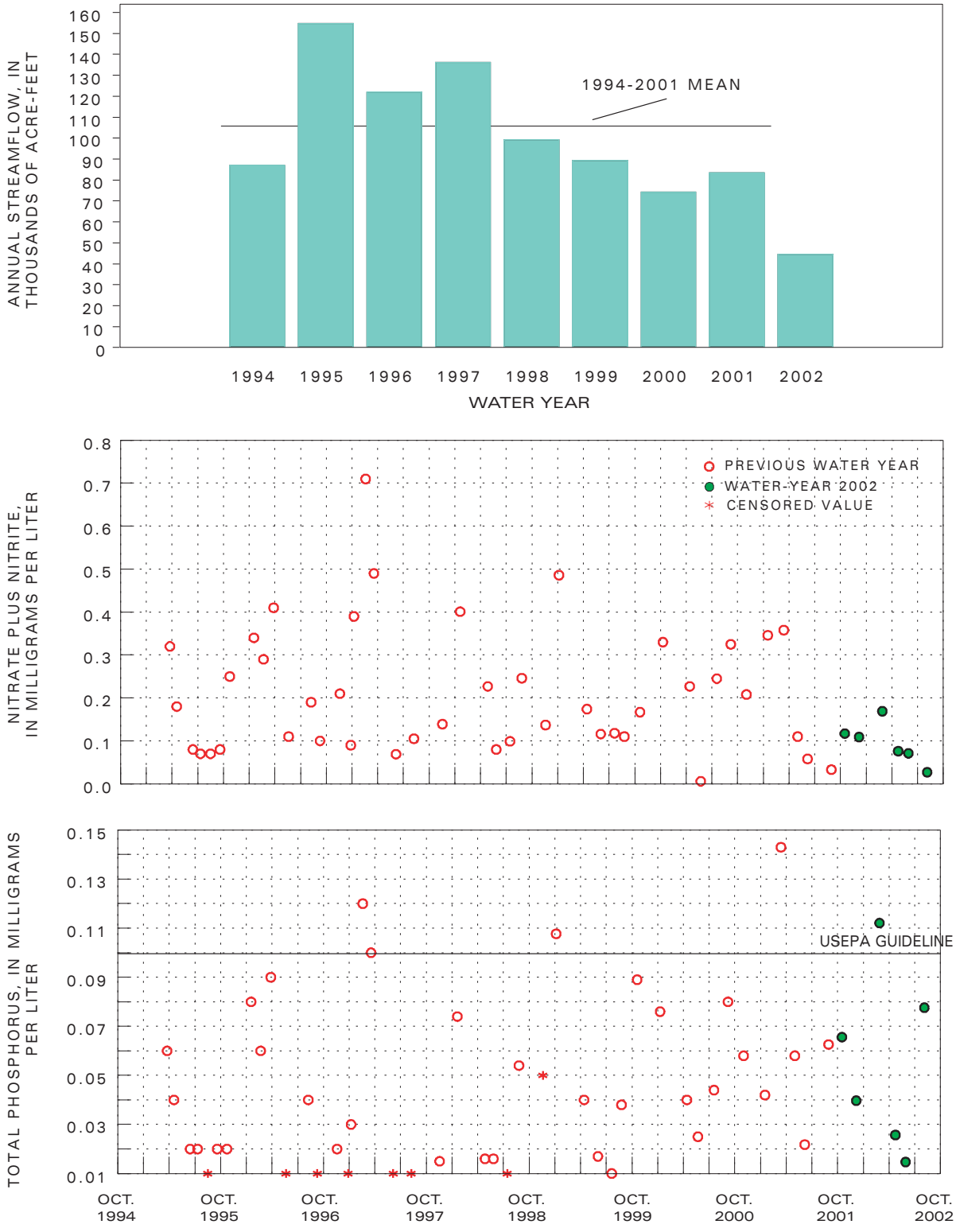


Figure 9. Annual streamflow and distribution of selected water-quality constituents relative to time for Slate River near Crested Butte.

Table 5. Summary of measured constituents and properties for Slate River near Crested Butte site 09111500

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved Oxygen	mg/L	2002	6	0	9.1	9.7	12/7/01	10.0	6	0	down	Minimum = 6.2 mg/L 15th percentile = 7.4
		1995-2001	46	0	9.2	10.6	11/19/96			0		
pH	Standard units	2002	6	0	7.5	8.0	8/5/02	7.9	6.5-9	0	none	Minimum = 7.1 15th percentile = 7.3
		1995-2001	46	0	7.6	8.3	5/20/96			0		
Specific conductance	µS/cm	2002	6	0	186	229	2/27/02	206	none	N/A	up	
		1995-2001	89	0	156	268	3/15/94			N/A		
Temperature	°C	2002	6	0	3.5	18.0	8/5/02	12.2	20	0	N/A	
		1995-2001	89	0	4.4	17.9	8/12/98			0		
Hardness (computed)	mg/L as $CaCO_3$	2002	4	0	65	87	10/17/01	78	none	N/A	(5)	
		1995-2001	27	0	65	87	3/25/95			N/A		
Calcium	mg/L	2002	4	0	21.6	28.6	10/17/01	26.0	none	N/A	(5)	
		1995-2001	27	0	21.1	28.0	3/25/95			N/A		
Magnesium	mg/L	2002	4	0	2.74	3.67	10/17/01	3.67	none	N/A	(5)	
		1995-2001	27	0	2.65	4.20	3/25/95			N/A		
Ammonia	mg/L	2002	6	1	0.128	0.779	2/27/02	0.228	none	N/A	none	current LRL = 0.015
		1995-2001	44	3	0.059	0.480	3/14/01			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	1	0.00037	0.0020	2/27/02	0.0012	0.02	0	(5)	
		1995-2001	44	3	0.00029	0.0037	8/25/99			0		

Table 5. Summary of measured constituents and properties for Slate River near Crested Butte site 09111500—Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Ammonia plus organic nitrogen	mg/L	2002	6	0	0.25	0.98	2/27/02	0.30	none	N/A	none	
		1995-2001	44	21	0.08	0.63	3/14/01			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	0	0.25	0.96	2/27/02	0.33	none	N/A	none	
		1995-2001	44	18	0.13	0.67	3/14/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	0	0.09	0.17	2/27/02	0.35	[6]10	0	down	
		1995-2001	44	0	0.18	0.71	2/18/97			0		
Nitrite	mg/L	2002	6	2	0.002	0.003	10/17/01	0.012	0.05	0	(5)	current LRL = 0.002
		1995-2001	44	22	0.001	0.030	[4]10/24/95			0		
Phosphorus	mg/L	2002	6	0	0.037	0.091	2/27/02	0.075	none	N/A	none	
		1995-2001	44	13	0.018	0.120	2/18/97			N/A		
Orthophosphate	mg/L	2002	6	1	0.031	0.076	2/27/02	0.065	none	N/A	none	current LRL = 0.007
		1995-2001	44	12	0.022	0.110	2/18/97			N/A		
Phosphorus, total	mg/L	2002	6	0	0.053	0.112	2/27/02	0.080	0.1	1	up	Concern
		1995-2001	44	8	0.039	0.143	3/14/01			4		
Aluminum	µg/L	2002	4	1	14	34	4/24/02	25	87 (ch)	0	(5)	current LRL = 15
		1999-2001	12	0	16	65	5/2/01			0		
Cadmium	µg/L	2002	4	0	0.2	0.5	4/24/02	0.5	1.7 (ch)	0	(5)	
		1999-2001	12	5	0.2	1.2	4/14/99			0		
Copper	µg/L	2002	4	1	1.0	2.0	4/24/02	2.0	6.6(ch)	0	(5)	current LRL = 1
		1999-2001	12	5	1.0	4.3	5/201			0		

Table 5. Summary of measured constituents and properties for Slate River near Crested Butte site 09111500—Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Iron	μg/L	2002	4	0	49	78	10/17/01	72	300	N/A	(5)	
		1995-2001	19	0	58	85	11/19/98			N/A		
Lead	μg/L	2002	4	2	0.3	0.6	4/24/02	0.6	1.7(ch)	0	(5)	current LRL = 1
		1999-2001	12	9	0	0.9	11/19/98			0		
Manganese	μg/L	2002	4	0	48	76	8/5/02	76	1466(ch)	0	(5)	water supply standard is 50
		1995-2001	19	0	47	158	4/14/99			0		
Silver	μg/L	2002	4	4	0	(5)	--	0	0.17(ch)	0	(5)	current LRL = 0.1
		1999-2001	12	12	0	(5)	--			0		
Zinc	μg/L	2002	4	0	37	72	4/24/02	72	88	0	(5)	Concern
		1999-2001	12	0	41	455	4/14/99			2		
Suspended sediment	mg/L	2002	4	0	5.0	6.2	5/30/02	8.8	none	N/A	(5)	
		1999-2001	12	0	3.7	53	5/2/01			N/A		
Turbidity	NTU	2002	3	0	2.8	6.6	4/24/02	6.6	none	N/A	(5)	
		2001	4	0	3.2	51	5/2/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	6	0	12	74	2/27/02	74	126	0	(5)	Geometric mean = 12
		2001	6	0	12	127	3/14/01			0		
Biochemical oxygen demand	mg/L	2002	4	0	1.0	2.3	2/27/02	2.3	none	N/A	(5)	
		1997-2001	5	0	0.9	3.0	3/14/01			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

385408106543600 EAST RIVER ABOVE CRESTED BUTTE, CO

Current Reason for Inclusion: Site of the Mount Crested Butte water intake. Rotational group 1.

General Site Information:
Location: 200 feet upstream from confluence with Brush Creek and 4.2 miles northeast of Crested Butte.

Station Type: USGS water quality

Latitude: 385251 Drainage Area: Not determined HUC: 14020001
Longitude: 1065430 Stream Segment: 5

USGS Data Summary:
Period of Record: water quality: April 1995 - September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: Data not collected

Other constituents of concern: None

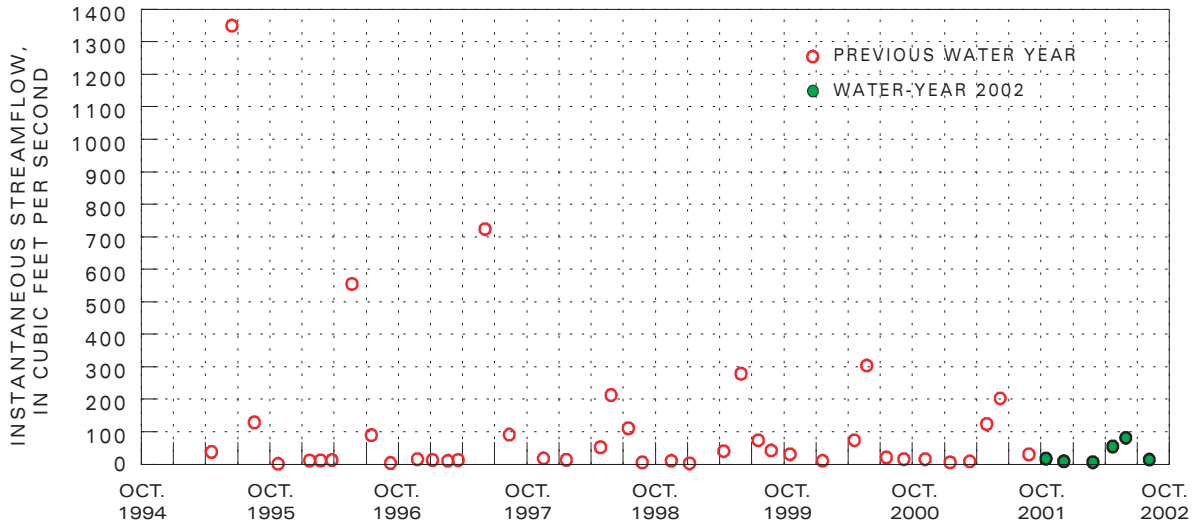


Figure 10. Time distribution and streamflow of water-quality samples for East River above Crested Butte.

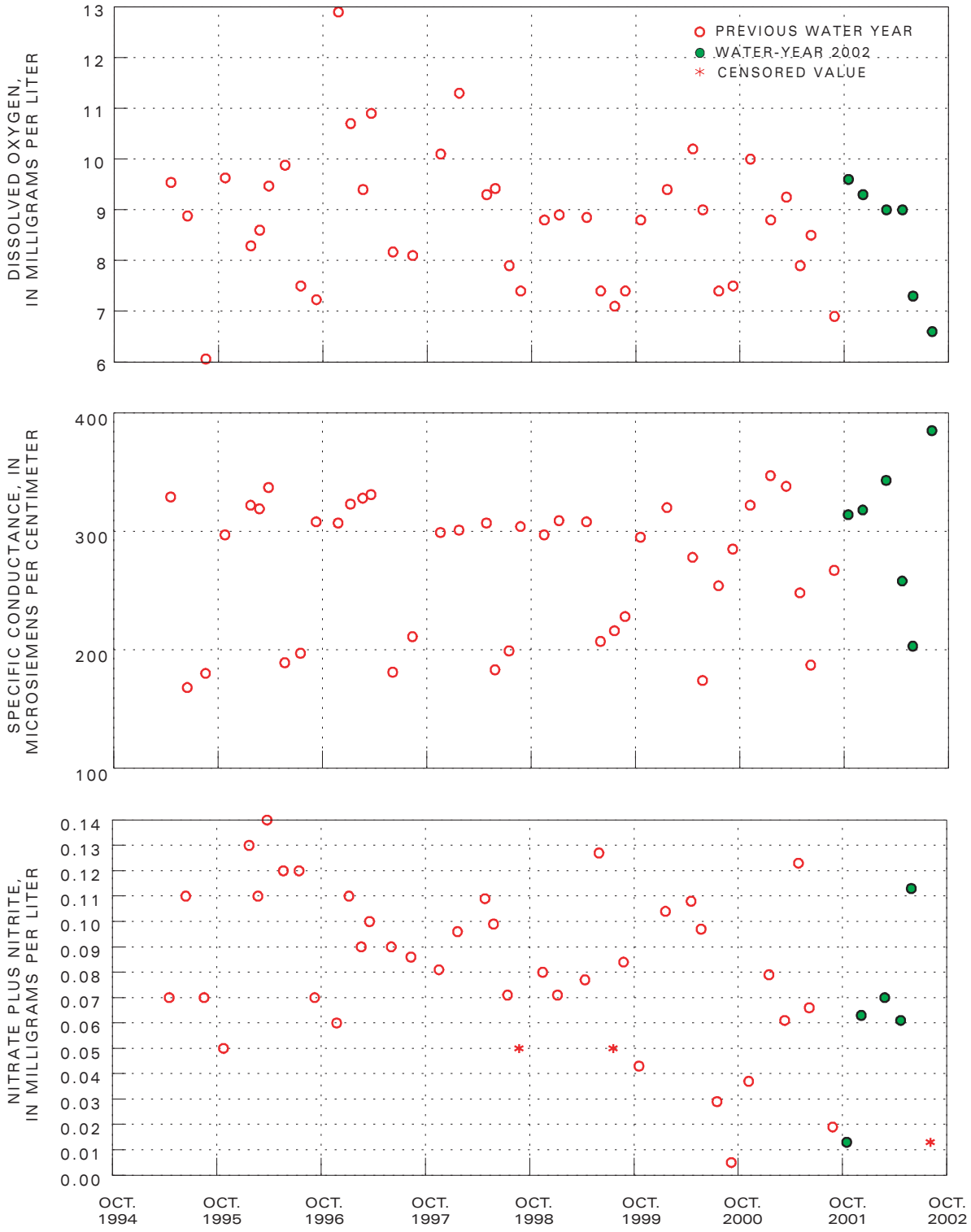


Figure 11. Distribuiton of selected water-quality constituents relative to time for East River above Crested Butte.

