

Prepared in cooperation with:

Bureau of Land Management
City of Gunnison
Colorado River Water Conservation District
Crested Butte South Metropolitan District
Gunnison County
Hinsdale County

Mount Crested Butte Water and Sanitation District
National Park Service
Town of Crested Butte
Upper Gunnison River Water Conservancy District
Western State College

Comparison of Water Years 2004–05 and Historical Water-Quality Data, Upper Gunnison River Basin, Colorado



Data Series Report 331

FRONT COVER

Slate River near Crested Butte, Colorado.
Photograph by David Hartle, U.S. Geological Survey.

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By Norman E. Spahr, David M. Hartle, and Paul Diaz

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Data Series Report 331

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

U.S. Department of the Interior
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U.S. Geological Survey
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Conversion Factors and Datums

Multiply	By	To obtain
	Length	
inch	2.54	centimeter (cm)
inch	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
	Area	
acre	0.4047	hectare (ha)
square foot (ft ²)	0.09290	square meter (m ²)
square mile (mi ²)	259.0	hectare (ha)
square mile (mi ²)	2.590	square kilometer (km ²)
	Volume	
gallon (gal)	3.785	liter (L)
gallon (gal)	0.003785	cubic meter (m ³)
cubic foot (ft ³)	0.02832	cubic meter (m ³)
acre-foot (acre-ft)	1,233	cubic meter (m ³)
	Flow rate	
acre-foot per day (acre-ft/d)	0.01427	cubic meter per second (m ³ /s)
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:

$$^{\circ}\text{F}=(1.8\times^{\circ}\text{C})+32$$

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Altitude, as used in this report, refers to distance above the vertical datum.

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (μS/cm at 25°C).

Concentrations of chemical constituents in water are given either in milligrams per liter (mg/L) or micrograms per liter (μg/L).

Comparison of Water Years 2004–05 and Historical Water-Quality Data, Upper Gunnison River Basin, Colorado

By Norman E. Spahr, David M. Hartle, and Paul Diaz

Introduction

Population growth and changes in land use 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 the Bureau of Land Management, City of Gunnison, Colorado River Water Conservation District, Crested Butte South Metropolitan District, Gunnison County, Hinsdale County, Mount Crested Butte Water and Sanitation District, National Park Service, Town of Crested Butte, Upper Gunnison River Water Conservancy District, and Western State College, 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 long term and stations that are considered rotational. The long-term stations are monitored to assist in defining temporal changes in water quality (how conditions may change 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. Some stations in the rotational group were changed beginning in water year 2007. Annual summaries of the water-quality data from the monitoring network provide a point of reference for discussions regarding water-quality monitoring in the upper Gunnison River Basin.

This summary includes data collected during water years 2004 and 2005. The introduction provides a map of the sampling sites, 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 years 2004 and 2005 are compared to historical data, State water-quality standards, and Federal water-quality guidelines. Data were collected following USGS protocols (U.S. Geological Survey, variously dated).

Definitions of Terms

Constituent 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 of the data 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 than the standard.

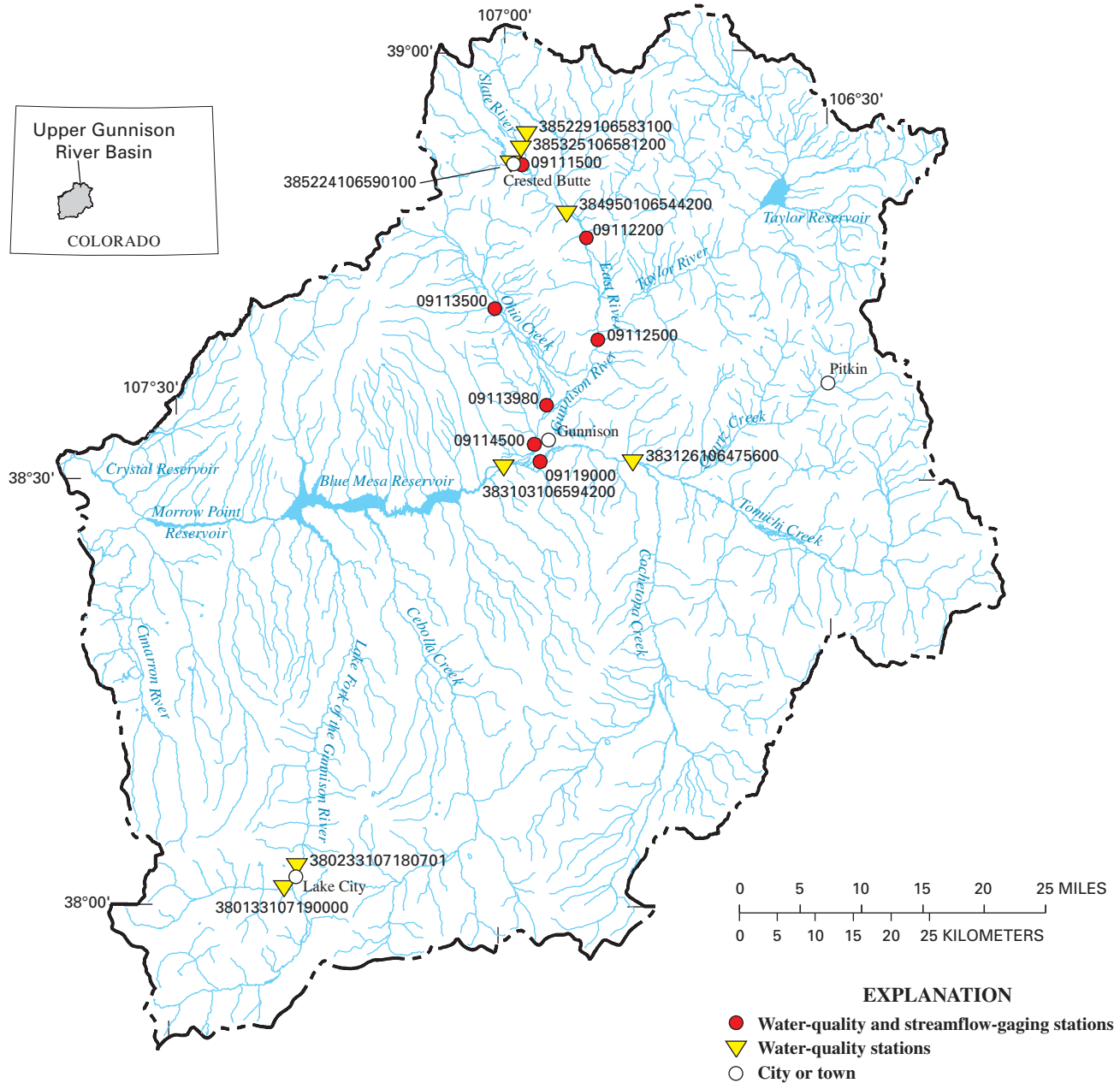
High Concern: The 85th percentile of the data is above the instream standard or recommended level.

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 *Escherichia coli* rather than the 85th percentile.

If a measured constituent is not listed with a concern level, it can be assumed that it is likely a low concern.

2 Comparison of Water Years 2004–05 and Historical Water-Quality Data, Upper Gunnison River Basin, Colorado



Long-term stations		Rotating stations	
Station number	Station name	Station number	Station name
09111500	Slate River near Crested Butte	385224106590100	Coal Creek above Mouth at Crested Butte
09112200	East River below Cement Creek	385325106581200	Washington Gulch below Woods Creek at Mount Crested Butte
09112500	East River at Almont	385229106583100	Crested Butte Wastewater Treatment Plant
09113980	Ohio Creek above mouth near Gunnison	384950106544200	East River above Slate River near Crested Butte
09119000	Tomichi Creek at Gunnison	09113500	Ohio Creek near Baldwin
383103106594200	Gunnison River at County Road 32 below Gunnison	09114500	Gunnison River near Gunnison
		383126106475600	Tomichi Creek below Cochetopa Creek
		380133107190000	Henson Creek at Mouth at Lake City
		380233107180701	Lake Fork Gunnison River near Lake City

Figure 1. Location of sampling sites.

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 April 2004 at http://www.cdphs.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 as follows:

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 milligram per liter (mg/L) for water not directly flowing into a lake or reservoir (U.S. Environmental Protection Agency, 1986).

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 or 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.

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 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.)

4 Comparison of Water Years 2004–05 and Historical Water-Quality Data, Upper Gunnison River Basin, Colorado

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](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.

Trend analyses were performed using the seasonal Kendall test (Helsel and Hirsch, 1993) using flow-adjusted concentrations. This analysis measures the monotonic relation between constituent concentration and time. Because the analysis is rank-based, it is resistant to the effects of small sample size, censored data, and non-normal population distributions. A trend was determined to be present when the p-value of the statistical test was less than the decision level (alpha-level) of 0.05. Trends identified as “up” indicate that the flow-adjusted concentrations increased more often than decreased over time. Trends identified as “down” indicate that the flow-adjusted concentration decreased more often than increased over time. A trend identified as “none” indicates there is insufficient evidence for rejection of the null hypothesis, which states that no relation between concentration and time exists.

Table 1. Summary of individual station results.

[Alk, Alkalinity; Ca, Calcium; Cd, Cadmium; Cl, chloride; Conductance, specific conductance; Al, aluminum; Cu, copper; DO, dissolved oxygen; *E. coli*, *Escherichia coli*; Fe, iron; Mg, magnesium; Mn, manganese; Ortho, orthophosphate; SO₄, sulfate; Zn, zinc]

Station name and number from figure 1 and table 1	Nutrients	Metals/ trace elements	pH, dissolved oxygen	<i>E. coli</i>	Trend
Coal Creek above Mouth at Crested Butte 385224106590100 ²	Low concern	High concern: Cd, Zn Concern: Al, Cu	Low concern	Low concern	None: DO, pH, conductance, calcium, magnesium, ammonia plus organic, nitrate, total phosphorus, Al, Cd, Cu, Fe, Mn, Zn, suspended sediment, <i>E. coli</i>
Washington Gulch below Woods Creek at Mount Crested Butte 385325106581200	High concern: total phosphorus ¹	No data	Low concern	Low concern	Insufficient data
Slate River near Crested Butte 09111500	Concern: total phosphorus ¹	Concern: Zn	Low concern	Low concern	Down: DO, ammonia plus organic Up: total phosphorus None: pH, conductance, hardness, ammonia, nitrate, orthophosphate, Fe, Zn, sediment
East River above Slate River near Crested Butte 384950106544200	Low concern	No data	Low concern	Low concern	None: DO, pH, conductance, nitrate
East River below Cement Creek 09112200	Low concern	Low concern	Low concern	Low concern	Up: chloride None: DO, pH, conductance, alkalinity, sulfate, nitrate, sediment
East River at Almont 09112500	Low concern	No data	Low concern	Low concern	Down: DO, nitrate Up: conductance None: pH
Ohio Creek near Baldwin 09113500	Concern: total phosphorus ¹	Low concern: Fe	Low concern	Low concern	Insufficient data
Ohio Creek above Mouth near Gunnison 09113980	Concern: total phosphorus ¹	No data	Low concern	Low concern	None: DO, pH, conductance, orthophosphate, total phosphorus
Gunnison River near Gunnison 09114500	Low concern	No data	Low concern	Low concern	Up: conductance None: DO, pH
Tomichi Creek below Cochetopa Creek 383126106475600	Concern: total phosphorus ¹	Low concern	Low concern	Low concern	Down: orthophosphate, total phosphorus None: DO, pH, conductance, hardness, Ca, Mg, ammonia plus organic, FE, Mn, <i>E. coli</i> , sediment
Tomichi Creek at Gunnison 09119000	Concern: total phosphorus ¹	Low concern	Low concern	Low concern	Down: orthophosphate None: DO, pH,, conductance, total phosphorus
Gunnison River at County Road 32 below Gunnison 383103106594200	Concern: total phosphorus ¹	Low concern	Low concern	Low concern	Up: conductance, hardness, Ca, Mg None: DO, pH, total phosphorus, manganese
Henson Creek at Mouth at Lake City 380133107190000	Low concern	Concern: Al, Zn	Low concern	No data	Insufficient data
Lake Fork Gunnison River near Lake City 380233107180701	Low concern	Concern: Al	Low concern	Low concern	Insufficient data

¹Total phosphorus concern levels are based on the USEPA recommendations of 0.1 milligram per liter (mg/L) for water not directly flowing into a lake or reservoir (U.S. Environmental Protection Agency, 1986).