Table 6. Summary of measured constituents and properties for East River above Crested Butte station 385408106543600

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percen-tile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	9.0	9.6	10/16/01	10.0	6	0	down	Minimum = 6.1 mg/L 15th percentile = 7.4
		1995-2001	40	0	9.8	12.9	11/25/96			0		
pH	Standard units	2002	6	0	8.2	8.3	8/5/02	8.3	6.5-9	0	none	Minimum = 7.3 15th percentile = 7.9
		1995-2001	40	0	8.1	8.4	7/16/96			0		
Specific conductance	μS/cm	2002	6	0	316	385	8/5/02	329	none	N/A	none	
		1995-2001	40	0	297	347	1/17/01			N/A		
Temperature	°C	2002	6	0	7.0	18.5	8/5/02	15.8	20	0	N/A	
		1995-2001	40	0	3.9	19.3	7/19/00			0		
Ammonia	mg/L	2002	6	5	0	0.011	10/16/01	0.020	none	N/A	(5)	current LRL = 0.015
		1995-2001	40	21	0	0.057	5/28/98			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	5	0	0.00009	8/5/02	0.00042	0.02	0	(5)	
		1995-2001	40	21	0	0.00130	7/19/01			0		
Ammonia plus organic nitrogen	mg/L	2002	6	2	0.07	0.09	10/16/01	0.09	none	N/A	(5)	current LRL = 0.10
		1995-2001	40	28	0	0.15	4/18/95			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	2	0.08	0.12	4/23/02	0.12	none	N/A	(5)	current LRL = 0.10
		1995-2001	40	26	0	0.40	6/15/95			N/A		
Nitrate plus nitrite	mg/L	2002	6	1	0.06	0.11	5/30/02	0.11	[6]10	0	down	
		1995-2001	40	2	0.08	0.14	3/26/96			0		

Table 6. Summary of measured constituents and properties for East River above Crested Butte station 385408106543600 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Nitrite	mg/L	2002	6	5	0	0.002	10/16/01	0.001	0.05	0	(5)	current LRL = 0.002
		1995-2001	40	31	0	0.021	4/13/99			0		
Phosphorus	mg/L	2002	6	6	0	(5)	--	0	none	N/A	(5)	current LRL = 0.004
		1995-2001	40	34	0	0.020	11/16/98			N/A		
Orthophosphate	mg/L	2002	6	6	0	(5)	--	0	none	N/A	(5)	current LRL = 0.007
		1995-2001	40	34	0	0.013	6/1/99			N/A		
Phosphorus, total	mg/L	2002	6	2	0.004	0.015	4/23/02	0.015	0.1	0	(5)	current LRL = 0.004
		1995-2001	40	23	0	0.070	6/15/95			0		
Escherichia Coli	Colonies per 100 mL	2002	6	3	2	6	5/30/02[4]	12	126	0	(5)	Geometric mean = 2
		2001	6	4	1	59	6/7/01			0		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

384950106544200 EAST RIVER ABOVE SLATE RIVER NEAR CRESTED BUTTE, CO

Current Reason for Inclusion: This station allows contributions of the Slate and East Rivers to be distinguished. Rotational Group 1.

General Station Information:
Location: Located 100 feet upstream from confluence with Slate River and 4.7 miles southeast of Crested Butte.

Station Type: USGS water quality

Site ID: 384950106544200 Latitude: 384850 Drainage Area: Not determined
HUC: 14020001 Longitude: 1065356 Stream Segment: 5

USGS Data Summary:
Period of Record: water quality: April 1995 - September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: Data not collected

Other constituents of concern: None
MBAS-no values above the laboratory reporting level

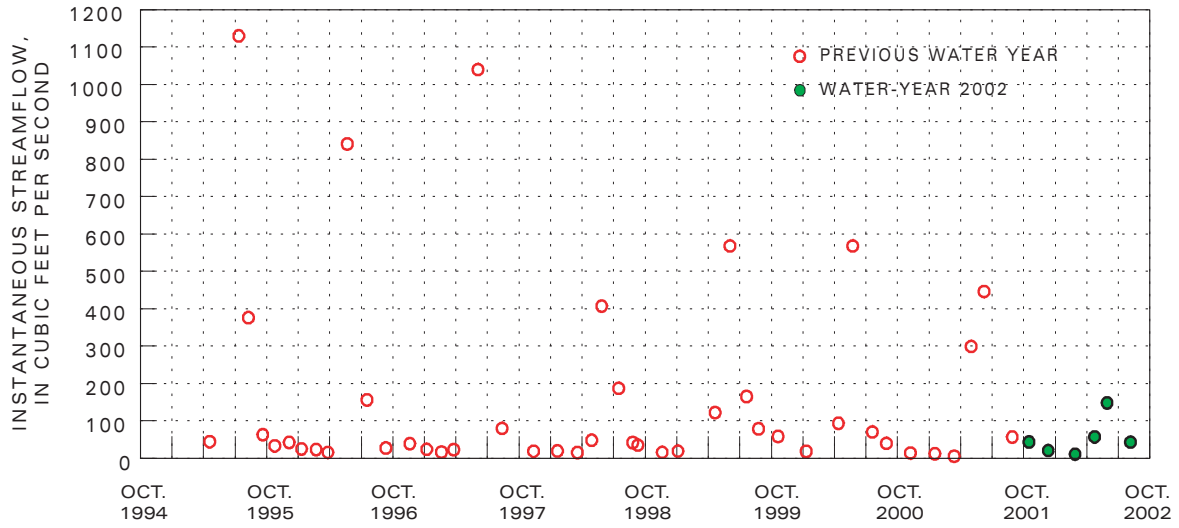


Figure 12. Time distribution and streamflow of water-quality samples for East River above Slate River near Crested Butte.

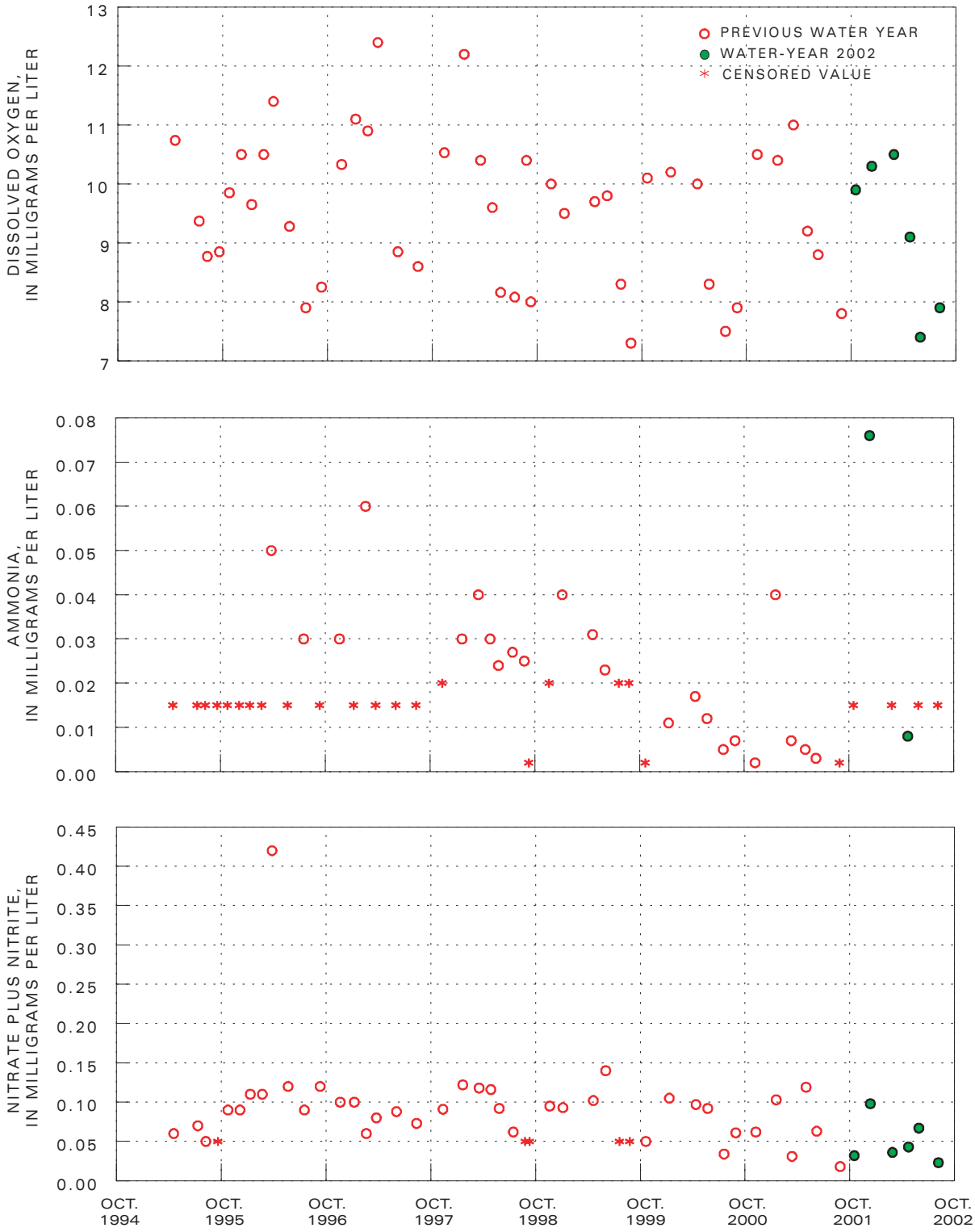


Figure 13. Distribution of selected water-quality constituents relative to time for East River above Slate River near Crested Butte.

Table 7. Summary of measured constituents and properties for East River above Slate River near Crested Butte station 384950106544200

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	9.5	10.5	2/27/02	10.5	6	0	none	Minimum = 7.3 mg/L 15th percentile =8.0
		1995-2001	44	0	9.7	12.4	3/26/97			0		
pH	Standard units	2002	6	0	8.3	8.6	4/24/02	8.4	6.5-9	0	none	Minimum = 7.4 15th percentile = 8.0
		1995-2001	45	0	8.2	8.6	3/14/01			0		
Specific conductance	µS/cm	2002	6	0	333	350	2/27/02	337	none	N/A	none	
		1995-2001	44	0	316	361	11/8/00			N/A		
Temperature	°C	2002	6	0	5.5	14.5	5/30/02	11.0	20	0	N/A	
		1995-2001	44	0	4.0	14.2	8/26/98			0		
Ammonia	mg/L	2002	6	4	0	0.076	12/12/01	0.030	none	N/A	(5)	current LRL = 0.015
		1995-2001	44	21	0.002	0.060	2/19/97			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	4	0	0.00082	12/12/01	0.00082	0.02	0	(5)	
		1995-2001	44	21	0.00004	0.00156	2/19/97			0		
Ammonia plus organic nitrogen	mg/L	2002	6	2	0.08	0.12	12/12/01	0.10	none	N/A	(5)	current LRL = 0.10
		1995-2001	44	32	0	0.11	4/19/95			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	1	0.11	0.14	12/12/01	0.14	none	N/A	(5)	current LRL = 0.10
		1995-2001	44	27	0	0.42	5/2/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	0	0.04	0.10	12/12/01	0.12	[6]10	0	down	
		1995-2001	44	5	0.09	0.42	3/27/96			0		

Table 7. Summary of measured constituents and properties for East River above Slate River near Crested Butte station 384950106544200 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percen-tile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Nitrite	mg/L	2002	6	5	0	0.002	10/17/01	0.002	0.05	0	(5)	current LRL = 0.002
		1995-2001	44	31	0	0.020	10/25/95			0		
Phosphorus	mg/L	2002	6	3	0.001	0.008	12/12/01	0.006	none	N/A	(5)	current LRL = 0.004
		1995-2001	44	31	0	0.050	3/27/96			N/A		
Orthophosphate	mg/L	2002	6	5	0	0.004	10/17/01	0.009	none	N/A	(5)	current LRL = 0.007
		1995-2001	44	31	0	0.040	3/27/96			N/A		
Phosphorus, total	mg/L	2002	6	1	0.010	0.013	5/30/02	0.016	0.1	0	(5)	current LRL = 0.004
		1995-2001	43	19	0.004	0.088	5/2/01			0		
Escherichia Coli	Colonies per 100 mL	2002	6	1	2	100	5/30/02	72	126	0	(5)	Geometric mean = 7
		2001	5	0	13	15	5/2/01			0		
Biochemical oxygen demand	mg/L	2002	3	0	0.6	2.4	2/27/02	2	none	N/A	(5)	
		1995-2001	30	0	0.8	2.6	4/19/95			N/A		
MBAS	mg/L	2002	6	6	0	(5)	--	0	none	N/A	(5)	No values greater than the LRL current LRL = 0.05
		2001	6	6	0	(5)	--			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

09112200 EAST RIVER BELOW CEMENT CREEK, CO

Current Reason for Inclusion: Long-term monitoring. First station on East River downstream from the confluence with the Slate River.

General Station Information:

Location: 1.6 miles downstream from Cement Creek (8.5 miles southeast of Crested Butte).