²This station name was changed from Coal Creek above Mouth near Crested Butte, CO, to Coal Creek above Mouth at Crested Butte, CO, in 2003.

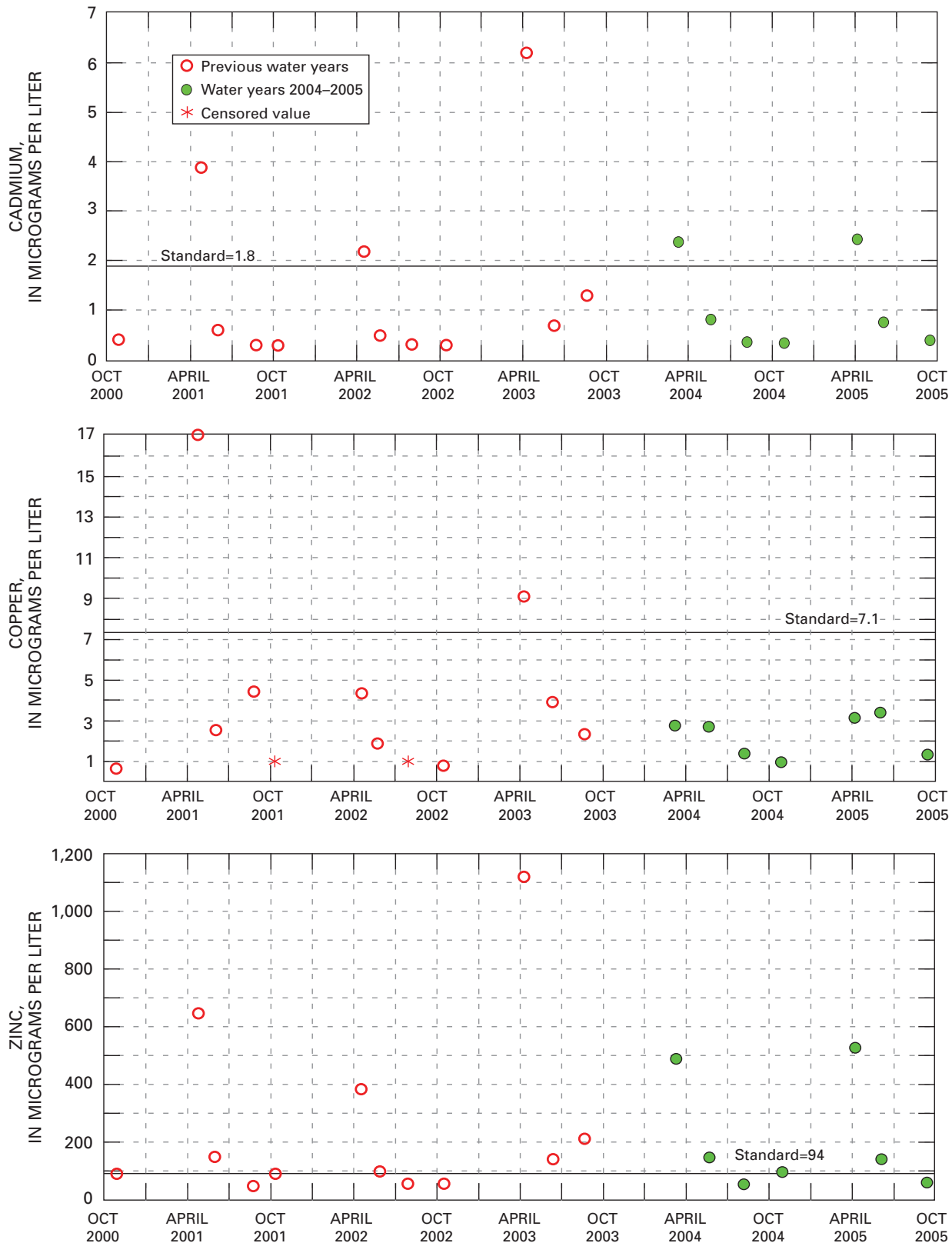


Figure 3. Distribution of selected water-quality constituents relative to time for Coal Creek above Mouth at Crested Butte.

Table 2. Summary of measured constituents and properties for Coal Creek above Mouth at Crested Butte station 385224106590100.

[This station name was changed from Coal Creek above Mouth near Crested Butte, CO, to Coal Creek above Mouth at Crested Butte, CO, in 2003. mg/L, milligrams per liter; $\mu\text{S/cm}$, microsiemens per centimeter at 25° Celsius; $\mu\text{g/L}$, 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; <, less than]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.4	10.6	01/13/04	10.1	6	0	None	Minimum=7.0
		2001–2003	18	0	9.4	10.3	02/26/02			0		15th percentile=7.7
pH	Standard units	2004–2005	11	0	7.7	8.3	11/04/04	8.0	6.5–9.0	0	None	Minimum=7.1
		2001–2003	18	0	7.7	8.2	08/05/02			0		15th percentile=7.4
Specific conductance	$\mu\text{S/cm}$	2004–2005	11	0	266	348	03/15/04	297	None	N/A	None	
		2001–2003	18	0	204	365	02/11/03			N/A		
Temperature	°C	2004–2005	11	0	3.4	15.8	08/12/04	12	20	0	N/A	
		2001–2003	18	0	3.4	16.3	08/05/02			0		
Hardness (computed)	mg/L as CaCO_3	2004–2005	7	0	96	156	03/15/04	129	None	N/A	(⁵)	
		2001–2003	12	0	60	129	08/05/02			N/A		
Calcium	mg/L	2004–2005	7	0	33	55	03/15/04	44	None	N/A	None	
		2001–2003	12	0	20	44	08/05/02			N/A		
Magnesium	mg/L	2004–2005	7	0	3.7	4.2	03/15/04	4.7	None	N/A	None	
		2001–2003	12	0	3.0	4.8	08/05/02			N/A		
Ammonia	mg/L	2004–2005	11	6	0	0.021	03/15/04	0.007	None	N/A	(⁵)	Current LRL=0.010
		2001–2003	18	13	0	0.010	04/15/03			N/A		
Un-ionized ammonia (computed)	mg/L	2004–2005	11	6	0	0.00007	03/15/04	0.00002	0.02	0	(⁵)	
		2001–2003	18	13	0	0.00011	08/30/01			0		
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	2	0.09	0.14	05/26/04	0.14	None	N/A	None	Current LRL=0.1
		2001–2003	18	5	0.08	0.19	04/15/03			N/A		
Nitrite plus nitrate	mg/L	2004–2005	11	2	0.04	0.20	03/15/04	0.10	⁶ 100	0	None	Current LRL=0.016
		2001–2003	18	2	0.05	0.49	04/15/03			0		
Nitrite	mg/L	2004–2005	11	5	0.001	0.001	⁴ 04/12/05	0.001	0.05	0	(⁵)	Current LRL=0.002
		2001–2003	18	16	0	0.002	12/06/01			0		
Orthophosphate	mg/L	2004–2005	11	11	0	⁷ <0.006	--	0	None	N/A	(⁵)	Current LRL=0.006
		2001–2003	18	18	0	⁷ <0.007	--			N/A		
Phosphorus (total)	mg/L	2004–2005	11	0	0.006	0.015	03/15/04	0.011	0.1	0	None	Current LRL=0.004
		2001–2003	18	4	0.005	0.021	05/01/01			0		
Aluminum	$\mu\text{g/L}$	2004–2005	7	0	39	81	06/08/05	81	87 (ch)	0	None	Concern
		2001–2003	12	0	45	240	05/01/01			2		

Table 2. Summary of measured constituents and properties for Coal Creek above Mouth at Crested Butte station 385224106590100.—Continued

[This station name was changed from Coal Creek above Mouth near Crested Butte, CO, to Coal Creek above Mouth at Crested Butte, CO, in 2003. mg/L, milligrams per liter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25° Celsius; $\mu\text{g}/\text{L}$, 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; <, less than]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Cadmium	$\mu\text{g}/\text{L}$	2004–2005	7	0	0.76	2.4	04/12/05	2.4	1.8 (ch)	2	None	High concern
		2001–2003	12	0	0.55	6.2	04/15/03			3		
Copper	$\mu\text{g}/\text{L}$	2004–2005	7	0	2.7	3.4	06/08/05	4.4	7.1 (ch)	0	None	Concern
		2001–2003	12	2	2.4	17.0	05/01/01			2		
Iron	$\mu\text{g}/\text{L}$	2004–2005	7	2	8	30	05/26/04	36	None	N/A	None	
		2001–2003	12	0	22	70	05/01/01			N/A		
Lead	$\mu\text{g}/\text{L}$	2004–2005	7	5	0	0.5	⁴ 06/08/05	0	1.8 (ch)	0	⁽⁵⁾	
		2001–2003	9	9	0	⁷ <1.0	--			0		
Manganese	$\mu\text{g}/\text{L}$	2004–2005	7	0	25	450	03/15/04	277	1509	0	None	
		2001–2003	12	0	40	598	04/15/03			0		
Silver	$\mu\text{g}/\text{L}$	2004–2005	7	7	0	⁷ <0.2	--	0	0.20 (ch)	0	⁽⁵⁾	Current LRL=0.2
		2001–2003	12	11	0	0.1	04/23/02			0		
Zinc	$\mu\text{g}/\text{L}$	2004–2005	7	0	141	526	04/12/05	526	94 (ch)	5	None	High concern
		2001–2003	12	0	121	1,120	04/15/03			8		
Suspended sediment	mg/L	2004–2005	7	1	4	13	04/12/05	12	None	N/A	None	
		2001–2003	12	1	2	13	04/15/03			N/A		
Turbidity	NTU	2004–2005	7	0	2	6	03/15/04	6	None	N/A	N/A	
		2001–2003	11	0	3	43	05/01/01			N/A		
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	4	1	22	07/25/05	⁽⁸⁾	126	0	None	Geometric mean=2.4
		2001–2003	18	4	1	19	08/26/03			0		

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1) see “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 2001–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

⁸Use geometric mean for comparison to standard.

385325106581200 Washington Gulch below Woods Creek at Mount Crested Butte, CO

Current Reason for Inclusion: To characterize nutrient concentrations. This station is part of the rotational group of stations.