Station Type: USGS water quality and streamflow gaging

Latitude: 384703 Drainage Area: 238 mi^2 HUC: 14020001
Longitude: 1065213 Stream Segment: 5

USGS Data Summary:

Period of Record: water quality: October 1993 - September 2002
streamflow gaging: October 1963-September 1972
October 1979-September 1981
October 1993-September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: Low Concern (based on historical information)

Other constituents of concern: None

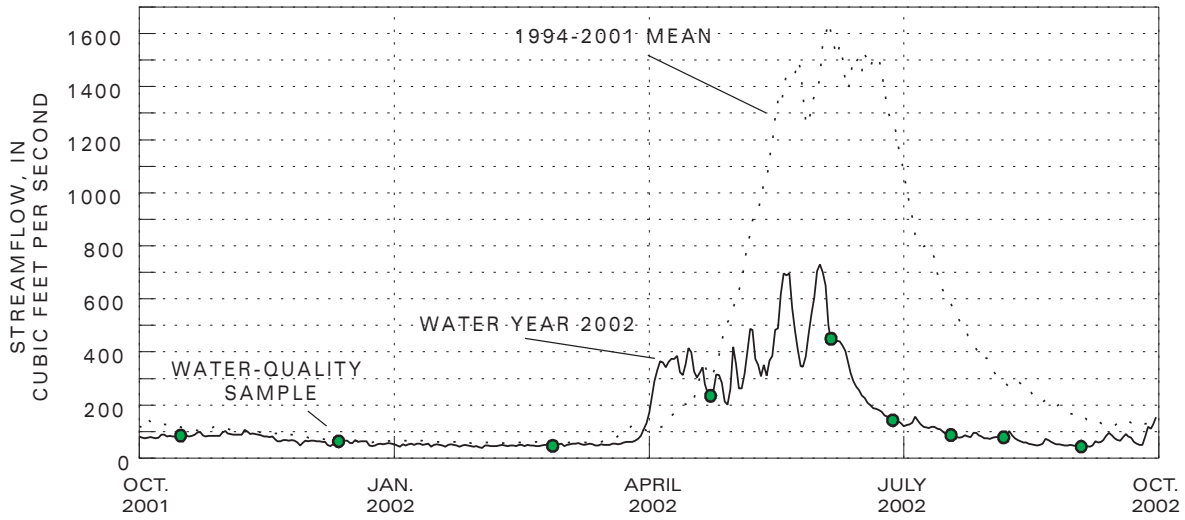


Figure 14. Daily mean streamflow and time distribution of water-quality samples for East River below Cement Creek.

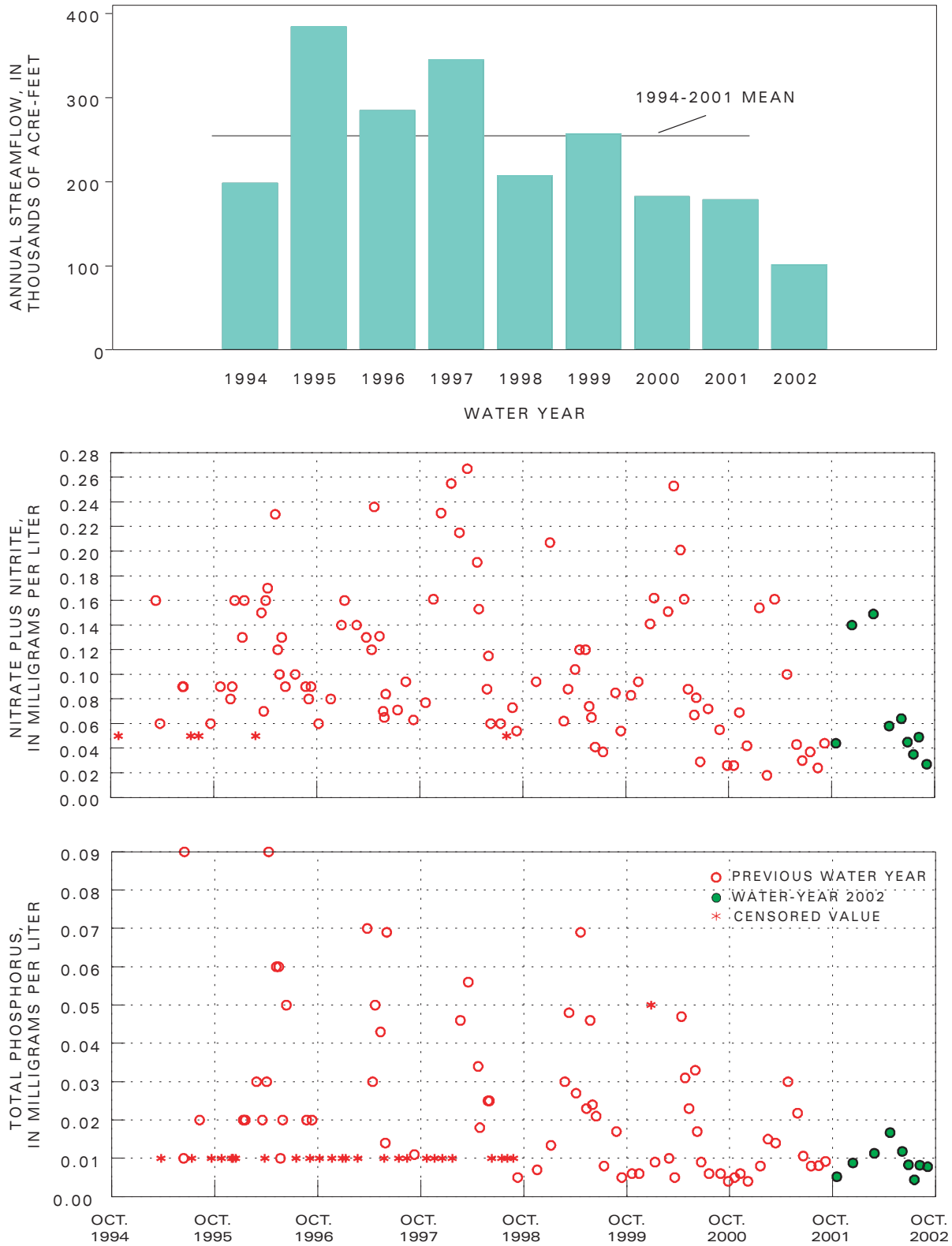


Figure 15. Annual streamflow and distribution of selected water-quality constituents relative to time for East River below Cement Creek.

Table 8. Summary of measured constituents and properties for East River below Cement Creek station 09112200

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	9	0	8.6	10.7	12/12/01	10.8	6	0	none	Minimum = 7.1 mg/L 15th percentile = 8.0
		1995-2001	103	0	9.4	12.6	3/25/94			0		
pH	Standard units	2002	9	0	8.3	8.5	2/26/02	8.6	6.5-9	0	none	Minimum = 7.6 15th percentile = 8.0
		1995-2001	103	0	8.3	9.0	[4]2/27/96			0		
Specific conductance	µS/cm	2002	9	0	314	335	9/3/02	314	none	N/A	none	
		1995-2001	103	0	276	329	11/8/00			N/A		
Temperature	°C	2002	9	0	9.9	14.5	6/27/02	12	20	0	N/A	
		1995-2001	103	0	5.4	17.2	8/5/98			0		
Alkalinity	mg/L	2002	9	0	115	136	2/26/02	120	none	N/A	none	
		1995-2001	80	0	101	129	12/15/95			N/A		
Sulfate	mg/L	2002	9	0	32	38	2/26/02	35	250	0	none	
		1995-2001	95	0	28	39	12/16/97			0		
Chloride	mg/L	2002	9	0	1.5	2.8	2/26/02	2.0	250	0	up	
		1995-2001	95	0	1.2	3.7	1/18/96			0		
Ammonia	mg/L	2002	9	8	0	0.008	10/16/01	0.030	none	N/A	(5)	current LRL = 0.015
		1995-2001	102	43	0.004	0.111	3/19/98			N/A		
Un-ionized ammonia (computed)	mg/L	2002	9	8	0	0.00017	8/5/02	0.00070	0.02	0	(5)	
		1995-2001	102	43	0.00013	0.00712	7/19/01			0		
Ammonia plus organic nitrogen	mg/L	2002	3	1	0.06	0.07	2/26/02	0.09	none	N/A	(5)	current LRL = 0.10
		1995-2001	102	69	0	0.22	4/23/97			N/A		

Table 8. Summary of measured constituents and properties for East River below Cement Creek station 09112200 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percen-tile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Ammonia plus organic nitrogen, total	mg/L	2002	9	0	0.08	0.16	4/23/02	0.20	none	N/A	(5)	current LRL = 0.10
		1995-2001	96	40	0.07	0.40	4/23/97			N/A		
Nitrate plus nitrite	mg/L	2002	9	0	0.05	0.15	2/26/02	0.16	[6]10	0	down	
		1995-2001	102	5	0.09	0.27	3/19/98			0		
Nitrite	mg/L	2002	9	5	0	0.002	10/16/01	0.002	0.05	0	(5)	current LRL = 0.002
		1995-2001	102	62	0	0.020	3/27/96			0		
Phosphorus	mg/L	2002	3	0	0.004	0.005	2/26/02	0.011	none	N/A	(5)	current LRL = 0.004
		1995-2001	102	53	0	0.036	2/19/98			N/A		
Orthophosphate	mg/L	2002	9	9	0	(5)	--	0.010	none	N/A	(5)	current LRL = 0.007
		1995-2001	102	64	0	0.042	2/19/98			N/A		
Phosphorus, total	mg/L	2002	9	0	0.008	0.017	4/23/02	0.034	0.1	0	(5)	current LRL = 0.004
		1995-2001	96	27	0.010	0.090	6/16/95			0		
Escherichia Coli	Colonies per 100 mL	2002	7	3	2	73	8/6/02	55	126	0	(5)	Geometric mean = 5
		1993-2001	18	4	6	82	6/1/94			0		
Suspended sediment	mg/L	2002	9	0	2	6	4/23/02	23	none	N/A	none	
		1995-2001	75	1	3	241	6/16/95			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

09112500 EAST RIVER AT ALMONT, CO

Current Reason for Inclusion: Allows identification of contributions from the East River to the Gunnison River. Long-term monitoring.

General Station Information:

Location: 400 feet upstream from confluence with Taylor River.

Station Type: USGS water quality and streamflow gaging

Latitude: 383952 Drainage Area: 289 mi^2 HUC: 14020001
Longitude: 1065051 Stream Segment: 5

USGS Data Summary:

Period of Record: Water quality: October 1990 - September 2002
Streamflow gaging: October 1934 - September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: Data not collected

Other constituents of concern: None

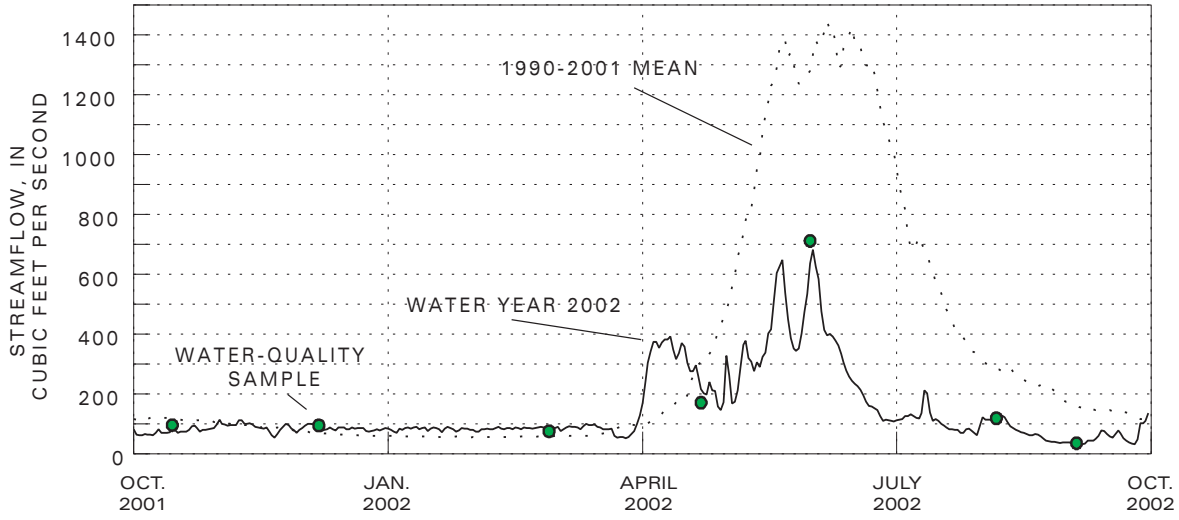


Figure 16. Daily mean streamflow and time distribution of water-quality samples for East River at Almont.

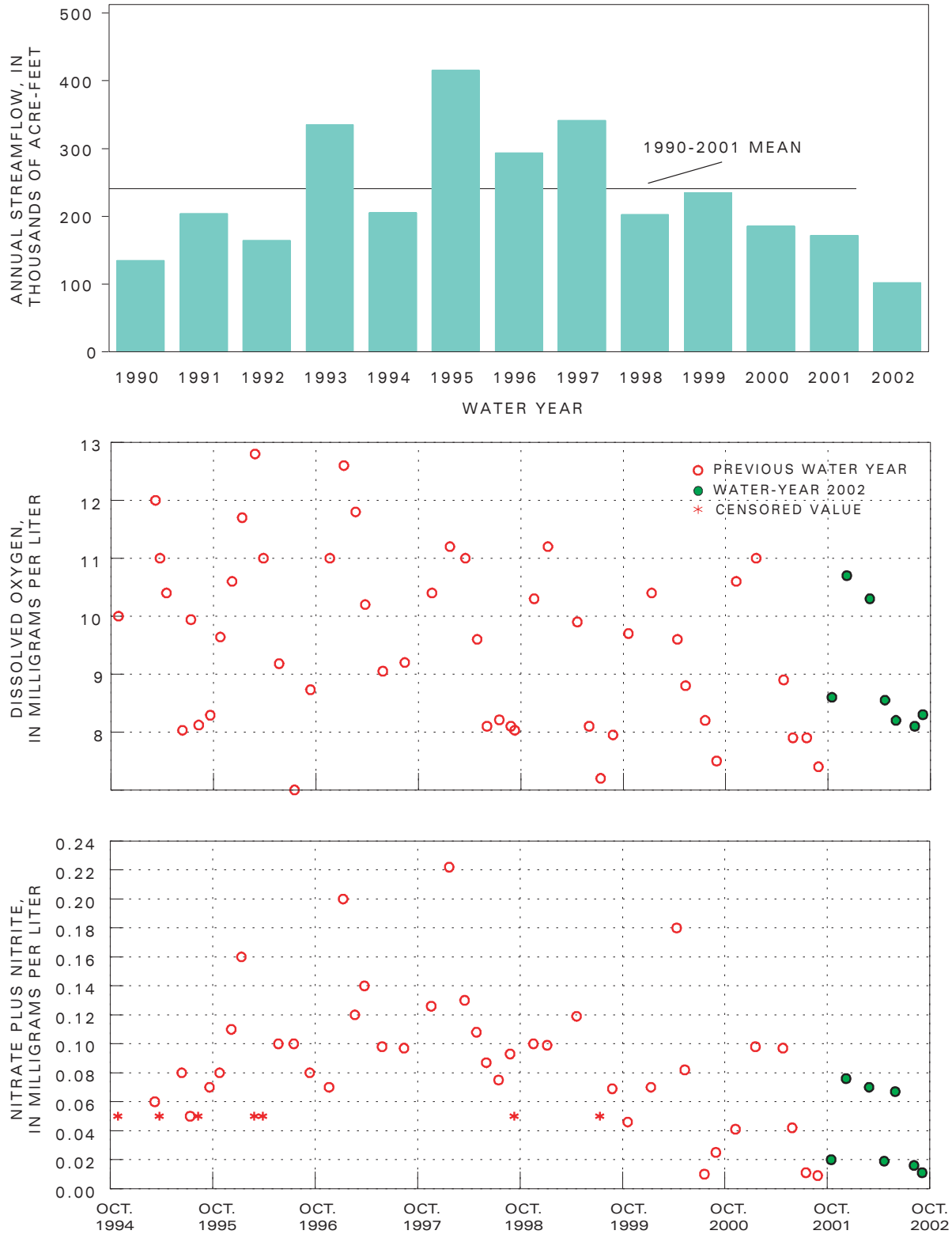


Figure 17. Annual streamflow and distribution of selected water-quality constituents relative to time for East River at Almont.