General Station Information:

Location: 50 feet downstream from the 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 2005

General Chemistry:

Water type: No major-ion data

Hardness: No major-ion data

pH: Low concern

Dissolved oxygen: Low concern

Nutrients:

Total phosphorus: High concern

E. coli: Low concern

Trace Elements/Metals: No data

Other constituents of concern: None

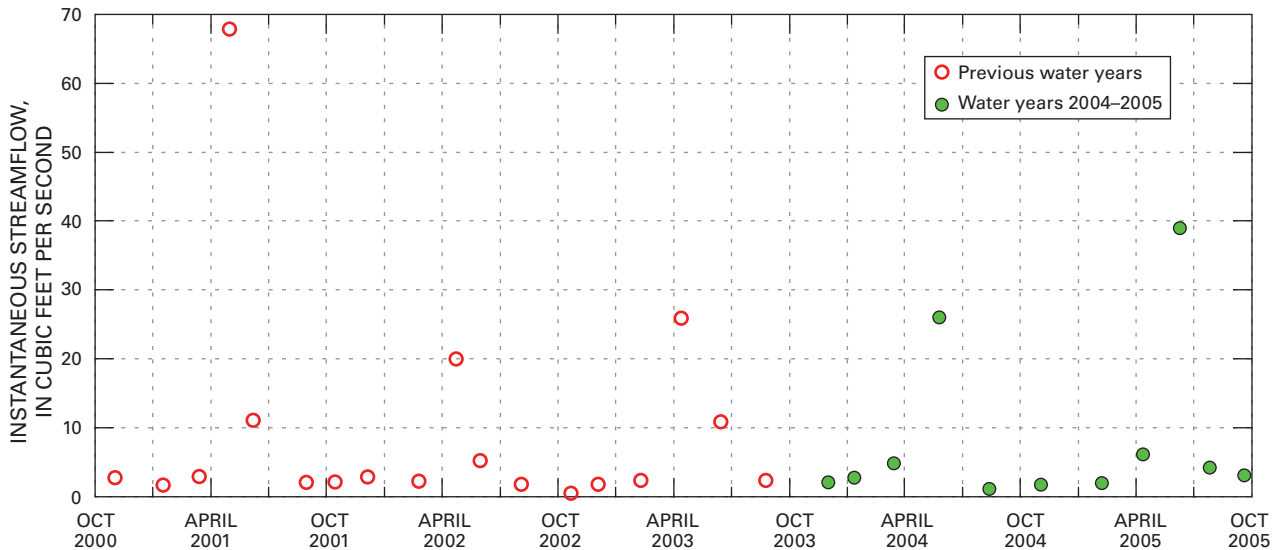


Figure 4. Time distribution and streamflow of water-quality samples for Washington Gulch below Woods Creek at Mount Crested Butte.

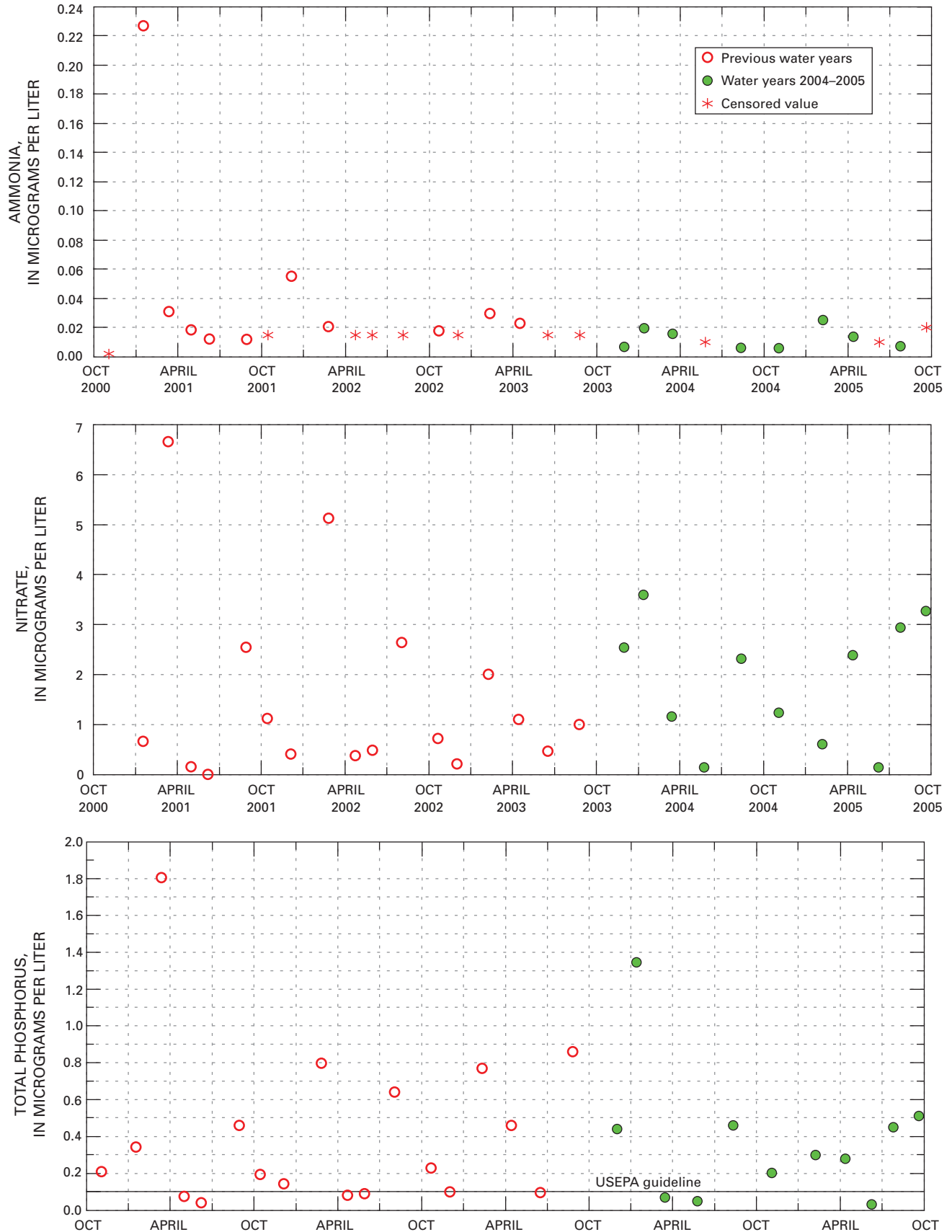


Figure 5. Distribution of selected water-quality constituents relative to time for Washington Gulch below Woods Creek at Mount Crested Butte.

Table 3. Summary of measured constituents and properties for Washington Gulch below Woods Creek station 385325106581200.

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; N/A, not applicable; mL, milliliters; --, no value; LRL, laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	7.9	10.1	04/12/05	9.9	6	0	None	Minimum=6.1 15th percentile=7.0
		2001–2003	18	0	8.7	10.2	01/17/01		0			
pH	Standard units	2004–2005	11	0	8.0	8.4	01/13/04	8.2	6.5–9.0	0	None	Minimum=7.5 15th percentile=7.8
		2001–2003	18	0	8.0	8.4	11/02/00		0			
Specific conductance	µS/cm	2004–2005	11	0	252	331	04/12/05	285	None	N/A	None	
		2001–2003	18	0	236	361	03/13/01		N/A			
Temperature	°C	2004–2005	11	0	4.2	15.7	08/12/04	15.5	20	0	N/A	
		2001–2003	18	0	6.4	18.0	08/05/02		0			
Ammonia	mg/L	2004–2005	11	3	0.007	0.025	02/07/05	0.025	None	N/A	⁽⁵⁾	Current LRL=0.010
		2001–2003	18	8	0.012	0.227	01/17/01		N/A			
Un-ionized ammonia (computed)	mg/L	2004–2005	10	3	0.00010	0.00057	01/13/04	0.00038	0.02	0	⁽⁵⁾	
		2001–2003	18	8	0.00013	0.00221	01/17/01		0			
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.34	0.65	04/12/05	0.58	None	N/A	None	
		2001–2003	18	0	0.36	2.50	03/13/01		N/A			
Nitrite plus nitrate	mg/L	2004–2005	11	0	2.3	3.60	01/13/04	2.9	⁽⁶⁾ 10	0	None	
		2001–2003	18	0	0.87	6.66	03/13/01		0			
Nitrite	mg/L	2004–2005	11	1	0.004	0.007	⁽⁴⁾ 03/15/04	0.011	0.05	0	None	Current LRL=0.002
		2001–2003	18	0	0.004	0.033	01/17/01		0			
Orthophosphate	mg/L	2004–2005	11	0	0.24	1.21	01/13/04	0.64	None	N/A	None	
		2001–2003	18	0	0.17	1.15	03/13/01		N/A			
Phosphorus (total)	mg/L	2004–2005	11	0	0.30	1.35	01/13/04	0.77	0.1	5	None	High concern
		2001–2003	18	0	0.22	1.81	03/13/01		13			
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	1	12	170	07/25/05	⁽⁷⁾	126	1	None	Geometric mean=18
		2001–2003	18	3	20	1,300	03/13/01		4			

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).³Period of record for trend analysis is water year 2001–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).⁴Multiple dates for maximum.⁵Statistic cannot be computed due to number of censored values or insufficient data.⁶Instream standard for nitrate.⁷Use geometric mean for comparison to standard.

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. Long-term monitoring. The station also characterizes 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 mi²

HUC: 14020002

Longitude: 1065808

Stream segment: 7

USGS Data Summary:

Period of Record:

Water quality:

March 1995–September 2005

Streamflow gaging:

April 1940–September 1951

October 1993–September 2005

General Chemistry:

Water type: Calcium carbonate

Hardness: Moderately hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients:

Total phosphorus: Concern

E. coli: Low concern

Trace Elements/Metals:

Concern: Zinc

Other constituents of concern: None

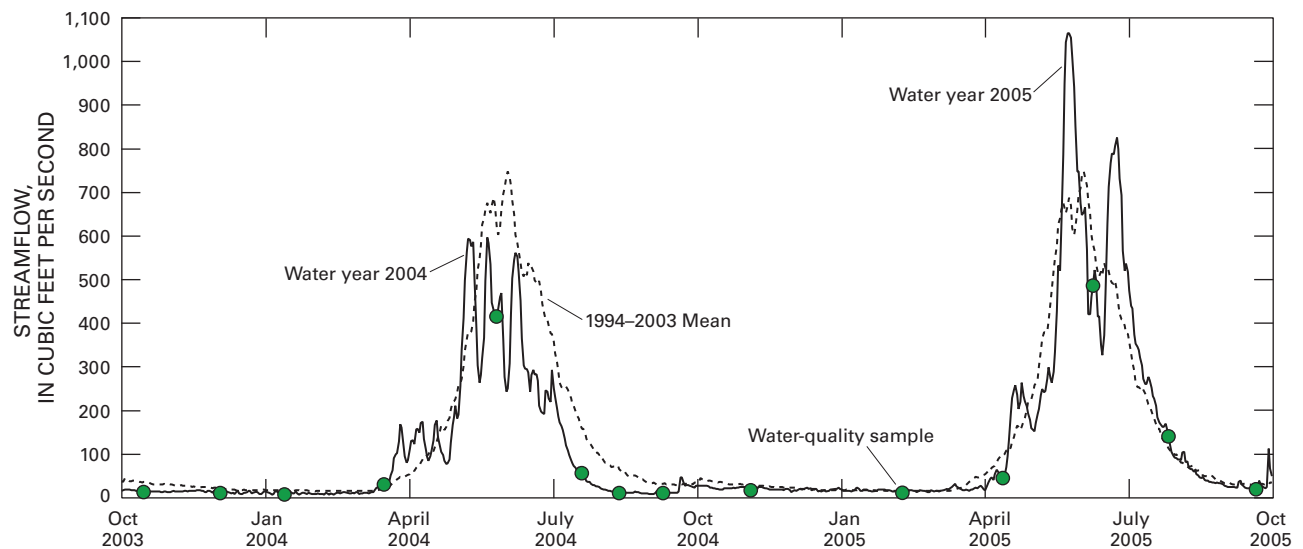


Figure 6. Daily mean streamflow and time distribution of water-quality samples for Slate River near Crested Butte.