Table 9. Summary of measured constituents and properties for East River at Almont station 09112500

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Dissolved oxygen	mg/L	2002	7	0	8.6	10.7	12/7/01	11.0	6	0	down	Minimum = 7.0 mg/L 15th percentile = 8.0
		1991-2001	62	0	9.6	12.8	[4]11/17/93			0		
pH	Standard units	2002	7	0	8.3	8.6	4/22/02	8.7	6.5-9	0	none	Minimum = 7.5 15th percentile = 8.1
		1991-2001	63	0	8.3	8.9	[4]11/17/93			0		
Specific conductance	µS/cm	2002	10	0	320	351	9/4/02	330	none	N/A	up	
		1990-2001	149	0	294	369	10/22/91			N/A		
Temperature	°C	2002	10	0	10.4	18.5	7/17/02	13	20	0	N/A	
		1990-2001	151	0	7.0	18.0	8/9/00			0		
Ammonia	mg/L	2002	7	7	0	[5]	--	0.024	none	N/A	[5]	current LRL = 0.015
		1994-2001	51	23	0.005	0.040	11/20/96			N/A		
Un-ionized ammonia (computed)	mg/L	2002	7	7	0	[5]	--	0.00097	0.02	0	[5]	
		1994-2001	51	23	0.00014	0.00300	7/17/96			0		
Ammonia plus organic nitrogen	mg/L	2002	7	2	0.06	0.11	4/22/02	0.11	none	N/A	[5]	current LRL = 0.10
		1994-2001	51	34	0	0.30	5/31/94			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	7	0	0.08	0.23	5/31/02	0.19	none	N/A	[5]	
		1995-2001	45	24	0	0.36	4/21/99			N/A		
Nitrate plus nitrite	mg/L	2002	7	0	0.02	0.08	12/7/01	0.12	[6]10	0	down	
		1994-2001	50	8	0.08	0.22	01/22/98			0		

Table 9. Summary of measured constituents and properties for East River at Almont station 09112500 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percen-tile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Nitrite	mg/L	2002	7	5	0	0.002	10/15/01	0.003	0.05	0	(5)	current LRL = 0.002
		1994-2001	51	34	0	0.030	11/20/96			0		
Phosphorus	mg/L	2002	7	5	0	0.005	5/31/02	0.005	none	N/A	(5)	current LRL = 0.004
		1994-2001	51	37	0	0.030	11/18/98			N/A		
Orthophosphate	mg/L	2002	7	7	0	(5)	--	0.002	none	N/A	(5)	current LRL = 0.007
		1994-2001	50	39	0	0.020	6/3/98			N/A		
Phosphoru, -total	mg/L	2002	7	1	0.005	0.047	5/31/02	0.021	0.1	0	(5)	current LRL = 0.004
		1995-2001	45	16	0.005	0.064	4/21/99			0		
Escherichia Coli	Colonies per 100 mL	2002	7	3	1	170	5/31/02	56	126	1	(5)	Geometric mean = 8
		1991-2001	29	7	7	300	10/26/95			1		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (fcoliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

09113980 OHIO CREEK ABOVE MOUTH, NEAR GUNNISON, CO

Current Reason for Inclusion: This station identifies the contributions of the Ohio Creek basin, which includes development and historic mining. Improves the spatial distribution of the network. Long-term monitoring.

General Station Information:

Location: County Road 48 bridge, 1.1 miles upstream from the confluence with the Gunnison River, and 3.1 miles north of Gunnison. The gage is on the left bank.

Station Type: USGS water quality and streamflow gaging

Latitude: 383516 Drainage Area: 161 mi^2 HUC: 14020002
Longitude: 1065551 Stream Segment: 16

USGS Data Summary:

Period of Record: Water quality: October 1996 - September 2002
Data prior to September 1998 published as site 383516106555000
Streamflow gaging: December 1998-September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Total phosphorus: High Concern

Trace Elements/Metals: Data not collected

Other constituents of concern: None

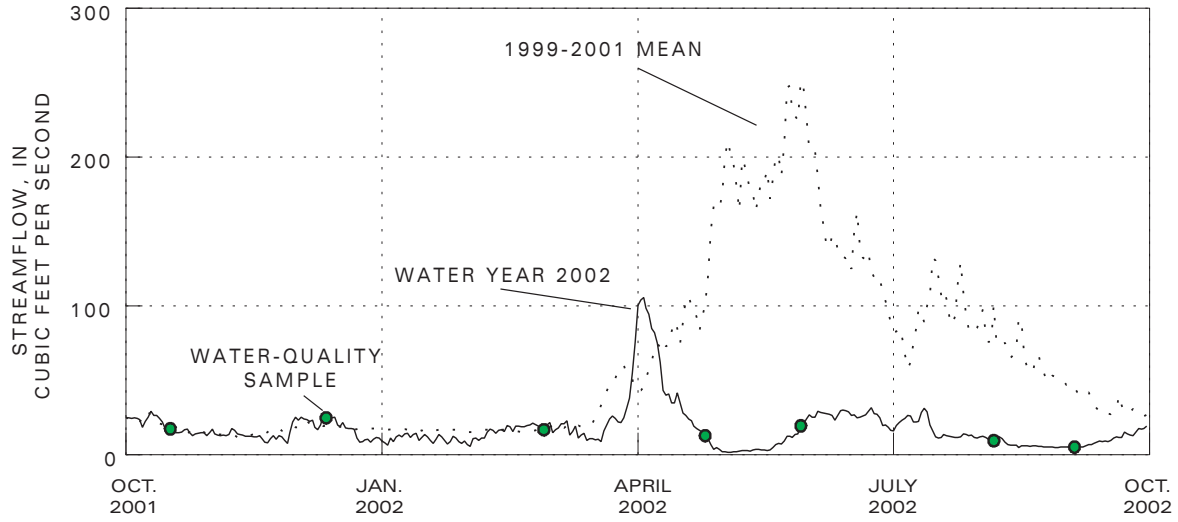


Figure 18. Daily mean streamflow and time distribution of water-quality samples for Ohio Creek above mouth near Gunnison.

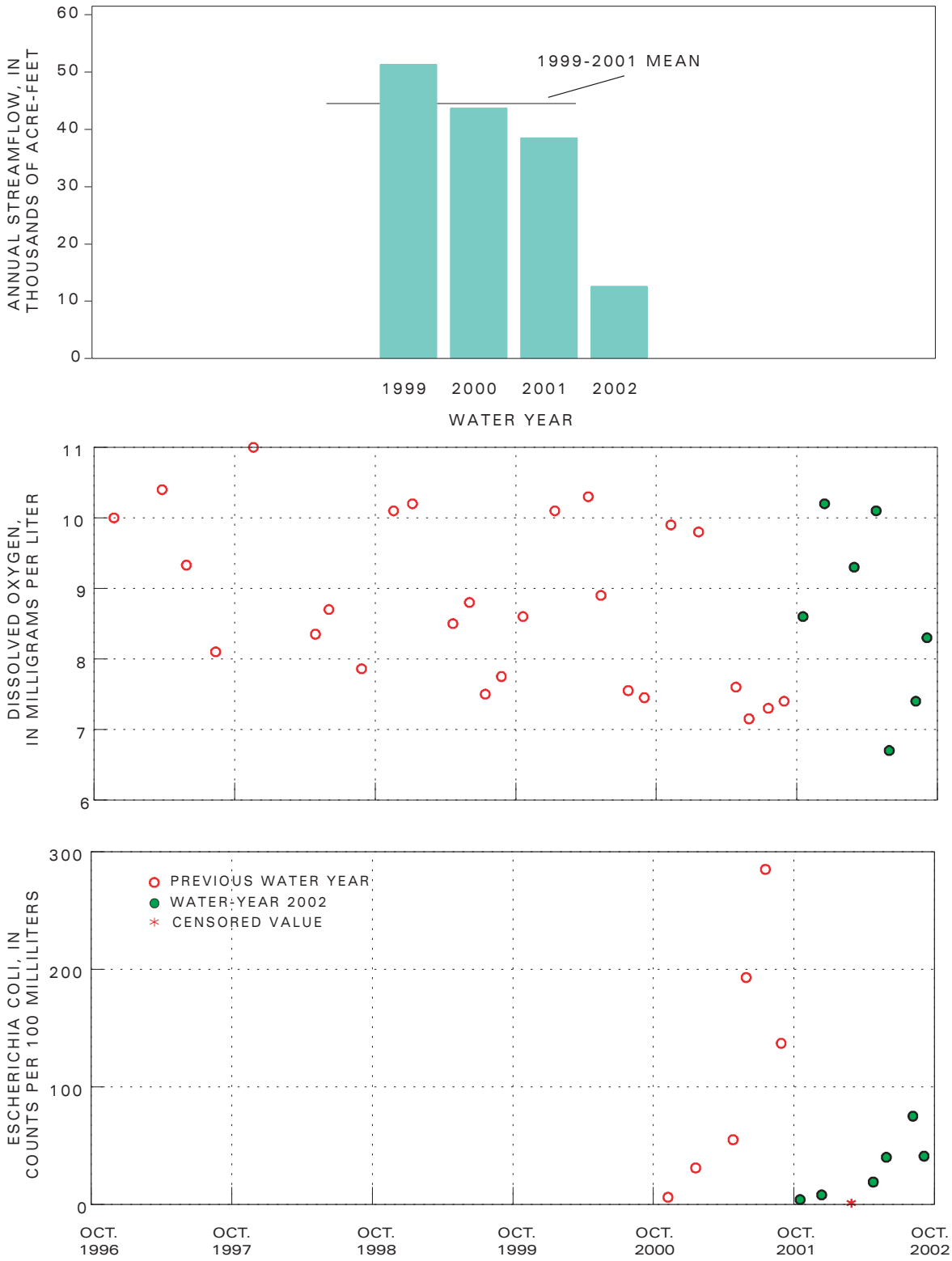


Figure 19. Annual streamflow and distribution of selected water-quality constituents relative to time for Ohio Creek above mouth near Gunnison.

Table 10. Summary of measured constituents and properties for Ohio Creek above mouth near Gunnison station 09113980

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Dissolved oxygen	mg/L	2002	7	0	8.6	10.2	12/12/01	10.2	6	0	down	Minimum = 6.7 mg/L 15th percentile = 7.4
		1997-2001	26	0	8.6	11.0	11/19/93			0		
pH	Standard units	2002	7	0	8.1	8.6	9/4/02	8.2	6.5-9	0	none	Minimum = 7.7 15th percentile = 7.9
		1997-2001	26	0	8.0	8.5	11/8/00			0		
Specific conductance	µS/cm	2002	10	0	342	399	7/16/02	339	none	N/A	none	
		1997-2001	40	0	202	363	6/27/00			N/A		
Temperature	°C	2002	10	0	12.2	22.5	7/16/02	16.8	20	2	N/A	
		1997-2001	40	0	7.8	18.2	8/25/99			0		
Ammonia	mg/L	2002	7	6	0	0.012	10/17/01	0.012	none	N/A	(5)	current LRL = 0.015
		1997-2001	26	8	0.003	0.029	4/29/98			N/A		
Un-ionized ammonia (computed)	mg/L	2002	7	6	0	0.00052	8/6/02	0.00033	0.02	0	(5)	
		1997-2001	26	8	0.00007	0.00131	8/25/99			0		
Ammonia plus organic nitrogen	mg/L	2002	7	0	0.11	0.46	5/29/02	0.30	none	N/A	(5)	
		1997-2001	26	4	0.18	0.35	5/30/01			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	7	0	0.21	0.49	5/29/02	0.43	none	N/A	(5)	
		1997-2001	26	4	0.28	0.57	6/3/98			N/A		
Nitrate plus nitrite	mg/L	2002	7	2	0.02	0.04	2/27/02	0.06	[6]10	0	(5)	current LRL = 0.013
		1997-2001	26	5	0.01	0.11	4/7/00			0		

Table 10. Summary of measured constituents and properties for Ohio Creek above mouth near Gunnison station 09113980 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Nitrite	mg/L	2002	7	6	0	0.002	10/17/01	0.001	0.05	0	(5)	current LRL = 0.002
		1997-2001	26	15	0	0.030	11/22/96			0		
Phosphorus	mg/L	2002	7	0	0.030	0.039	8/6/02	0.042	none	N/A	(5)	
		1997-2001	26	5	0.026	0.058	6/3/98			N/A		
Orthophosphate	mg/L	2002	7	0	0.020	0.029	8/6/02	0.030	none	N/A	none	
		1997-2001	26	0	0.020	0.046	4/7/00			N/A		
Phosphorus, total	mg/L	2002	7	0	0.051	0.084	12/12/01	0.084	0.1	0	none	High concern
		1997-2001	26	0	0.061	0.133	6/3/98			4		
Escherichia Coli	Colonies per 100 mL	2002	7	1	19	75	8/6/02	193	126	0	(5)	Geometric mean = 28
		2001	6	0	96	285	7/19/01			3		
Biochemical oxygen demand	mg/L	2002	3	0	0.2	2.2	2/27/02	1.6	none	N/A	(5)	
		1997-2001	21	0	1.0	2.9	4/7/00			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

09114500 GUNNISON RIVER NEAR GUNNISON, CO

Current Reason for Inclusion: This station is upstream from the City of Gunnison treatment-plant discharge. Rotational Group 1.

General Station Information:

Location: 0.7 miles downstream from Antelope Creek and 1.2 miles west of Gunnison. The gage is on the right bank.

Station Type: USGS water quality and streamflow gaging

Latitude: 383231 Drainage Area: 1012 mi^2 HUC: 14020002
Longitude: 1065657 Stream Segment: 14

USGS Data Summary:

Period of Record: Water quality: April 1995 - September 2002
Streamflow gaging: October 1944 - September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

E. Coli Low Concern

Trace Elements/Metals: Data not collected

Other constituents of concern: None

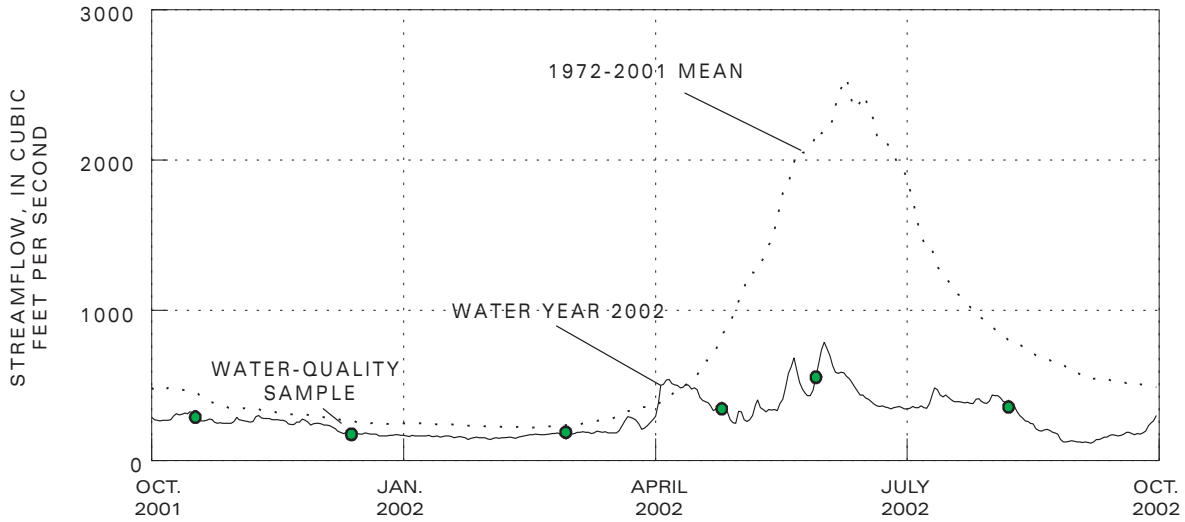


Figure 20. Daily mean streamflow and time distribution of water-quality samples for Gunnison River at Gunnison.

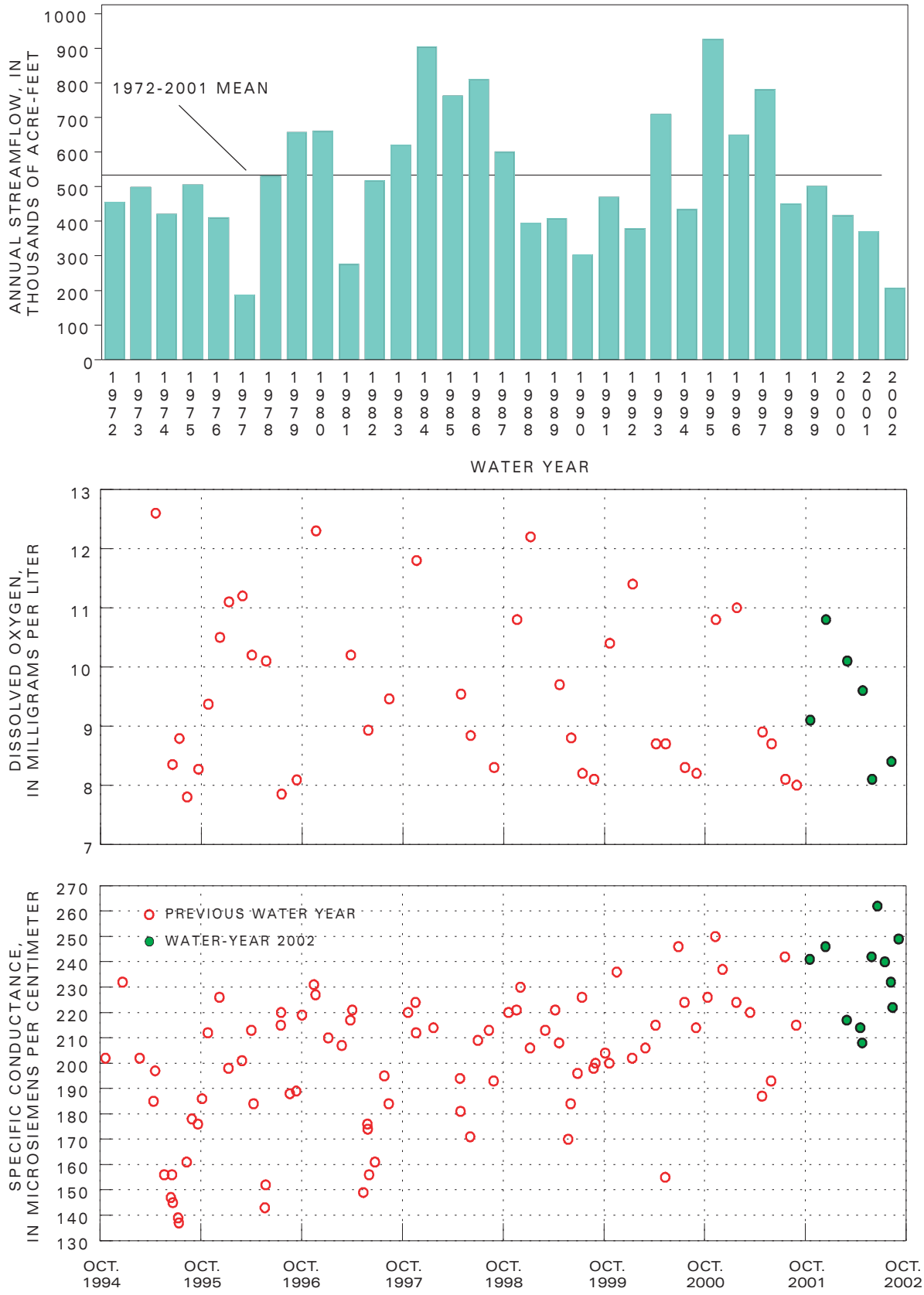


Figure 21. Annual streamflow and distribution of selected water-quality constituents relative to time for Gunnison River at Gunnison.

Table 11. Summary of measured constituents and properties for Gunnison River near Gunnison station 09114500

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percen-tile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	9.4	10.8	12/13/01	11.1	6	0	down	Minimum = 7.8 mg/L 15th percentile =8.1
		1995-2001	39	0	8.9	12.6	4/19/95			0		
pH	Standard units	2002	6	0	8.3	8.4	4/25/02	8.4	6.5-9	0	none	Minimum = 7.6 15th percentile = 8.0
		1995-2001	39	0	8.2	8.6	9/12/96			0		
Specific conductance	µS/cm	2002	11	0	240	262	6/19/02	230	none	N/A	up	
		1995-2001	83	0	202	250	11/9/00			N/A		
Temperature	°C	2002	11	0	11.0	16.7	6/19/02	13.3	20	0	N/A	
		1995-2001	83	0	6.5	15.5	8/30/95			0		
Ammonia	mg/L	2002	6	6	0	(5)	--	0.025	none	N/A	(5)	current LRL = 0.015
		1995-2001	39	21	0	0.051	6/4/98			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	6	0	(5)	--	0.00036	0.02	0	(5)	
		1995-2001	39	21	0	0.00121	11/21/96			0		
Ammonia plus organic nitrogen	mg/L	2002	6	2	0.08	0.14	5/29/02	0.13	none	N/A	(5)	current LRL = 0.10
		1995-2001	39	25	0	0.17	4/19/95			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	0	0.11	0.16	4/25/02	0.23	none	N/A	(5)	current LRL = 0.10
		1995-2001	39	19	0.07	0.46	4/27/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	1	0.01	0.04	12/13/01	0.07	[6]10	0	(5)	
		1995-2001	39	12	0.03	0.15	6/3/99			0		

Table 11. Summary of measured constituents and properties for Gunnison River near Gunnison station 09114500 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Nitrite	mg/L	2002	6	6	0	(5)	--	0.001	0.05	0	(5)	current LRL = 0.002
		1995-2001	39	31	0	0.011	6/4/98			0		
Phosphorus	mg/L	2002	6	1	0.005	0.007	4/25/02	0.011	none	N/A	(5)	current LRL = 0.004
		1995-2001	38	14	0.006	0.030	11/19/98			N/A		
Orthophosphate	mg/L	2002	6	6	0	(5)	--	0.013	none	N/A	(5)	current LRL = 0.007
		1995-2001	39	22	0	0.030	9/21/95			N/A		
Phosphorus, total	mg/L	2002	6	0	0.013	0.016	8/7/02	0.035	0.1	0	(5)	current LRL = 0.004
		1995-2001	38	11	0.016	0.120	6/19/95			1		
Escherichia Coli	Colonies per 100 mL	2002	6	1	10	38	8/7/02	52	126	0	(5)	Geometric mean = 10
		2001	5	0	11	147	5/30/01			1		
Biochemical oxygen demand	mg/L	2002	3	0	1.6	2.4	2/28/02	2	none	N/A	none	
		1995-2001	29	0	0.9	2.6	9/21/95			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

383604106312400 QUARTZ CREEK BELOW PITKIN, CO

Current Reason for Inclusion: Rotational group 1.

Location: One mile south of Pitkin on Wuanita Pass Road.

Station Type: USGS water quality

General Station Information:
Latitude: 383604 Drainage Area: Not determined HUC: 14020003
Longitude: 1063124 Stream Segment: 19

USGS Data Summary:
Period of Record: Water quality: November 2000 - September 2002

General Chemistry: Water type: Major-ion data not collected
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Low Concern

Trace Elements/Metals: Low Concern

Other constituents of concern: None

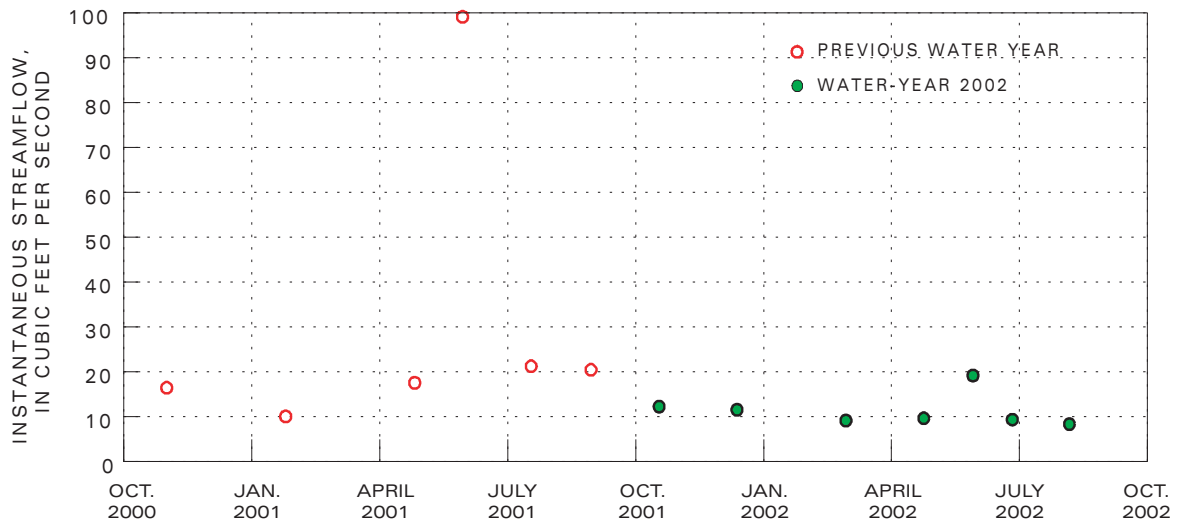


Figure 22. Time distribution and streamflow of water-quality samples for Quartz Creek below Pitkin.

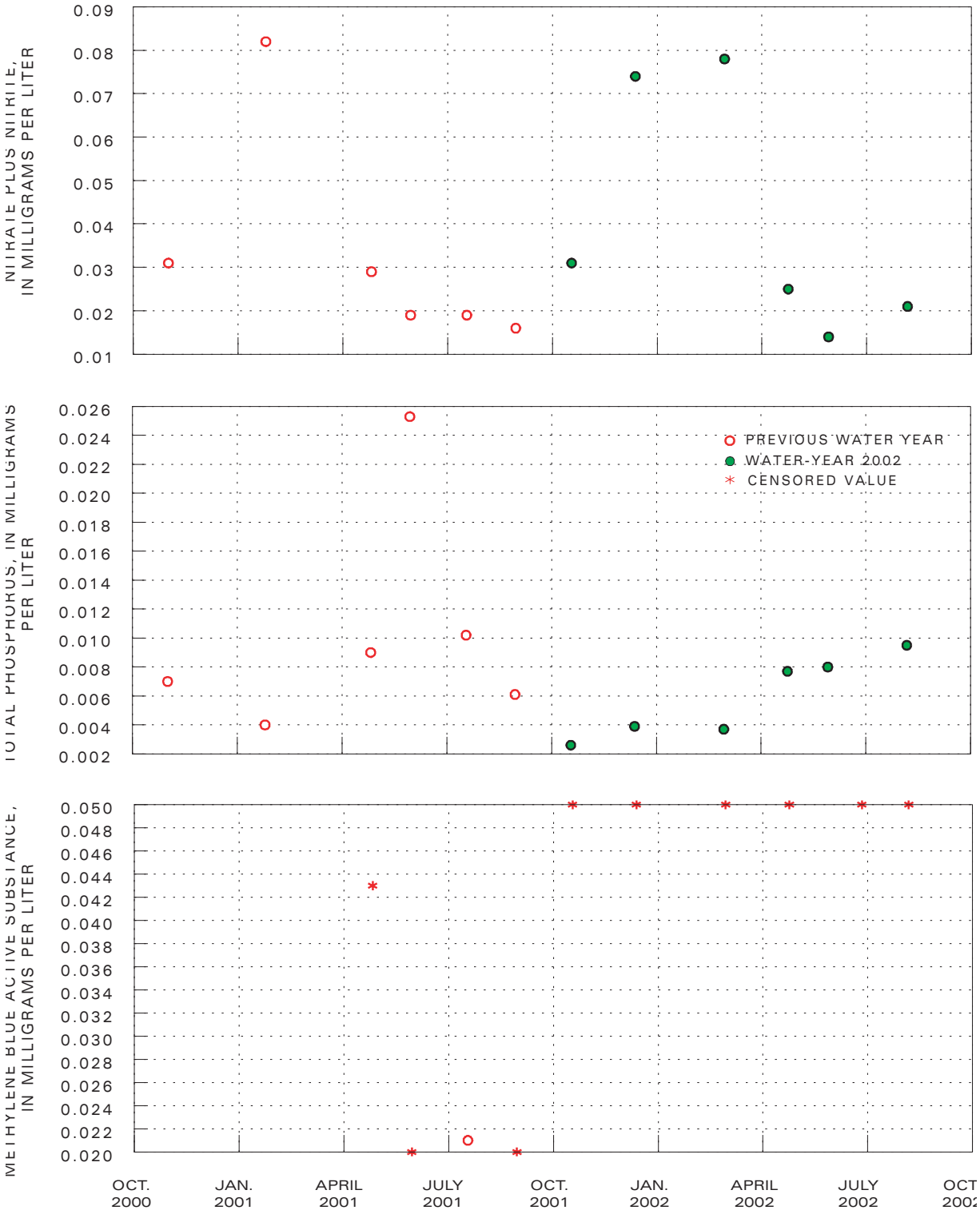


Figure 23. Distribution of selected water-quality constituents relative to time for Quartz Creek below Pitkin.