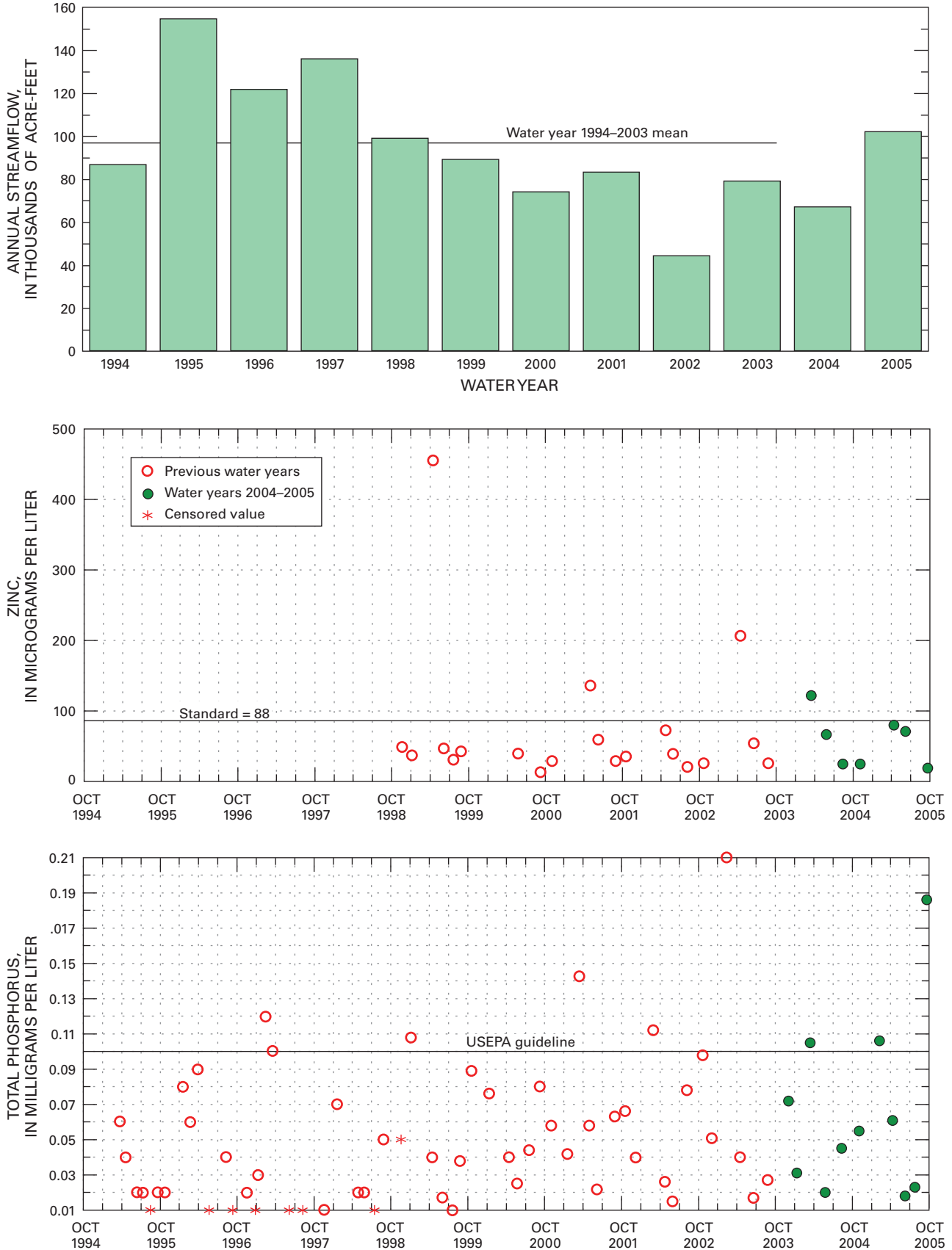


Figure 7. Annual streamflow and distribution of selected water-quality constituents relative to time for Slate River near Crested Butte.

Table 4. Summary of measured constituents and properties for Slate River near Crested Butte station 09111500.

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than; BOD, biochemical oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	8.8	10.2	01/13/04	9.9	6	0	Down	Minimum=6.2 15th percentile=7.6
		1995–2003	58	0	9.2	10.6	11/19/96		0			
pH	Standard units	2004–2005	11	0	7.4	7.8	⁴ 11/04/04	7.8	6.5–9.0	0	None	Minimum=7.0 15th percentile=7.3
		1995–2003	58	0	7.6	8.3	05/20/96					
Specific conductance	µS/cm	2004–2005	14	0	174	213	04/12/05	206	None	N/A	None	
		1995–2003	106	0	158	268	03/15/94		N/A			
Temperature	°C	2004–2005	14	0	7.4	18.7	07/19/04	12.0	20	0	N/A	
		1995–2003	106	0	4.0	18.0	08/05/02		0			
Hardness (computed)	mg/L as CaCO ₃	2004–2005	7	0	73	90	04/12/05	78	None	N/A	None	(99–05)
		1995–2003	35	0	66	87	03/25/95		N/A			
Calcium	mg/L	2004–2005	7	0	24	29	04/12/05	26	None	N/A	(°)	
		1995–2003	35	0	22	29	10/17/01		N/A			
Magnesium	mg/L	2004–2005	7	0	2.9	4.7	04/12/05	3.7	None	N/A	(°)	
		1995–2003	35	0	2.7	4.2	03/25/95		N/A			
Ammonia	mg/L	2004–2005	11	4	0.009	0.158	03/16/04	0.181	None	N/A	None	Current LRL=0.010
		1995–2003	56	7	0.060	0.779	02/27/02		N/A			
Un-ionized ammonia (computed)	mg/L	2004–2005	11	4	0.00001	0.00046	08/12/05	0.00092	0.02	0	(°)	
		1995–2003	56	7	0.00028	0.00370	08/25/99		0			
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.10	0.28	03/16/04	0.32	None	N/A	Down	
		1995–2003	56	18	0.16	0.96	02/27/02		N/A			
Nitrite plus nitrate	mg/L	2004–2005	11	0	0.18	0.41	12/03/03	0.36	⁶ 10	0	None	
		1995–2003	56	0	0.17	0.71	02/18/97		0			
Nitrite	mg/L	2004–2005	11	1	0.002	0.007	09/20/05	0.01	0.05	0	(°)	Current LRL=0.002
		1995–2003	56	25	0.002	0.030	⁴ 10/24/95		0			
Orthophosphate	mg/L	2004–2005	11	1	0.019	0.145	09/20/05	0.07	None	N/A	None	Current LRL=0.006
		1995–2003	56	15	0.021	0.162	02/11/03		N/A			
Phosphorus (total)	mg/L	2004–2005	11	0	0.055	0.186	09/20/05	0.090	0.1	3	up	Concern
		1995–2003	56	8	0.040	0.210	02/11/03		6			
Aluminum	µg/L	2004–2005	7	0	7	34	06/08/05	30	87 (ch)	0	(°)	
		1999–2003	17	2	20	70	05/02/01		0			
Cadmium	µg/L	2004–2005	7	1	0.21	0.42	05/26/04	0.42	1.7 (ch)	0	(°)	Current LRL=0.04
		1999–2003	20	5	0.20	1.2	04/14/99		0			

Table 4. Summary of measured constituents and properties for Slate River near Crested Butte station 09111500.—Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than; BOD, biochemical oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Copper	µg/L	2004–2005	7	0	1.0	3.4	06/08/05	2.2	6.6 (ch)	0	(°)	
		1999–2003	20	7	1.0	4.3	05/02/01		0			
Iron	µg/L	2004–2005	7	0	26	77	09/20/05	71	None	N/A	None	(99–05)
		1995–2003	27	0	55	85	11/19/98			N/A		
Lead	µg/L	2004–2005	7	2	0.14	0.61	06/08/05	0.24	1.7 (ch)	0	(°)	Current LRL=0.08
		1999–2003	15	14	0	1.0	06/17/03		0			
Manganese	µg/L	2004–2005	7	0	49	117	03/16/04	93	1,467 (ch)	0	(°)	
		1995–2003	27	0	48	158	04/14/99		0			
Silver	µg/L	2004–2005	7	7	0	⁷ <0.2	--	0	0.17 (ch)	0	(°)	Current LRL=0.2
		1999–2003	20	20	0	⁷ <0.2	--		0			
Zinc	µg/L	2004–2005	7	0	66	122	03/16/04	79	88	1	None	Concern
		1999–2003	20	0	40	455	04/14/99			3		
Suspended sediment	mg/L	2004–2005	6	0	4	101	05/26/04	13	None	N/A	None	(99–05)
		1999–2003	20	0	5	53	05/02/01			N/A		
Turbidity	NTU	2004–2005	7	4	0	4	06/08/05	7	None	N/A	(°)	
		2001–2003	11	0	3	52	05/02/01			N/A		
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	0	3	130	08/12/04	(°)	126	1	(°)	Geometric mean=7
		2001–2002	18	0	8	130	03/14/01			1		
BOD	mg/L	2004–2005	11	11	0	⁷ <2	--	2.2	None	N/A	(°)	
		1997–2002	15	11	0	3	03/14/01			N/A		

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado 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).

³Period of record for trend analysis is water year 1996–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

⁸Use geometric mean for comparison to standard.

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 and is part of the rotational group of stations.

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

Latitude: 384850

Drainage area: 102 mi²

HUC: 14020001

Longitude: 1065336

Stream segment: 5

USGS Data Summary:

Period of Record:

Water quality: April 1995–September 2005

General Chemistry:

Water type: Calcium carbonate

Hardness: Hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients: Low concern

E. coli: Low concern

Trace Elements/Metals: No data

Other constituents of concern: None

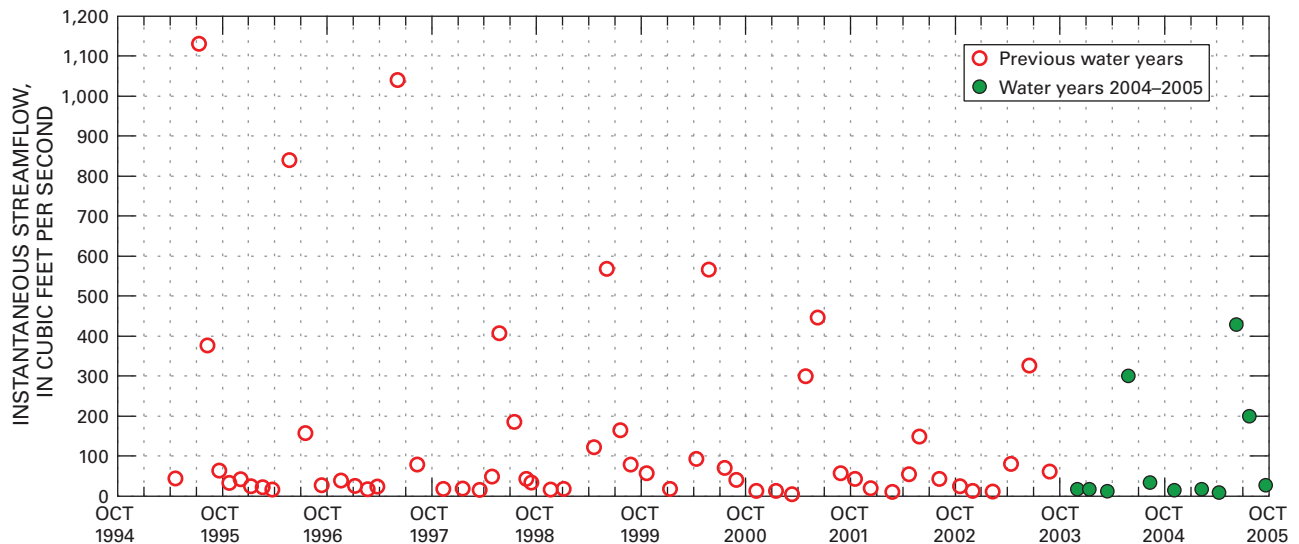


Figure 8. Time distribution and streamflow of water-quality samples for East River above Slate River near Crested Butte.