Table 12. Summary of measured constituents and properties for Quartz Creek below Pitkin station 3836041063124000

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level, MBAS, methylene blue active substances]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Dissolved oxygen	mg/L	2002	6	0	9.2	10.0	10/18/0[4]	10.0	6	0	(5)	Minimum = 7.3 mg/L 15th percentile = 7.6
		2001	6	0	9.2	10.0	1/25/01[4]			0		
pH	Standard units	2002	6	0	8.0	8.4	8/6/02	8.3	6.5-9	0	(5)	Minimum = 7.1 15th percentile = 7.7
		2001	6	0	8.0	8.3	11/1/00			0		
Specific conductance	µS/cm	2002	7	0	177	198	8/6/02	180	none	N/A	(5)	
		2001	6	0	167	178	1/25/01			N/A		
Temperature	°C	2002	7	0	9.5	14.8	8/6/02	14.0	20	0	N/A	
		2001	6	0	4.5	12.0	8/30/01			0		
Hardness (computed)	mg/L as $CaCO_3$	2002	4	0	87	96	8/6/02	91	none	N/A	(5)	
		2001	4	0	78	84	11/1/00			N/A		
Calcium	mg/L	2002	4	0	25.5	28.4	8/6/02	26.6	none	N/A	(5)	
		2001	4	0	23.1	25.1	11/1/00			N/A		
Magnesium	mg/L	2002	4	0	5.70	6.15	8/6/02	5.91	none	N/A	(5)	
		2001	4	0	4.90	5.34	11/1/00			N/A		
Ammonia	mg/L	2002	6	6	0.00	(5)	--	0.005	none	N/A	(5)	current LRL = 0.015
		2001	6	1	0.002	0.011	8/30/01			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	6	0	(5)	--	0.00010	0.02	0	(5)	
		2001	6	1	0.00003	0.00024	8/30/01			0		

Table 12. Summary of measured constituents and properties for Quartz Creek below Pitkin station 3836041063124000 —Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level, MBAS, methylene blue active substances]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Ammonia plus organic nitrogen	mg/L	2002	6	3	0.03	0.07	8/6/02	0.07	none	N/A	(5)	current LRL = 0.1
		2001	6	3	0.03	0.08	5/30/01			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	1	0.07	0.10	10/18/01	0.13	none	N/A	(5)	current LRL = 0.1
		2001	6	0	0.10	0.16	4/26/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	0	0.03	0.08	2/28/02	0.08	[6]10	0	(5)	
		2001	6	0	0.02	0.08	1/25/01			0		
Nitrite	mg/L	2002	6	6	0	(5)	--	0	0.05	0	(5)	current LRL = 0.002
		2001	6	5	0	0.001	11/01/00			0		
Phosphorus	mg/L	2002	6	4	0	0.003	5/29/02	0.003	none	N/A	(5)	current LRL = 0.004
		2001	6	4	0	0.003	1/25/01			N/A		
Orthophosphate	mg/L	2002	6	6	0	(5)	--	0	none	N/A	(5)	current LRL = 0.007
		2001	6	6	0	(5)	--			N/A		
Phosphorus, total	mg/L	2002	6	0	0.006	0.010	8/6/02	0.010	0.1	0	(5)	current LRL = 0.004
		2001	6	0	0.008	0.025	5/30/01			0		
Aluminum	µg/L	2002	4	4	0	(5)	--	0	87 (ch)	0	(5)	current LRL = 15
		2001	4	3	0	14	5/30/01			0		
Cadmium	µg/L	2002	4	4	0	(5)	--	0	2.0 (ch)	0	(5)	current LRL = 0.1
		2001	4	3	0	0.09	8/30/01			0		
Copper	µg/L	2002	4	2	0.4	1.0	8/6/02	1.0	8.0 (ch)	0	(5)	current LRL = 1
		2001	4	2	0.4	1.4	5/30/01			0		

Table 12. Summary of measured constituents and properties for Quartz Creek below Pitkin station 3836041063124000 —Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level, MBAS, methylene blue active substances]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Iron	µg/L	2002	4	0	29	76	8/6/02	72	300	0	(5)	water supply standard
		2001	4	0	38	72	8/30/01			0		
Lead	µg/L	2002	4	3	0	1.3	8/6/02	0	2.1 (ch)	0	(5)	current LRL = 1
		2001	4	4	0	(5)	--			0		
Manganese	µg/L	2002	4	0	1.8	2.4	4/4/02	2.6	50	0	(5)	water supply standard
		2001	4	0	2.5	3.6	8/30/01			0		
Silver	µg/L	2002	4	4	0	(5)	--	0	0.26 (ch)	0	(5)	current LRL = 0.1
		2001	4	4	0	(5)	--			0		
Zinc	µg/L	2002	4	4	0	(5)	--	0	106 (ch)	0	(5)	current LRL = 24
		2001	4	4	0	(5)	--			0		
Suspended sediment	mg/L	2002	4	0	1.5	1.9	5/29/02	5.9	none	N/A	(5)	
		2001	4	0	4.2	6.4	5/30/01			N/A		
Turbidity	NTU	2002	4	0	1.7	4.6	8/6/02	4.1	none	N/A	(5)	
		2001	4	0	2.5	4.1	4/26/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	6	1	2	4	2/28/02	6	126	0	(5)	Geometric mean = 3
		2001	5	0	4	10	8/30/01			0		
MBAS	mg/L	2002	6	6	0	(5)	--	0	none	N/A	(5)	current LRL = 0.05
		2001	4	3	0	0.02	7/18/01			N/A		
Biochemical oxygen demand	mg/L	2002	4	0	1.6	2.5	5/29/02	2	none	N/A	(5)	
		2001	5	0	1.2	2.0	11/01/00			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

383126106475600 TOMICHI CREEK BELOW COCHETOPA CREEK, CO

Current Reason for Inclusion:

General Site Information:
Location: One mile downstream from confluence with Cochetopa Creek and 4 miles northwest of Parlin.

Station Type: USGS water quality

Latitude: 383126 Drainage Area: Not determined HUC: 14020003
Longitude: 1064756 Stream Segment: 18

USGS Data Summary:
Period of Record: Water quality: November 2000 - September 2002
1 sample each in March and September 1998

General Chemistry: Water type: Major-ion data not collected
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Total phosphorus: Concern

Trace Elements/Metals: Low Concern

Other constituents of concern: None

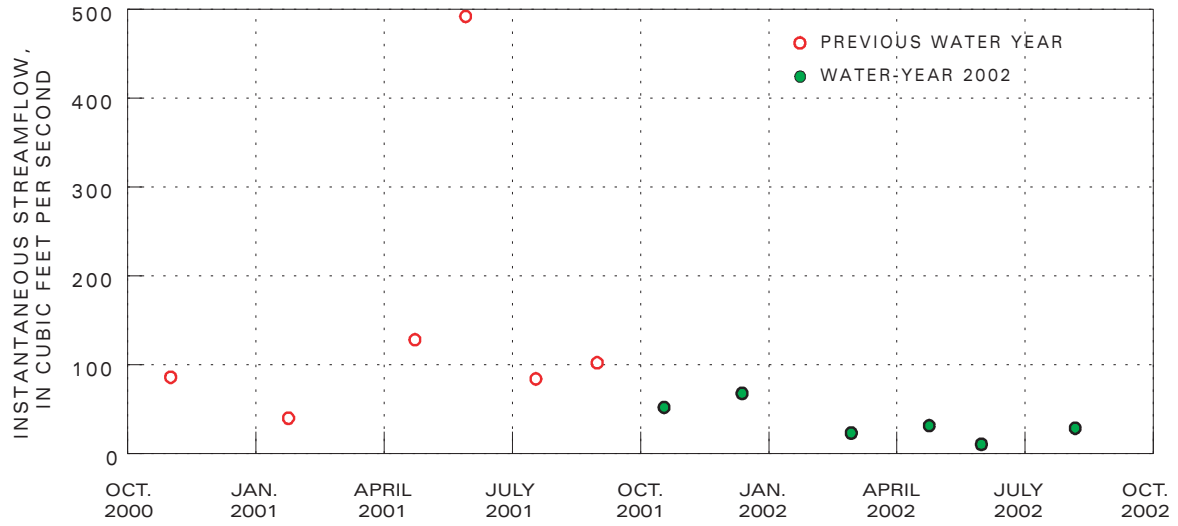


Figure 24. Time distribution and streamflow of water-quality samples for Tomichi Creek below Cochetopa Creek.

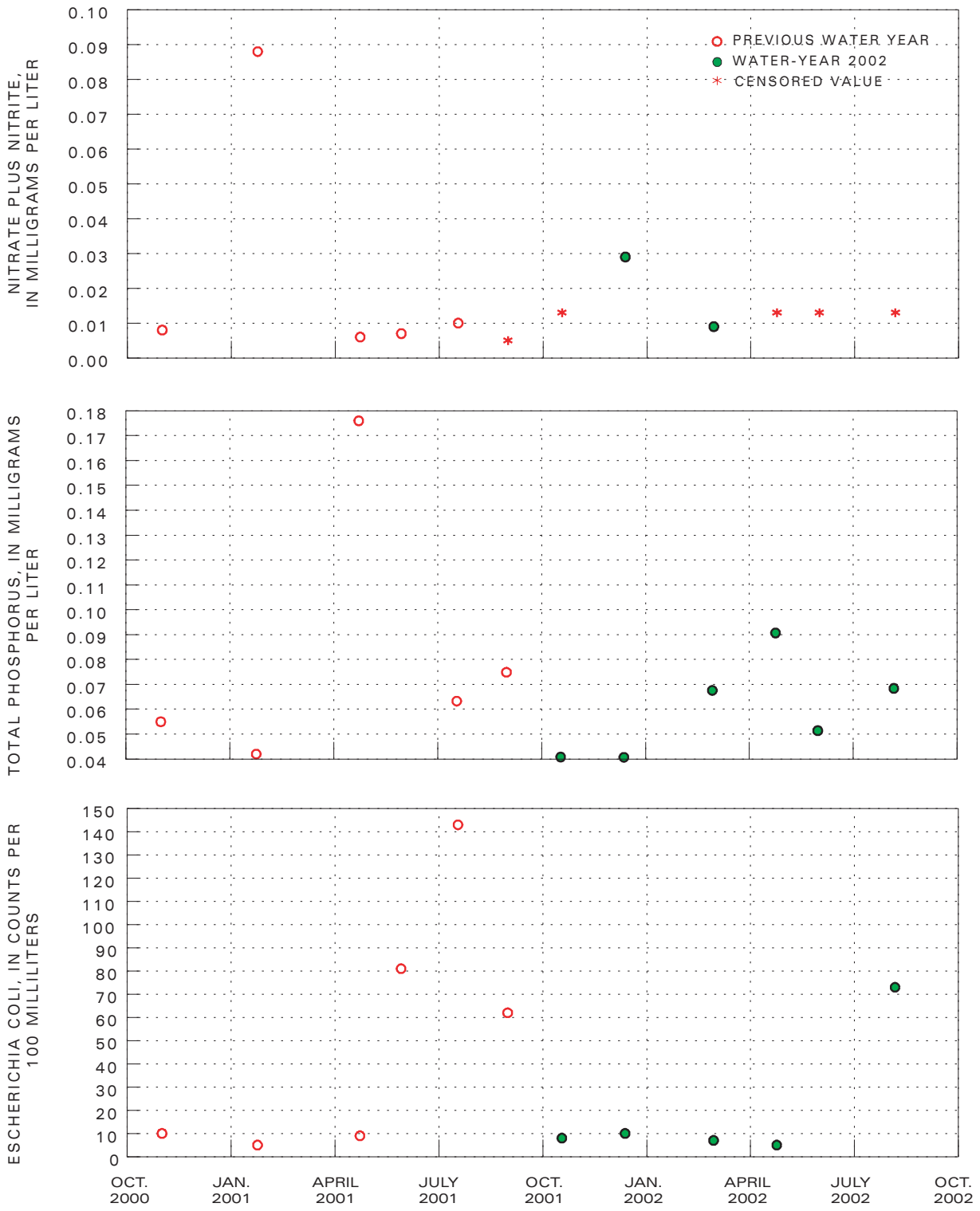


Figure 25. Distribution of selected water-quality constituents relative to time for Tomichi Creek below Cochetopa Creek.

Table 13. Summary of measured constituents and properties for Tomichi Creek below Cochetopa Creek station 383126106475600

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Dissolved oxygen	mg/L	2002	6	0	9.4	10.5	12/13/01	10.5	6	0	(5)	Minimum = 7.5 mg/L 15th percentile = 8.4
		2001	5	0	9.6	11.0	1/24/01			0		
pH	Standard units	2002	6	0	8.2	8.8	8/6/02	8.4	6.5-9	0	(5)	Minimum = 7.8 15th percentile = 7.8
		2001	6	0	8.1	8.3	11/1/00			0		
Specific conductance	µS/cm	2002	6	0	278	420	5/31/02	401	none	N/A	(5)	
		2001	6	0	240	401	7/18/01			N/A		
Temperature	°C	2002	6	0	12.4	21.4	8/6/02	17.7	20	1	N/A	
		2001	5	0	7.5	17.7	7/18/01			0		
Hardness (computed)	mg/L as $CaCO_3$	2002	4	0	150	196	5/31/02	164	none	N/A	(5)	
		2001	4	0	98	130	11/1/00			N/A		
Calcium	mg/L	2002	4	0	42.5	53.8	5/31/02	46.1	none	N/A	(5)	
		2001	4	0	27.7	37.0	11/1/00			N/A		
Magnesium	mg/L	2002	4	0	10.7	14.9	5/31/02	11.9	none	N/A	(5)	
		2001	4	0	6.9	9.0	11/1/00			N/A		
Ammonia	mg/L	2002	6	6	0.00	(5)	--	0.009	none	N/A	(5)	current LRL = 0.015
		2001	6	2	0.007	0.011	01/24/01			N/A		
Un-ionized ammonia (computed)	mg/L	2002	6	6	0	(5)	--	0.00019	0.02	0	(5)	
		2001	5	2	0.00006	0.00041	7/18/01			0		

Table 13. Summary of measured constituents and properties for Tomichi Creek below Cochetopa Creek station 383126106475600 —Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Ammonia plus organic nitrogen	mg/L	2002	6	0	0.18	0.40	5/31/02	0.40	none	N/A	(5)	
		2001	5	0	0.18	0.44	7/18/01			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	6	0	0.25	0.50	5/31/02	0.53	none	N/A	(5)	
		2001	5	0	0.25	0.54	7/18/01			N/A		
Nitrate plus nitrite	mg/L	2002	6	4	0	0.03	12/13/01	0.03	[6]10	0	(5)	current LRL = 0.013
		2001	6	1	0.01	0.09	1/24/01			0		
Nitrite	mg/L	2002	6	5	0	0.002	10/18/01	0.001	0.05	0	(5)	current LRL = 0.002
		2001	6	4	0	0.001	11/01/00			0		
Phosphorus	mg/L	2002	6	0	0.041	0.067	4/24/02	0.050	none	N/A	(5)	
		2001	5	0	0.032	0.050	8/31/01			N/A		
Orthophosphate	mg/L	2002	6	0	0.032	0.055	4/24/02	0.039	none	N/A	(5)	
		2001	6	0	0.026	0.031	7/18/01			N/A		
Phosphorus, total	mg/L	2002	6	0	0.060	0.091	4/24/02	0.091	0.1	0	(5)	concern
		2001	5	0	0.063	0.176	4/23/01			1		
Aluminum	µg/L	2002	4	4	0	(5)	--	0	87 (ch)	0	(5)	current LRL = 15
		2001	4	4	0	(5)	--			0		
Cadmium	µg/L	2002	4	4	0	(5)	--	0	2.7 (ch)	0	(5)	current LRL = 0.1
		2001	4	4	0	(5)	--			0		
Copper	µg/L	2002	4	2	0.3	0.7	8/16/02	0.7	11.3 (ch)	0	(5)	current LRL = 1
		2001	4	2	0.4	1.8	5/29/01			0		

Table 13. Summary of measured constituents and properties for Tomichi Creek below Cochetopa Creek station 383126106475600 —Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of exceedences		
Iron	μg/L	2002	4	0	52	77	4/24/02	98	300	0	(5)	water supply standard
		2001	4	0	96	111	4/23/01			0		
Lead	μg/L	2002	4	4	0	(5)	--	0	3.4 (ch)	0	(5)	current LRL = 1
		2001	4	4	0	(5)	--			0		
Manganese	μg/L	2002	4	0	44	117	5/31/02	59	1802	0	(5)	water supply standard is 50
		2001	4	0	28	42	4/23/01			0		
Silver	μg/L	2002	4	4	0	(5)	--	0	0.51(ch)	0	(5)	current LRL = 0.1
		2001	4	4	0	(5)	--			0		
Zinc	μg/L	2002	4	4	0	(5)	--	0	148(ch)	0	(5)	current LRL = 24
		2001	4	3	0	13	11/1/00			0		
Suspended sediment	mg/L	2002	4	0	2.9	5.2	4/24/02	42	none	N/A	(5)	
		2001	4	0	24	104	4/23/01			N/A		
Turbidity	NTU	2002	4	0	3.6	7.4	8/6/02	11.1	none	N/A	(5)	
		2001	4	0	7.7	37.1	4/23/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	5	0	8	73	8/6/02	81	126	0	(5)	Geometric mean = 18
		2001	6	0	36	143	7/18/01			1		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

09119000 TOMICHI CREEK AT GUNNISON, CO

Current Reason for Inclusion: This station represents contribution of the entire Tomichi Creek basin and allows for Tomichi Creek influences to be separated from those of the Gunnison River. Improves the spatial distribution of the network. Long-term monitoring.

General Station Information:
Location: 300 feet downstream from highway bridge, 1.8 miles southwest of United States Post Office in Gunnison and 2.0 miles upstream from mouth.

Station Type: USGS water quality and streamflow gaging

Latitude: 383118 Drainage Area: 1061 mi^2 HUC: 14020003
Longitude: 1065625 Stream Segment 18

USGS Data Summary:
Period of Record: Water quality: October 1990 - September 1993
April 1995 - September 2002
Streamflow gaging: October 1937- September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Total phosphorus: Concern

Trace Elements/Metals: Manganese: Concern if water supply standard used

Other constituents of concern: None

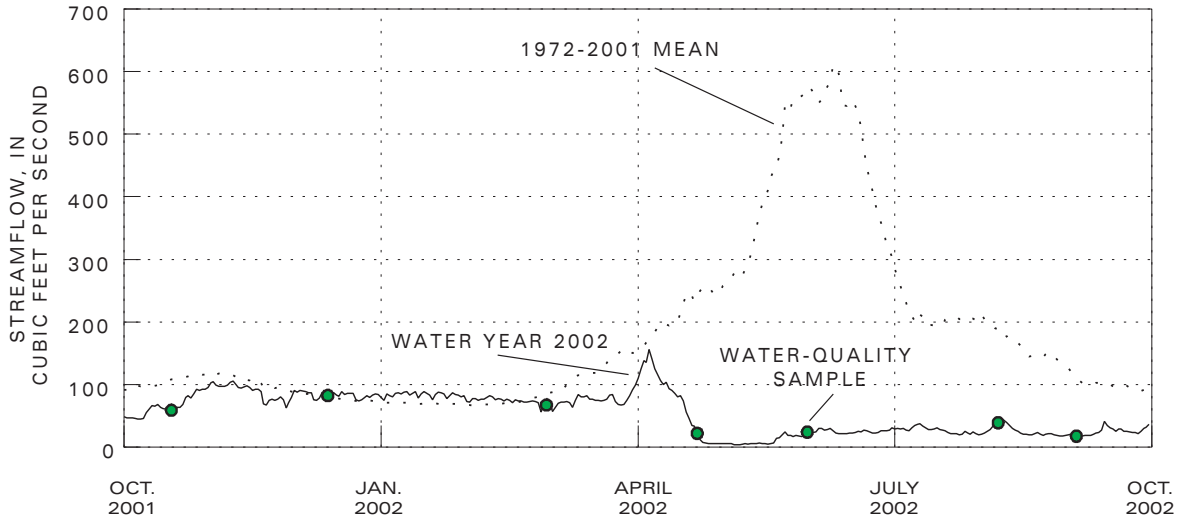


Figure 26. Daily mean streamflow and time distribution of water-quality samples for Tomichi Creek at Gunnison.

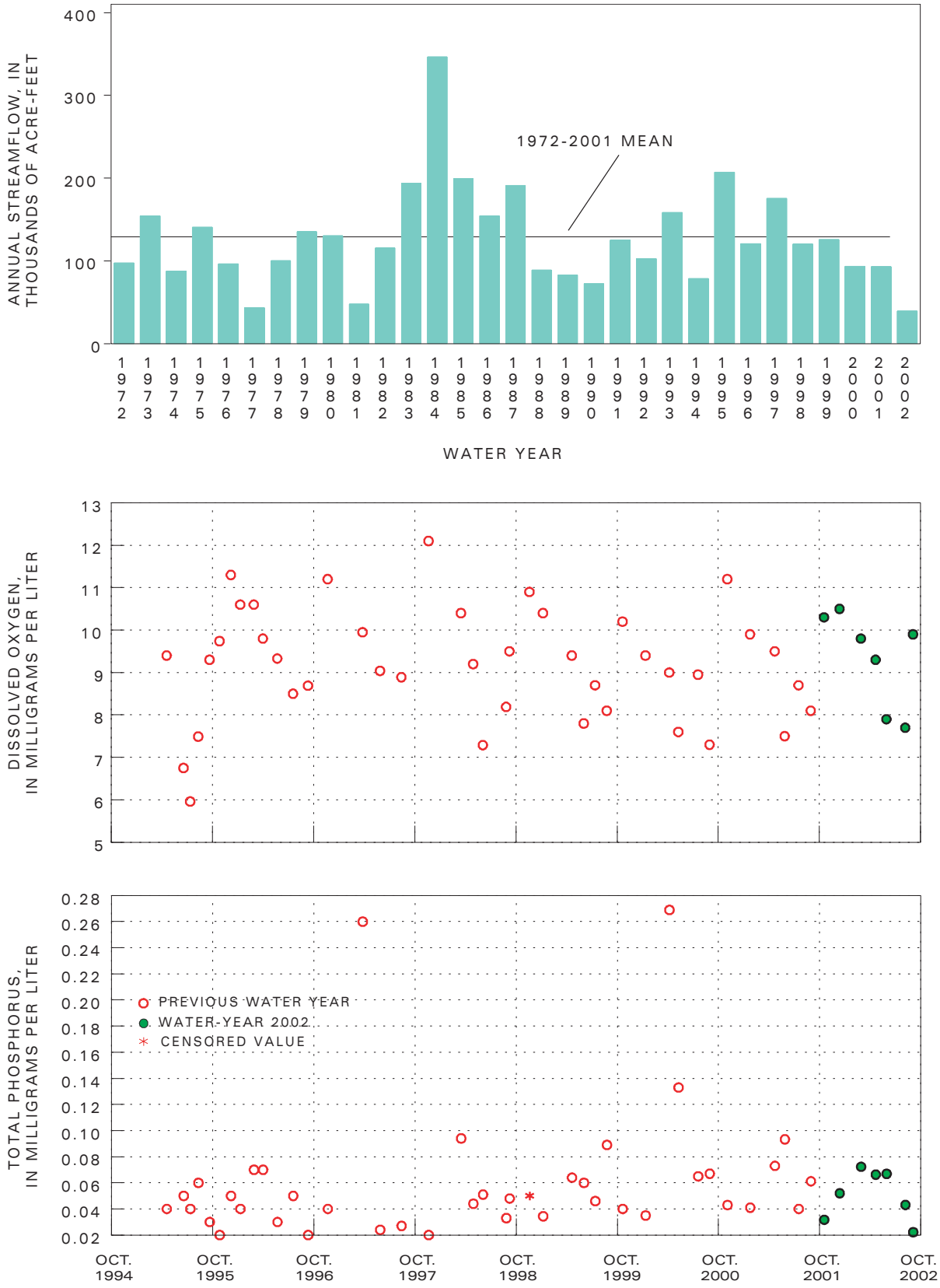


Figure 27. Annual streamflow and distribution of selected water-quality constituents relative to time for Tomichi Creek at Gunnison.

Table 14. Summary of measured constituents and properties for Tomichi Creek at Gunnison station 09119000

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Dissolved oxygen	mg/L	2002	7	0	9.8	10.5	12/13/01	10.5	6	0	down	Minimum = 6.0 mg/L 15th percentile = 7.7
		1995-2001	41	0	9.3	12.1	11/20/97			0		
pH	Standard units	2002	7	0	8.2	8.6	9/4/02	8.4	6.5-9	0	none	Minimum = 7.4 15th percentile = 7.9
		1995-2001	41	0	8.2	8.7	8/27/98			0		
Specific conductance	µS/cm	2002	7	0	330	399	5/31/02	340	none	N/A	none	
		1995-2001	41	0	247	398	7/20/00			N/A		
Temperature	°C	2002	7	0	12.0	20.0	5/31/02[4]	16.7	20	2	N/A	
		1995-2001	41	0	10.6	21.5	7/18/01			4		
Hardness (computed)	mg/L as $CaCO_3$	2002	5	0	168	191	5/31/02	167	none	N/A	(5)	
		1995-2001	27	0	109	169	7/19/96			N/A		
Calcium	mg/L	2002	5	0	46.5	56.7	5/31/02	46.4	none	N/A	(5)	
		1995-2001	27	0	30.4	48.0	7/19/96			N/A		
Magnesium	mg/L	2002	5	0	12.1	13.3	8/7/02	12.0	none	N/A	(5)	
		1995-2001	27	0	8.0	12.0	7/19/96			N/A		
Ammonia	mg/L	2002	7	6	0	0.009	8/7/02	0.020	none	N/A	(5)	current LRL = 0.015
		1995-2001	41	22	0	0.050	4/1/96			N/A		
Un-ionized ammonia (computed)	mg/L	2002	7	6	0	0.00036	9/4/02	0.00048	0.02	0	(5)	
		1995-2001	41	22	0	0.00169	7/19/96			0		

Table 14. Summary of measured constituents and properties for Tomichi Creek at Gunnison station 09119000—Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Ammonia plus organic nitrogen	mg/L	2002	7	0	0.16	0.41	5/31/02	0.40	none	N/A	(5)	
		1995-2001	41	12	0.20	0.50	6/19/95			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	7	0	0.26	0.50	5/31/02	0.51	none	N/A	(5)	
		1995-2001	41	6	0.30	1.19	4/7/00			N/A		
Nitrate plus nitrite	mg/L	2002	7	4	0	0.043	12/13/01	0.063	[6]10	0	(5)	current LRL = 0.013
		1995-2001	41	23	0	0.106	1/12/00			0		
Nitrite	mg/L	2002	7	6	0	0.002	10/18/01	0.001	0.05	0	(5)	current LRL = 0.002
		1995-2001	41	32	0	0.020	4/1/96			0		
Phosphorus	mg/L	2002	7	0	0.027	0.043	4/22/02	0.043	none	N/A	none	
		1995-2001	41	6	0.023	0.056	3/17/98			N/A		
Orthophosphate	mg/L	2002	7	0	0.014	0.032	4/22/02	0.036	none	N/A	none	
		1995-2001	41	3	0.021	0.041	8/27/98			N/A		
Phosphorus, total	mg/L	2002	7	0	0.052	0.072	2/28/02	0.072	0.1	0	none	concern
		1995-2001	41	1	0.046	0.269	4/7/00			3		
Aluminum	µg/L	2002	5	5	0	(5)	--	10	87 (ch)	0	(5)	current LRL = 15
		1995-2001	20	15	0	80	6/19/95			0		
Cadmium	µg/L	2002	5	5	0	(5)	--	0	2.4 (ch)	0	(5)	current LRL = 0.1
		1995-2001	20	20	0	(5)	--			0		
Copper	µg/L	2002	5	2	0.6	0.8	10/18/01	1.3	9.5 (ch)	0	(5)	current LRL = 1
		1995-2001	20	11	0	2.0	6/19/95			0		

Table 14. Summary of measured constituents and properties for Tomichi Creek at Gunnison station 09119000—Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Iron	μg/L	2002	5	0	48	108	4/22/02	135	300	0	(5)	water supply standard
		1995-2001	15	0	78	190	6/19/95			0		
Lead	μg/L	2002	5	4	0	0.09	9/4/02	0	2.7 (ch)	0	(5)	current LRL = 1
		1995-2001	20	20	0	(5)	--			0		
Manganese	μg/L	2002	5	0	57	124	4/22/02	57	1688	0	(5)	water supply standard is 50
		1995-2001	15	0	30	58	3/17/98			0		
Silver	μg/L	2002	5	5	0	(5)	--	0	0.36(ch)	0	(5)	current LRL = 0.1
		1999-2001	8	8	0	(5)	--			0		
Zinc	μg/L	2002	5	5	0	(5)	--	0	125(ch)	0	(5)	current LRL = 24
		1995-2001	20	18	0	12	6/4/98			0		
Suspended sediment	mg/L	2002	4	0	4.4	6.0	5/31/02	38	none	N/A	(5)	
		1995-2001	26	0	14	135	3/27/97			N/A		
Turbidity	NTU	2002	5	0	3.5	12.9	5/31/02	12.9	none	N/A	(5)	
		2001	4	0	6.5	13.6	5/29/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	7	1	20	150	5/31/02	150	126	1	(5)	Geometric mean = 17
		2001	6	0	25	269	8/31/01			1		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

383103106594200 GUNNISON RIVER AT COUNTY ROAD 32 BELOW GUNNISON, CO

Current Reason for Inclusion: This station is downstream from the City of Gunnison treatment plant discharge. When compared to sites 9 and 13, this site should give insight to the change in water quality due to point and non-point sources in the City of Gunnison. Characterize water-quality conditions upstream from Curecanti National Recreation Area. Long-term monitoring.