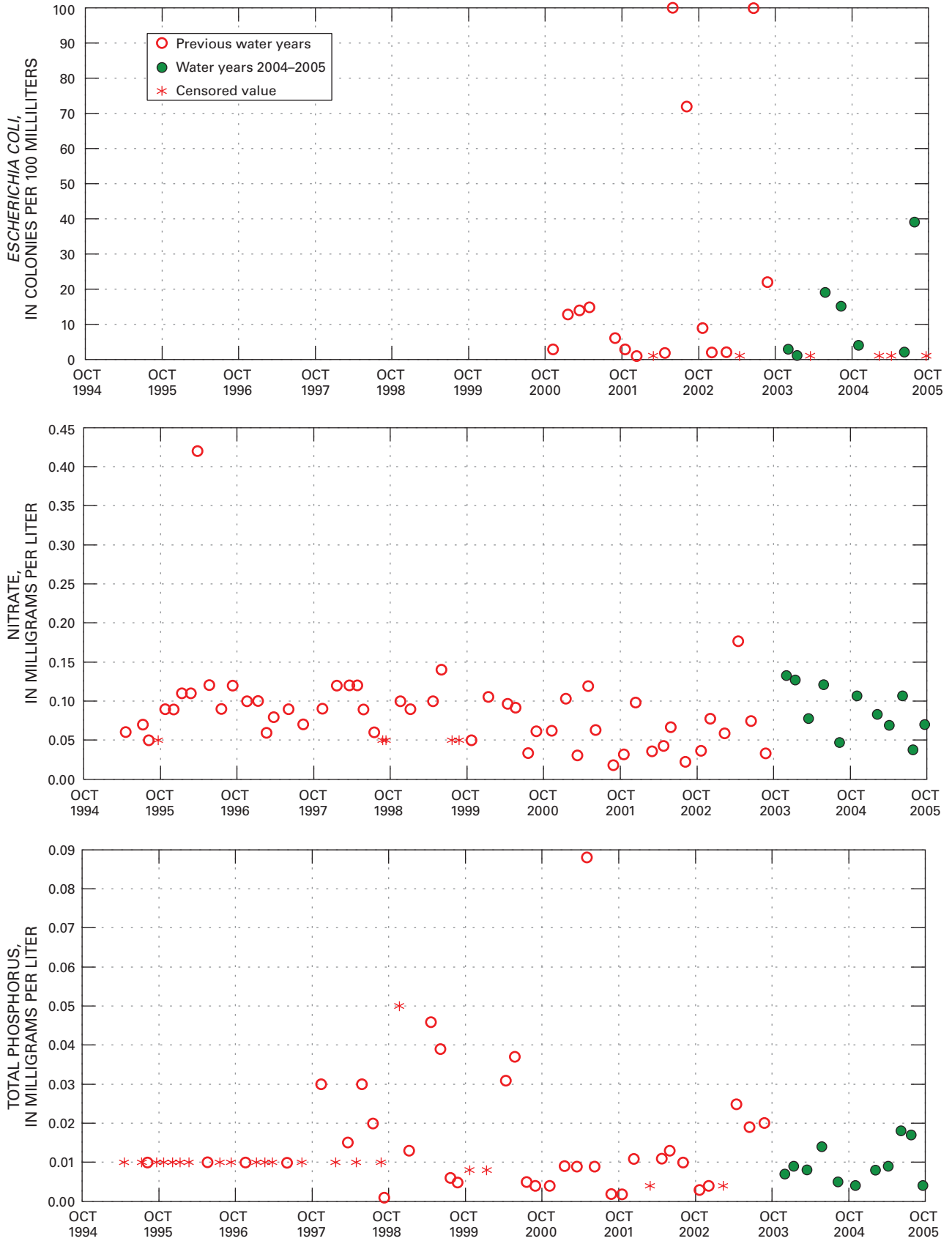


Figure 9. Distribution of selected water-quality constituents relative to time for East River above Slate River near Crested Butte.

Table 5. Summary of measured constituents and properties for East River above Slate River station 384950106544200.

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; N/A, not applicable; mL, milliliters; --, no value; LRL, laboratory reporting level; BOD, biochemical oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.6	11.4	04/07/05	10.7	6	0	None	Minimum=7.3 15th percentile=7.9
		1995–2003	56	0	9.7	12.4	03/26/97		0			
pH	Standard units	2004–2005	11	0	8.3	8.9	03/16/04	8.4	6.5–9.0	0	None	Minimum=7.4 15th percentile=8.1
		1995–2003	57	0	8.2	8.6	⁴ 03/14/01		0			
Specific conductance	µS/cm	2004–2005	11	0	334	356	01/13/04	337	None	N/A	None	
		1995–2003	56	0	317	361	11/08/00		None	N/A		
Temperature	°C	2004–2005	11	0	3.6	16.0	08/11/04	11.0	20	0	N/A	
		1995–2003	56	0	4.0	14.5	05/30/02		0	0		
Ammonia	mg/L	2004–2005	11	4	0.008	0.037	01/13/04	0.030	None	N/A	(⁵)	Current LRL = 0.01
		1995–2003	56	30	0	0.076	12/12/01		None	N/A		
Un-ionized ammonia (computed)	mg/L	2004–2005	11	4	0.0001	0.00082	03/16/04	0.0007	0.02	0	(⁵)	
		1995–2003	56	30	0	0.00156	02/19/97		0	0		
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	3	0.08	0.14	01/13/04	0.13	None	N/A	(⁵)	Current LRL=0.1
		1995–2003	56	29	0	0.42	05/02/01		None	N/A		
Nitrite plus nitrate	mg/L	2004–2005	11	0	0.08	0.13	12/03/03	0.12	⁶ 10	0	None	
		1995–2003	56	5	0.08	0.42	03/27/96		0	0		
Nitrite	mg/L	2004–2005	11	2	0.001	0.003	03/16/04	0.002	0.05	0	(⁵)	Current LRL=0.002
		1995–2003	56	41	0	0.020	⁴ 10/25/95		0	0		
Orthophosphate	mg/L	2004–2005	11	6	0	0.004	⁴ 04/07/05	0.004	None	N/A	(⁵)	Current LRL=0.007
		1995–2003	56	42	0	0.040	03/27/96		None	N/A		
Phosphorus (total)	mg/L	2004–2005	11	0	0.008	0.018	06/08/05	0.020	0.1	0	(⁵)	
		1995–2003	55	21	0.004	0.088	05/02/01		0	0		
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	4	2	39	07/26/05	(⁷)	126	0	(⁵)	Geometric mean=5
		2001–2003	17	2	6	100	⁴ 05/30/02		0	0		
BOD	mg/L	2004–2005	11	10	0	1.0	09/20/05	0.9	None	N/A	(⁵)	
		1995–2003	39	31	0	2.6	⁴ 04/19/95		None	N/A		

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado 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).

³Period of record for trend analysis is water year 1996–water year 2003; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷Use geometric mean for comparison to standard.

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 Site 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: 1065613	Stream segment: 5	

USGS Data Summary:

Period of Record:

Water quality:

October 1993–September 2005

Streamflow gaging:

October 1963–September 1972

October 1979–September 1981

October 1993–September 2005

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: Low concern (based on historical information 1994–2001)

Other constituents of concern: None

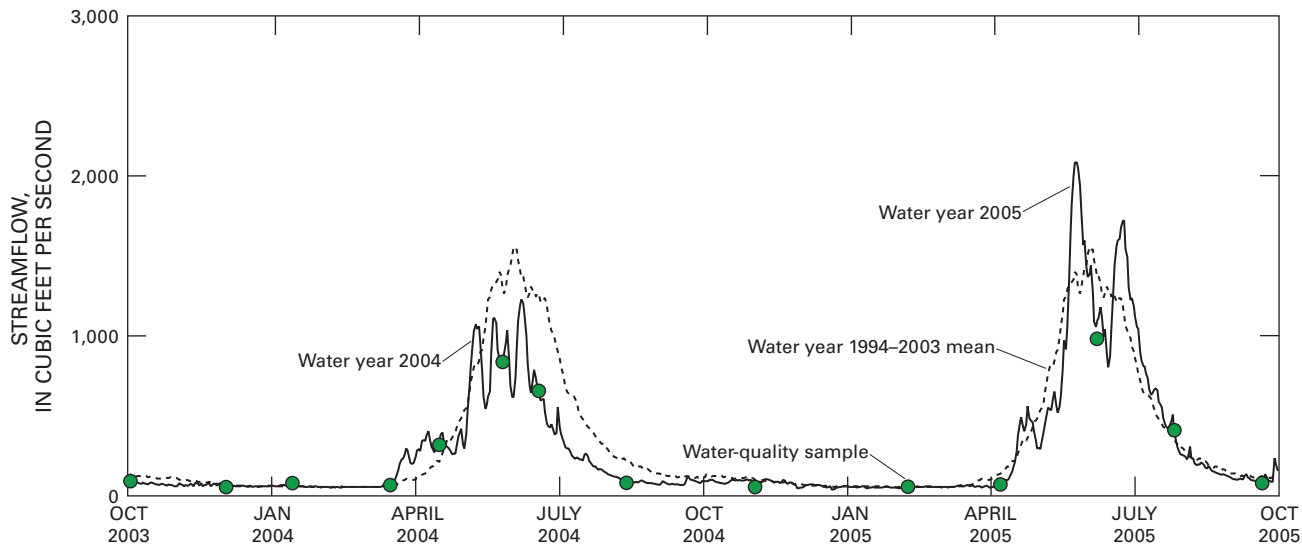


Figure 10. Daily mean streamflow and time distribution of water-quality samples for East River below Cement Creek.

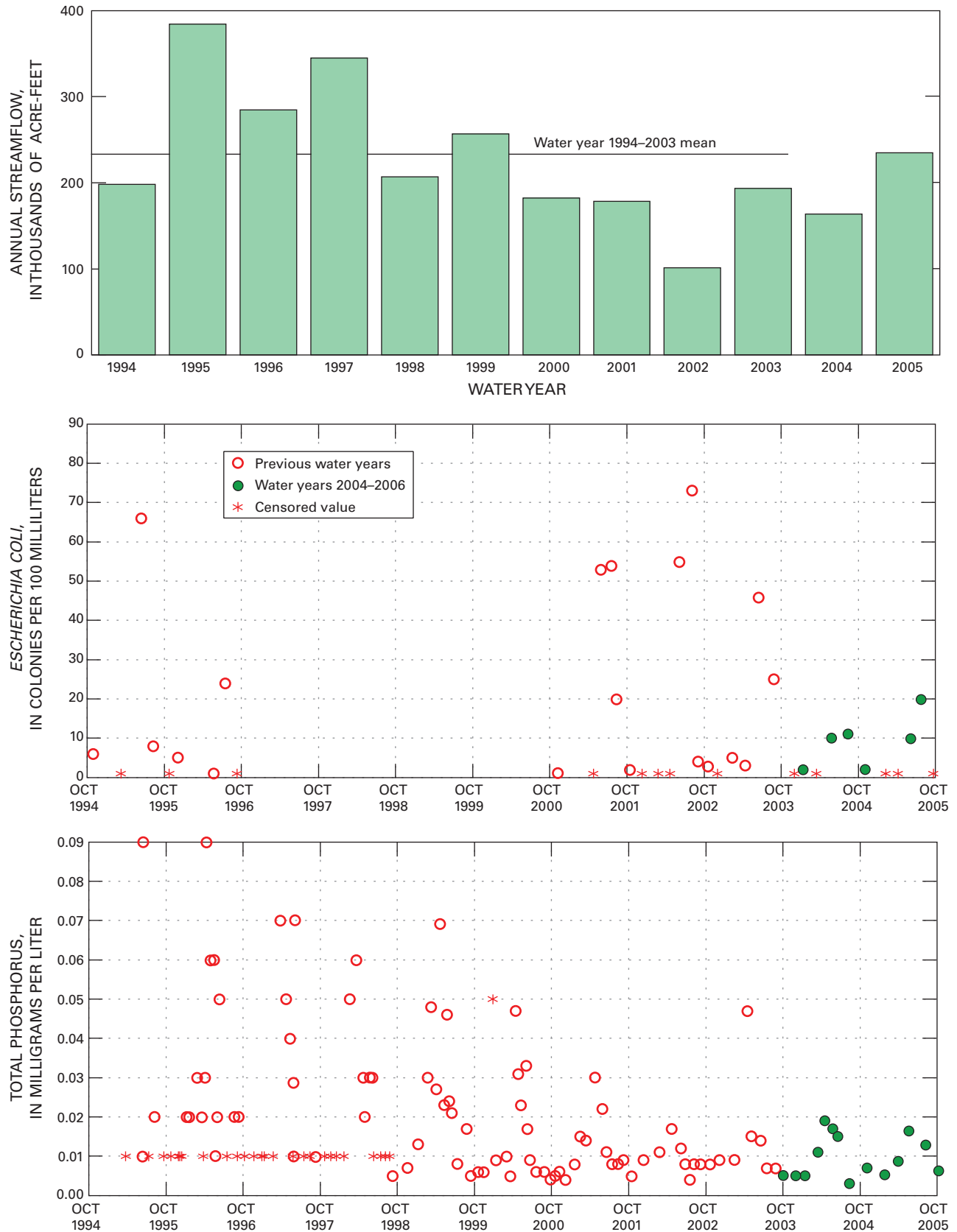


Figure 11. Annual streamflow and distribution of selected water-quality constituents relative to time for East River below Cement Creek.

Table 6. 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; N/A, not applicable; mL, milliliters; LRL, laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	14	0	8.5	12.0	02/08/05	10.8	6	0	None	Minimum=7.1
		1994–2003	120	0	9.4	12.7	03/25/94		0	15th percentile=8.0		
pH	Standard units	2004–2005	14	0	8.4	8.8	⁴ 01/14/04	8.6	6.5–9.0	0	None	Minimum=7.6
		1994–2003	120	0	8.3	9.0	⁴ 02/27/96					0
Specific conductance	µS/cm	2004–2005	14	0	290	328	08/13/04	314	None	N/A	None	
		1994–2003	120	0	278	335	09/03/02		N/A			
Temperature	°C	2004–2005	14	0	7.6	15.6	07/26/05	11.9	20	0	N/A	
		1994–2003	120	0	5.6	17.2	08/05/98		0			
Alkalinity	mg/L	2004–2005	14	0	114	142	⁴ 01/14/04	122	None	N/A	None	
		1995–2003	97	0	103	136	02/26/02		N/A			
Sulfate	mg/L	2004–2005	14	0	32	40	01/14/04	36	250	0	None	
		1995–2003	112	0	30	40	02/12/03		0			
Chloride	mg/L	2004–2005	14	0	2.0	3.8	03/16/04	2.1	250	0	Up	
		1995–2003	112	0	1.3	3.7	01/18/96		0			
Ammonia	mg/L	2004–2005	14	7	0.002	0.011	⁴ 06/07/05	0.027	None	N/A	(°)	Current LRL=0.01
		1994–2003	119	56	0.003	0.110	03/19/98		N/A			
Un-ionized ammonia (computed)	mg/L	2004–2005	14	7	0.00003	0.00074	02/08/05	0.00066	0.02	0	(°)	
		1994–2003	119	56	0.00007	0.00705	03/19/98		0			
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	14	2	0.09	0.17	04/16/04	0.19	None	N/A	(°)	Current LRL=0.1
		1995–2003	113	44	0.08	0.40	⁴ 04/23/97		N/A			
Nitrite plus nitrate	mg/L	2004–2005	14	0	0.08	0.19	04/16/04	0.16	⁶ 10	0	None	
		1994–2003	119	5	0.09	0.32	05/06/03		0			
Nitrite	mg/L	2004–2005	14	4	0.001	0.002	⁴ 04/07/05	0.002	0.05	0	(°)	Current LRL=0.002
		1994–2003	119	72	0	0.020	⁴ 03/27/96		0			
Orthophosphate	mg/L	2004–2005	14	13	0	0.003	11/03/04	0.010	None	N/A	(°)	Current LRL=0.006
		1994–2003	119	81	0	0.040	02/19/98		N/A			
Phosphorus (total)	mg/L	2004–2005	14	0	0.008	0.019	04/16/04	0.030	0.1	0	(°)	
		1995–2003	113	27	0.009	0.090	⁴ 06/16/95		0			
Suspended sediment	mg/L	2004–2005	13	2	2	10	06/07/05	19	None	N/A	None	
		1995–2003	92	1	3	241	06/16/95		N/A			
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	5	2	20	07/26/05	(°)	126	0	(°)	Geometric mean=5
		1994–2003	31	8	4	82	06/01/94		0			

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1996–water year 2003; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷Use geometric mean for comparison to standard.

09112500 East River at Almont, CO

Current Reason for Inclusion: Allows contributions of the East River to be identified. 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 mi²

HUC: 14020001

Longitude: 1065051

Stream segment: 5

USGS Data Summary:

Period of Record:

Water quality: October 1990–September 2005

Streamflow gaging: October 1934–September 2005

General Chemistry:

Water type: Calcium carbonate

Hardness: Hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients: Low concern

E. coli: Low concern

Trace Elements/Metals: No data

Other constituents of concern: None

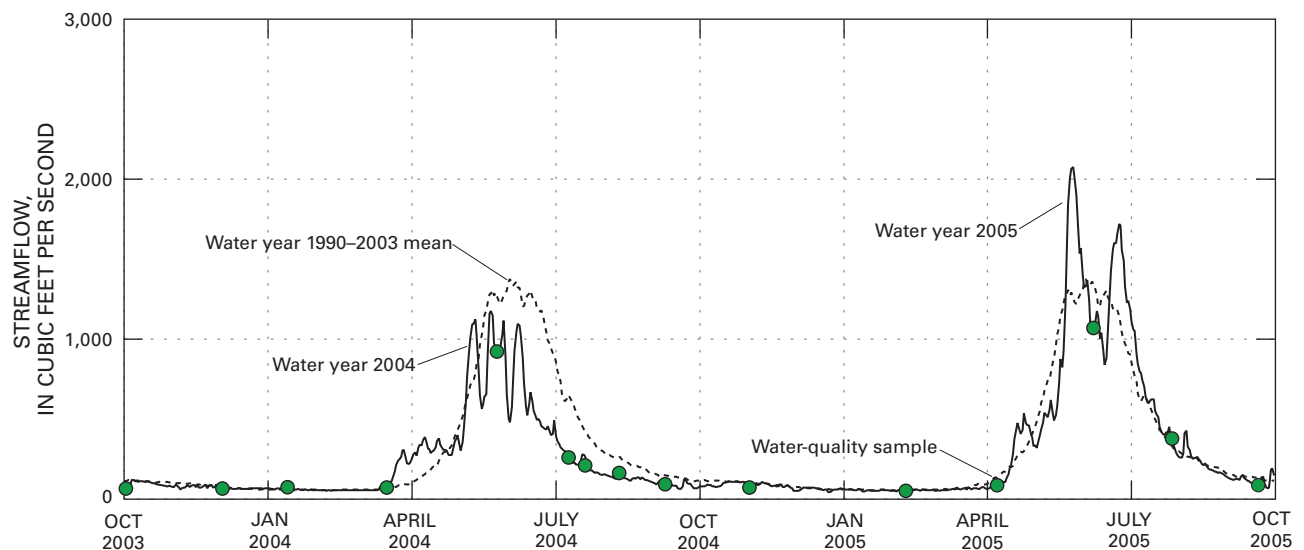


Figure 12. Daily mean streamflow and time distribution of water-quality samples for East River at Almont.

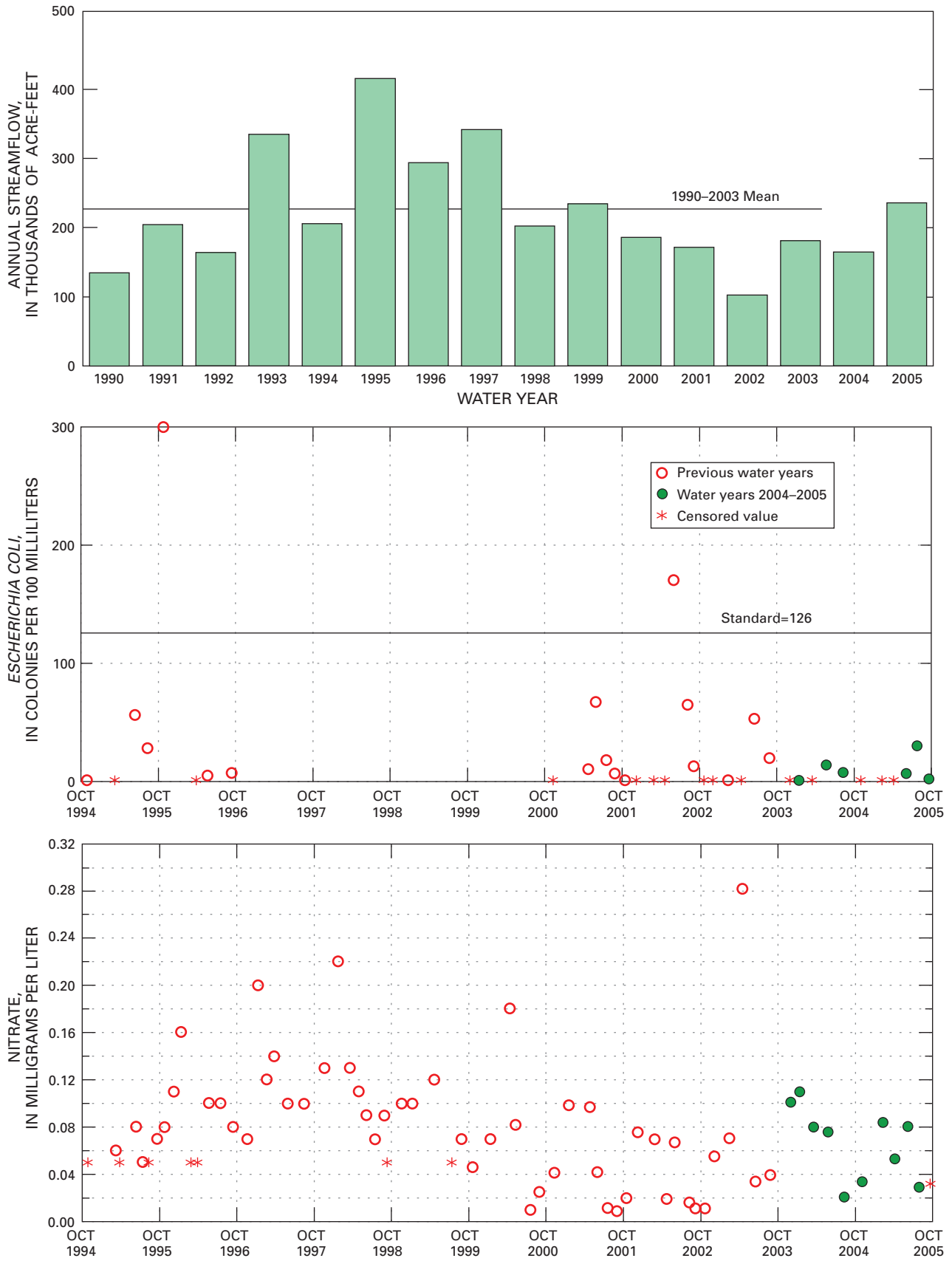


Figure 13. Annual streamflow and distribution of selected water-quality constituents relative to time for East River at Almont.