General Site Information:
Location: County Road 32 bridge, 0.25 mile south of U.S. Highway 50, and 3.3 miles west of Gunnison.

Station Type: USGS water quality
Latitude: 383103 Drainage Area: 2128 mi^2 HUC: 14020002
Longitude: 1065942 Stream Segment 14

USGS Data Summary:
Period of Record: Water quality: December 1994 - September 2002

General Chemistry: Water type: Calcium carbonate
Hardness: Moderately hard
pH: Low Concern
Dissolved oxygen: Low Concern

Nutrients: Total phosphorus: Concern

Trace Elements/Metals: Low Concern

Other constituents of concern: None

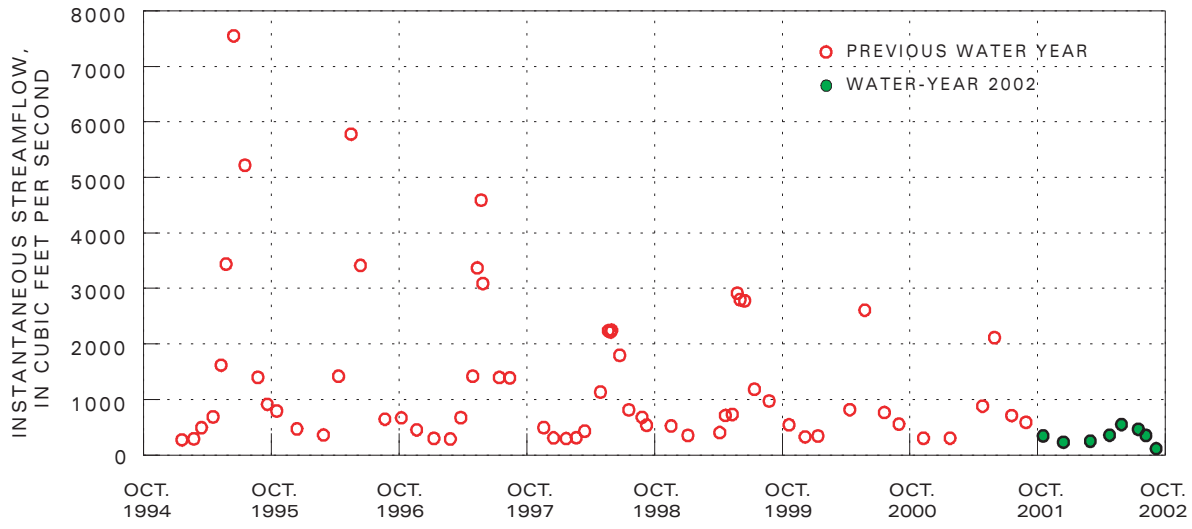


Figure 28. Time distribution and streamflow of water-quality samples for Gunnison River at County Road 32 below Gunnison.

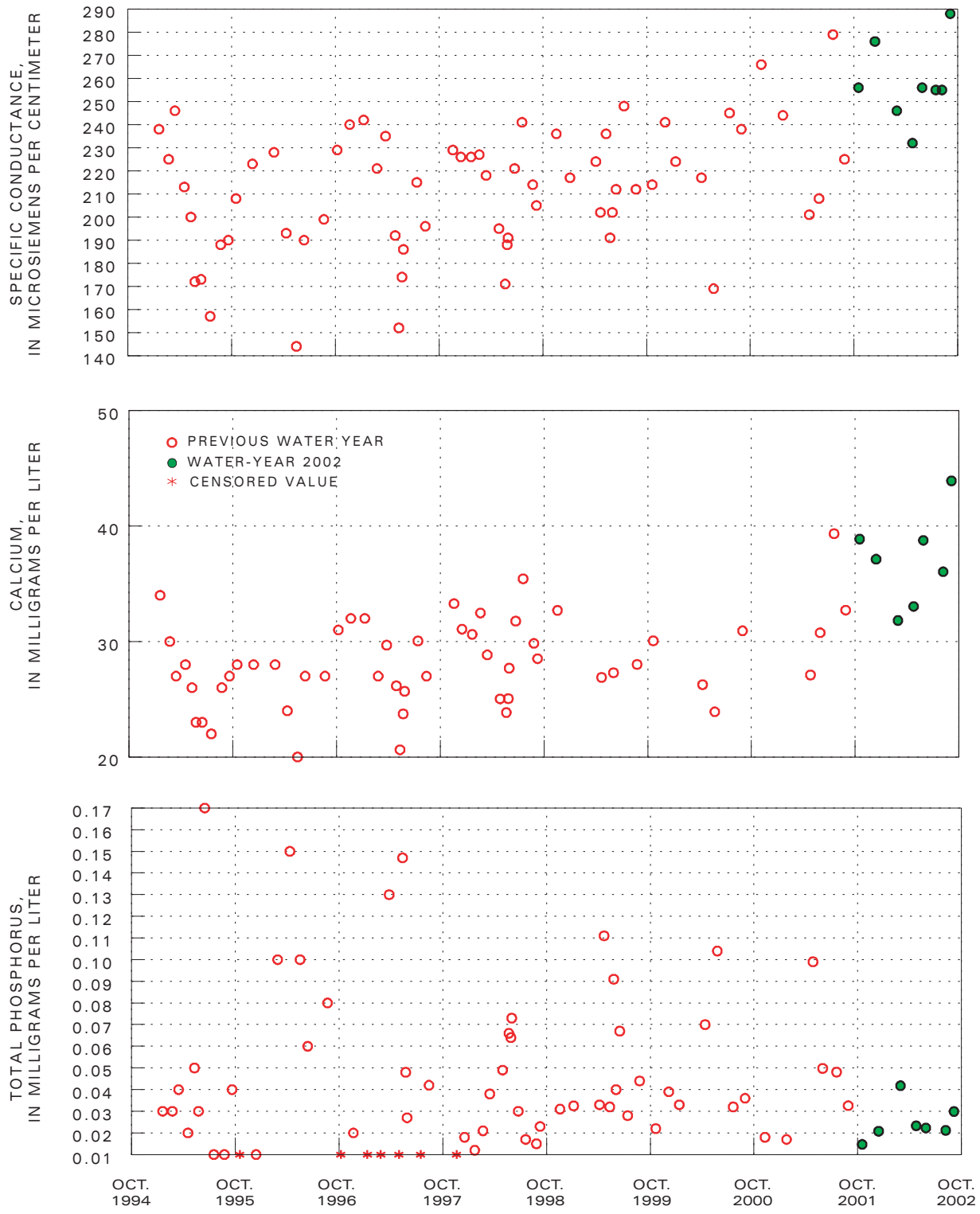


Figure 29. Distribution of selected water-quality constituents relative to time for Gunnison River at County Road 32 below Gunnison.

Table 15. Summary of measured constituents and properties for Gunnison River at County Road 32 below Gunnison station 383103106594200

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level; MBAS, methylene blue active substances]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Dissolved oxygen	mg/L	2002	7	0	9.3	10.9	3/1/02	11.2	6	0	none	Minimum = 7.0 mg/L 15th percentile = 8.2
		1995-2001	64	0	9.3	12.5	12/17/97			0		
pH	Standard units	2002	7	0	8.3	8.4	4/25/02	8.5	6.5-9	0	none	Minimum = 7.6 15th percentile = 8.0
		1995-2001	64	0	8.2	8.6	1/19/95[4]			0		
Specific conductance	µS/cm	2002	8	0	256	288	9/5/02	246	none	N/A	up	
		1995-2001	64	0	214	279	7/19/01			N/A		
Temperature	°C	2002	8	0	10.3	14.7	8/7/02	14.5	20	0	N/A	
		1995-2001	64	0	7.6	17.3	7/20/98			0		
Hardness (computed)	mg/L as $CaCO_3$	2002	7	0	126	147	9/5/02	114	none	N/A	up	
		1995-2001	53	0	94	133	7/19/01			N/A		
Calcium	mg/L	2002	7	0	37.1	43.9	9/5/02	33.2	none	N/A	up	
		1995-2001	53	0	28.0	39.3	7/19/01			N/A		
Magnesium	mg/L	2002	7	0	7.65	9.12	9/5/02	7.46	none	N/A	up	
		1995-2001	53	0	6.14	8.50	7/19/01			N/A		
Ammonia	mg/L	2002	7	7	0	(5)	--	0.020	none	N/A	(5)	current LRL = 0.015
		1995-2001	64	32	0.001	0.069	5/22/98			N/A		
Un-ionized ammonia (computed)	mg/L	2002	7	7	0	(5)	--	0.00047	0.02	0	(5)	
		1995-2001	64	32	0.00002	0.00275	9/9/98			0		

Table 15. Summary of measured constituents and properties for Gunnison River at County Road 32 below Gunnison station 383103106594200—Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level; MBAS, methylene blue active substances]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Ammonia plus organic nitrogen	mg/L	2002	7	0	0.08	0.15	5/29/02	0.20	none	N/A	(5)	current LRL = 0.1
		1995-2001	64	30	0.06	0.30	6/16/95[4]			N/A		
Ammonia plus organic nitrogen, total	mg/L	2002	7	0	0.15	0.18	5/29/02	0.37	none	N/A	(5)	current LRL = 0.1
		1995-2001	64	19	0.20	0.60	6/16/95[4]			N/A		
Nitrate plus nitrite	mg/L	2002	7	0	0.04	0.18	3/1/02	0.11	[6]10	0	(5)	
		1995-2001	64	12	0.06	0.14	1/9/97			0		
Nitrite	mg/L	2002	7	6	0	0.002	9/5/02	0.002	0.05	0	(5)	current LRL = 0.002
		1995-2001	64	38	0	0.020	6/13/96[4]			0		
Phosphorus	mg/L	2002	7	0	0.015	0.032	3/1/02	0.024	none	N/A	(5)	
		1995-2001	64	24	0.012	0.036	5/29/98			N/A		
Orthophosphate	mg/L	2002	7	0	0.008	0.026	3/1/02	0.020	none	N/A	(5)	
		1995-2001	64	10	0.014	0.032	2/20/98			N/A		
Phosphorus, total	mg/L	2002	7	0	0.022	0.042	3/1/02	0.080	0.1	0	none	conceren
		1995-2001	64	7	0.033	0.170	6/16/95			6		
Aluminum	µg/L	2002	7	7	0	(5)	--	8	87 (ch)	0	(5)	current LRL = 15
		1995-2001	21	13	0	11	6/1/98			0		
Cadmium	µg/L	2002	7	7	0	(5)	--	0	2.3 (ch)	0	(5)	current LRL = 0.1
		1999-2001	21	21	0	(5)	--			0		
Copper	µg/L	2002	7	4	0	0.8	3/1/02	1.1	9.2(ch)	0	(5)	current LRL = 1
		1995-2001	21	13	0	1.9	6/1/98			0		
Iron	µg/L	2002	7	0	17	20	5/29/02	62	300	0	none	water supply standard
		1995-2001	53	1	29	120	6/16/95			0		

Table 15. Summary of measured constituents and properties for Gunnison River at County Road 32 below Gunnison station 383103106594200—Continued

[mg/L, milligrams per liter; μS/cm, microsiemens per centimeter at 25° Celsius; μg/L, micrograms per liter; °C, degrees Celsius; $CaCO_3$, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL laboratory reporting level; MBAS, methylene blue active substances]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored samples	Median[1]	Maximum		85th percentile[1]	Standard[2]		Trend[3]	Comments
						Value	Date		Value	Number of Exceedences		
Lead	μg/L	2002	7	6	0	3.2	8/7/02	0	2.6 (ch)	0	(5)	current LRL = 1
		1995-2001	21	21	0	(5)	--			0		
Manganese	μg/L	2002	7	0	19	26	4/25/02	21	1663	0	none	water supply standard is 50
		1995-2001	53	0	15	38	3/16/95			0		
Silver	μg/L	2002	7	7	0	(5)	--	0	0.33 (ch)	0	(5)	current LRL = 0.1
		1999-2001	13	13	0	(5)	--			0		
Selenium	μg/L	2002	6	4	0	0.5	4/25/02	0.3	4.6 (ch)	0	(5)	current LRL = 0.3
		2001	6	5	0	0.3	9/20/95			0		
Zinc	μg/L	2002	7	6	0	5.0	9/5/02	5.2	121(ch)	0	(5)	current LRL = 24
		1995-2001	21	14	0	15.8	4/27/01			0		
Turbidity	NTU	2002	7	0	2.8	7.0	8/7/02	7.6	none	N/A	(5)	
		2001	4	0	6.2	13.7	4/27/01			N/A		
Escherichia Coli	Colonies per 100 mL	2002	7	0	12	65	8/7/02	65	126	0	(5)	Geometric mean = 16
		2001	5	0	32	97	5/31/01			0		
MBAS	mg/L	2002	6	5	0	0.01	8/7/02	0.06	none	N/A	(5)	current LRL = 0.05
		1995-2001	17	12	0	0.09	5/26/99			N/A		
Biochemical oxygen demand	mg/L	2002	3	0	1.1	2.8	3/1/02	1.9	none	N/A	(5)	
		1995-2001	20	0	1.1	2.4	5/29/98			N/A		

[1] Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see definitions section.
[2]Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2001); and USEPA, Quality criteria for water (1986).
[3]Period of record for trend analysis is water year 1996 - water year 2002; seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).
[4]Multiple dates for maximum.
[5]Statistic cannot be computed due to number of censored values or insufficient data.
[6]Instream standard for nitrate.

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