Table 7. 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; N/A, not applicable; mL, milliliters; LRL, laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	8.3	10.5	12/03/03	11.0	6	0	Down	Minimum=7.0
		1991–2003	75	0	9.4	12.8	⁴ 11/17/93			0		15th percentile=8.0
pH	Standard	2004–2005	11	0	8.3	8.7	03/16/04	8.6	6.5–9.0	0	None	Minimum=7.5
	units	1991–2003	76	0	8.3	8.9	⁴ 11/17/93			0		15th percentile=8.1
Specific conductance	µS/cm	2004–2005	15	0	309	349	09/09/04	330	None	N/A	Up	
		1990–2003	172	0	298	369	10/22/91			N/A		
Temperature	°C	2004–2005	15	0	11.4	16.8	07/09/04	14	20	0	N/A	
		1990–2003	174	0	7.4	18.5	07/17/02			0		
Ammonia	mg/L	2004–2005	11	4	0.005	0.009	06/07/05	0.020	None	N/A	(⁵)	Current LRL=0.01
		1994–2003	64	36	0	0.040	⁴ 11/20/96			N/A		
Un-ionized ammonia (computed)	mg/L	2004–2005	11	4	0.0001	0.0005	08/11/04	0.0007	0.02	0	(⁵)	
		1994–2003	64	36	0	0.0033	07/17/96			0		
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	1	0.11	0.12	⁴ 03/16/04	0.16	None	N/A	(⁵)	Current LRL=0.1
		1994–2003	58	25	0.07	0.36	04/21/99			N/A		
Nitrite plus nitrate	mg/L	2004–2005	11	1	0.08	0.11	01/14/04	0.11	⁶ 10	0	Down	Current LRL=0.032
		1994–2003	63	8	0.07	0.28	04/16/03			0		
Nitrite	mg/L	2004–2005	11	1	0.001	0.002	⁴ 04/07/05	0.002	0.05	0	(⁵)	Current LRL=0.002
		1994–2003	64	44	0	0.030	11/20/96			0		
Orthophosphate	mg/L	2004–2005	11	9	0	0.003	⁴ 11/02/04	0.001	None	N/A	(⁵)	Current LRL=0.006
		1994–2003	63	52	0	0.020	06/03/98			N/A		
Phosphorus (total)	mg/L	2004–2005	11	0	0.009	0.023	06/07/05	0.021	0.1	0	(⁵)	
		1994–2003	58	17	0.005	0.064	04/21/99			0		
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	5	1	30	07/27/05	(⁷)	126	0	(⁵)	Geometric mean=6
		1991–2003	42	13	6	300	10/26/95			2		

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado 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).

³Period of record for trend analysis is water year 1996–water year 2003; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷Use geometric mean for comparison to standard.

09113500 Ohio Creek near Baldwin

Current Reason for Inclusion: To provide baseline water-quality data in anticipation of possible energy development upstream.

General Station Information:

Station Type: USGS water quality

Latitude: 384208

Drainage area: 121 mi²

HUC: 14020002

Longitude: 1065952

Stream segment: 16

USGS Data Summary:

Period of Record:

Water quality: December 2003 to September 2005

General Chemistry:

Water type: Insufficient major-ion data

pH: Low concern

Dissolved oxygen: Low concern

Nutrients:

Total phosphorus: Concern

E. coli: Low concern

Trace Elements/Metals:

Iron: Low concern

Other constituents of concern: None

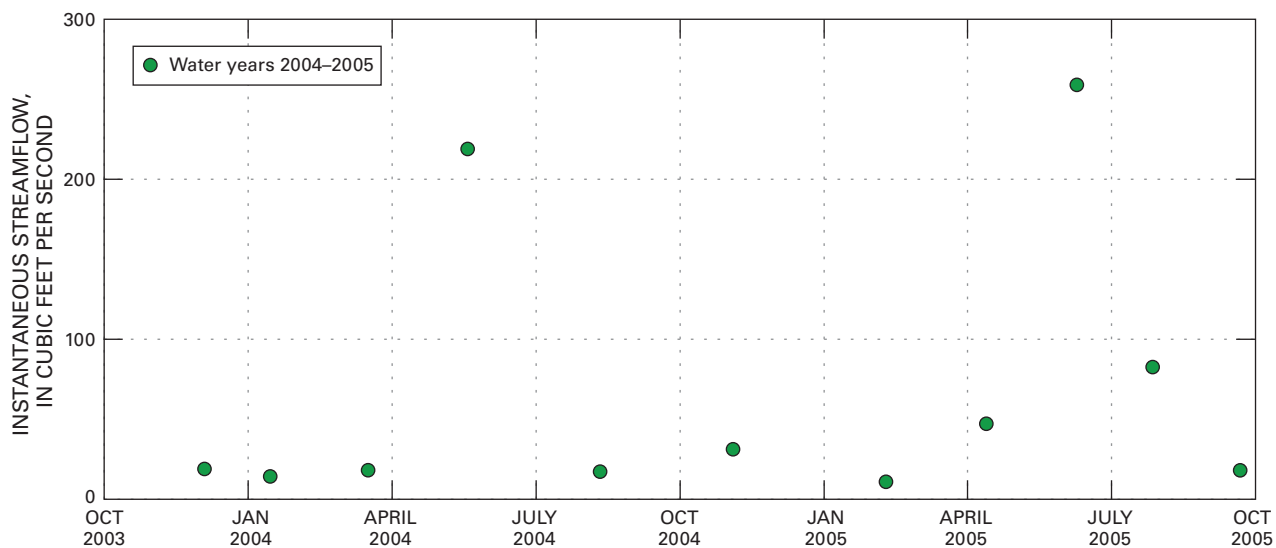


Figure 14. Time distribution and streamflow of water-quality samples for for Ohio Creek near Baldwin.

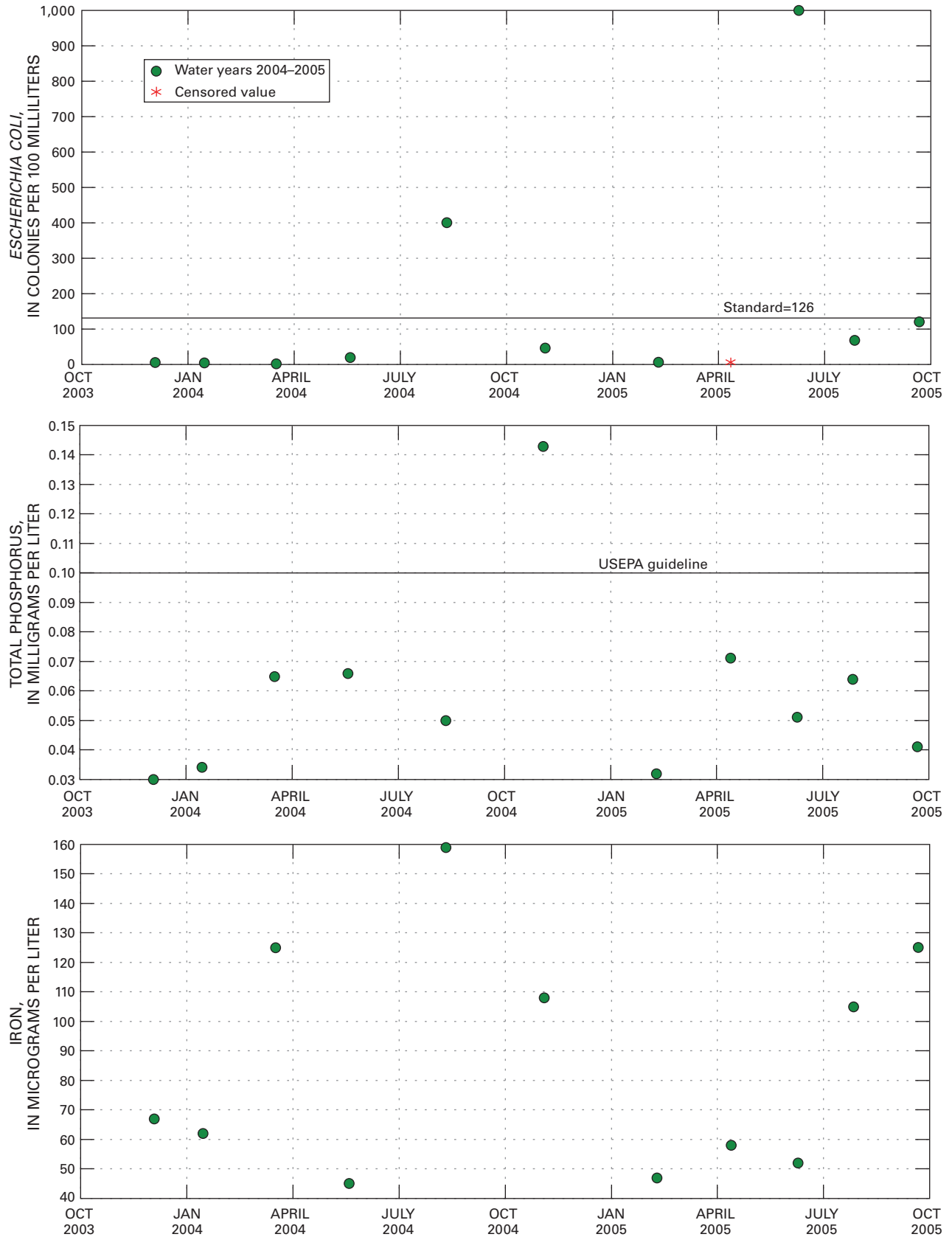


Figure 15. Distribution of selected water-quality constituents relative to time for Ohio Creek near Baldwin.

Table 8. Summary of measured constituents and properties for Ohio Creek near Baldwin station 09113500.

[mg/L, milligrams per liter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25° Celsius; $\mu\text{g}/\text{L}$, micrograms per liter; °C, degrees Celsius; N/A, not applicable; NTU, nephelometric turbidity units; mL, milliliters; LRL, laboratory reporting level]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.5	10.5	04/13/05	10.1	6	0	N/A	Minimum=7.3 15th percentile=8.5
pH	Standard units	2004–2005	11	0	7.8	8.2	09/21/05	8.0	6.5–9.0	0	N/A	Minimum=7.2 15th percentile=7.4
Specific conductance	$\mu\text{S}/\text{cm}$	2004–2005	11	0	134	213	04/13/05	203	None	N/A	N/A	
Temperature	°C	2004–2005	11	0	2	15.7	07/27/05	10.9	20	0	N/A	
Ammonia	mg/L	2004–2005	11	9	0	0.008	09/21/05	0.007	None	N/A	N/A	Current LRL=0.01
Un-ionized ammonia (computed)	mg/L	2004–2005	11	9	0	0.0002	09/21/05	0.00003	0.02	0	N/A	
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.26	0.40	11/04/04	0.38	None	N/A	N/A	
Nitrite plus nitrate	mg/L	2004–2005	11	4	0.03	0.09	01/15/04	0.08	⁶ 10	0	N/A	Current LRL=0.016
Nitrite	mg/L	2004–2005	11	3	0.001	0.002	02/09/05	0.001	0.05	0	N/A	Current LRL=0.002
Orthophosphate	mg/L	2004–2005	11	0	0.012	0.024	03/17/04	0.019	None	N/A	N/A	Current LRL=0.006
Phosphorus (total)	mg/L	2004–2005	11	0	0.051	0.143	11/04/04	0.071	0.1	1	N/A	Concern
Sulfate	mg/L	2004–2005	11	0	9.8	37.9	03/17/04	34.1	⁶ 250	0	N/A	
Iron	$\mu\text{g}/\text{L}$	2004–2005	11	0	67	159	08/11/04	125	⁶ 300	0	N/A	
Sediment	mg/L	2004–2005	11	0	7	74	11/04/04	53	None		N/A	
Turbidity	NTU	2004–2005	11	0	4.6	8.7	04/13/05	6.6	None		N/A	
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	1	19	1,000	06/09/05	(⁷)	126	2	N/A	Geometric mean=22

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Insufficient data for trend analysis.

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate, WS standard for sulfate and iron.

⁷Use geometric mean for comparison to standard.

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 historical 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 mi²

HUC: 14020002

Longitude: 1065551

Stream segment: 16

USGS Data Summary:

Period of Record:

Water quality: October 1996–September 2005

Data prior to September 1998 published as station 383516106555000

Streamflow gaging: December 1998–September 2005

General Chemistry:

Water type: Calcium carbonate

Hardness: Moderately hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients: Total phosphorus: Concern

E. coli: Low concern

Trace Elements/Metals: No data

Other constituents of concern: None

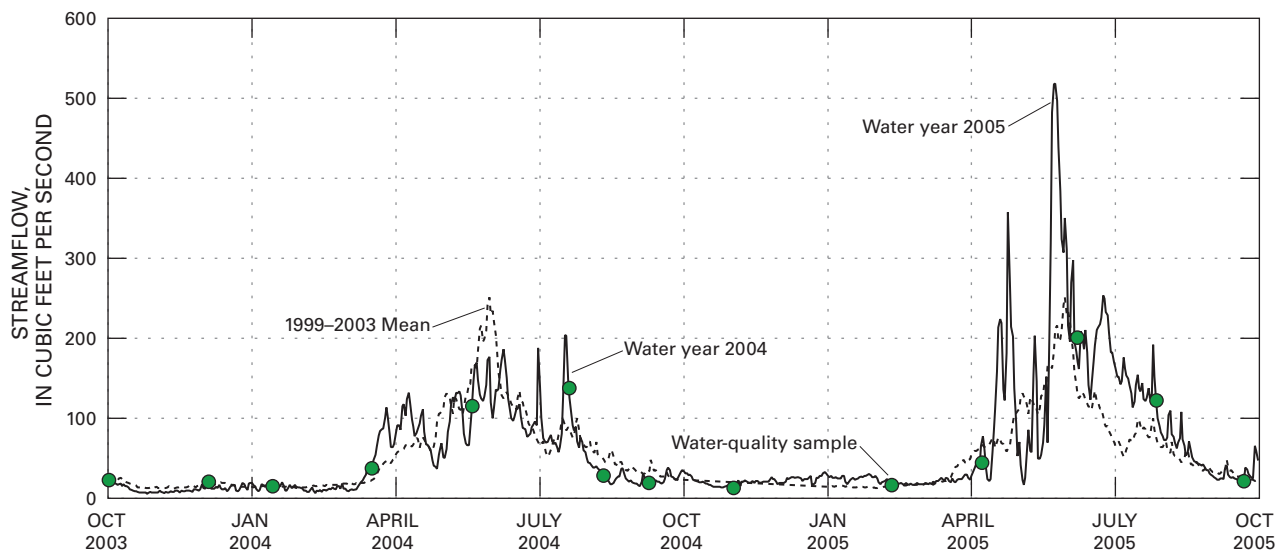


Figure 16. Daily mean streamflow and time distribution of water-quality samples for Ohio Creek above mouth near Gunnison.

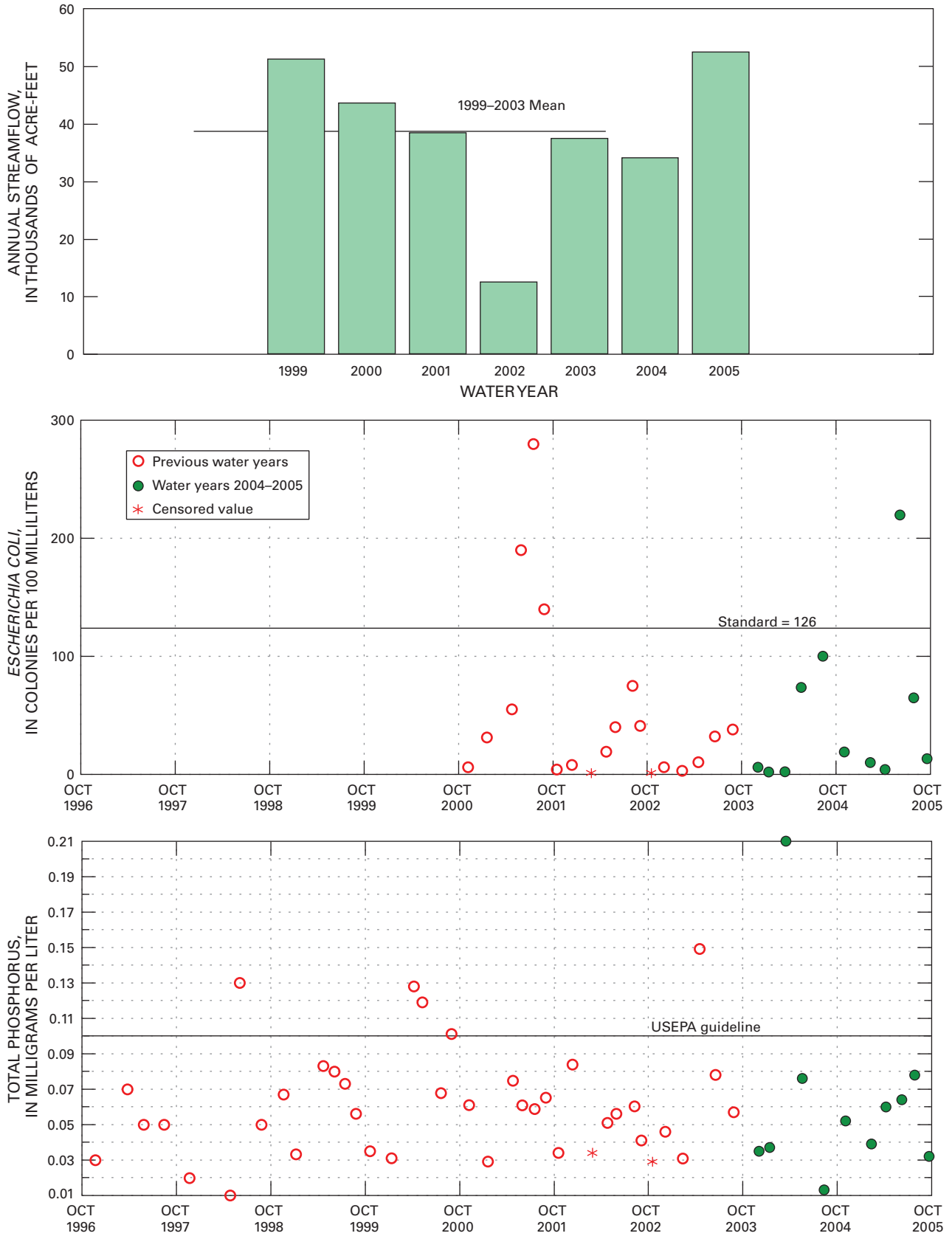


Figure 17. Annual streamflow and distribution of selected water-quality constituents relative to time for Ohio Creek above mouth near Gunnison.

Table 9. Summary of measured constituents and properties for Ohio Creek above mouth station 09113980.

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; N/A, not applicable; mL, milliliters; LRL, laboratory reporting level; BOD, biological oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	8.9	11.0	04/08/05	10.3	6	0	None	Minimum=6.7 15th percentile=7.5
		1997–2003	39	0	8.7	11.0	⁴ 11/19/97		0			
pH	Standard units	2004–2005	11	0	8.1	8.5	11/02/04	8.3	6.5–9.0	0	None	Minimum=7.6 15th percentile=7.9
		1997–2003	39	0	8.1	8.6	09/04/02		0			
Specific conductance	µS/cm	2004–2005	14	0	251	359	11/02/04	339	None	N/A	None	
		1997–2003	61	0	223	438	10/02/02		N/A			
Temperature	°C	2004–2005	14	0	11.8	18.8	07/20/04	17.0	20	0	N/A	
		1997–2003	61	0	8.5	22.5	07/16/02		2			
Ammonia	mg/L	2004–2005	11	4	0.005	0.080	03/17/04	0.010	None	N/A	⁽⁵⁾	Current LRL=0.01
		1997–2003	39	19	0.002	0.030	04/29/98		N/A			
Un-ionized ammonia (computed)	mg/L	2004–2005	11	4	0.00005	0.00089	03/17/04	0.00024	0.02	0	⁽⁵⁾	
		1997–2003	39	19	0.00003	0.00131	08/25/99		0			
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.25	0.93	03/17/04	0.43	None	N/A	⁽⁵⁾	Current LRL=0.1
		1997–2003	39	4	0.23	0.59	04/16/03		N/A			
Nitrite plus nitrate	mg/L	2004–2005	11	4	0.018	0.10	03/17/04	0.06	⁶ 10	0	⁽⁵⁾	Current LRL=0.016
		1997–2003	39	10	0.013	0.17	04/16/03		0			
Nitrite	mg/L	2004–2005	11	1	0.001	0.003	03/17/04	0.002	0.05	0	⁽⁵⁾	Current LRL=0.004
		1997–2003	39	25	0	0.030	11/22/96		0			
Orthophosphate	mg/L	2004–2005	11	0	0.017	0.080	03/17/04	0.029	None	N/A	None	
		1997–2003	39	0	0.020	0.046	04/07/00		N/A			
Phosphorus (total)	mg/L	2004–2005	11	0	0.052	0.210	03/17/04	0.083	0.1	1	None	Concern
		1997–2003	39	0	0.057	0.149	04/16/03		5			
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	0	13	220	06/07/05	⁽⁷⁾	126	1	⁽⁵⁾	Geometric mean=18
		2001–2003	19	2	31	280	07/19/01		3			
BOD	mg/L	2004–2005	11	7	0	4.0	03/17/04	1.6	None	N/A	⁽⁵⁾	
		1997–2003	30	19	0	2.9	04/07/00		N/A			

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1997–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷Use geometric mean for comparison to standard.

09114500 Gunnison River near Gunnison, CO

Current Reason for Inclusion: This station is upstream from the City of Gunnison treatment-plant discharge and is part of the rotational group of stations.

General Station Information:

Location: 0.7 mile 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: 1,012 mi² HUC: 14020002
 Longitude: 1065657 Stream segment: 14

USGS Data Summary:

Period of Record:

Water quality: April 1995–September 2005
 Streamflow gaging: October 1944–September 2005

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: No data

Other constituents of concern: None

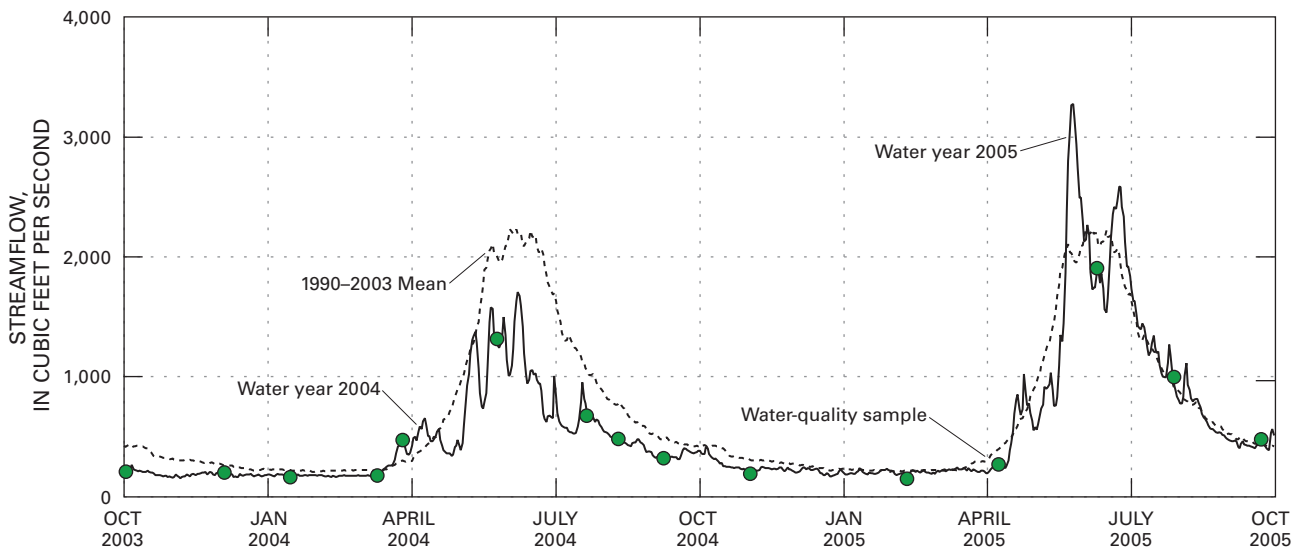


Figure 18. Daily mean streamflow and time distribution of water-quality samples for Gunnison River at Gunnison.

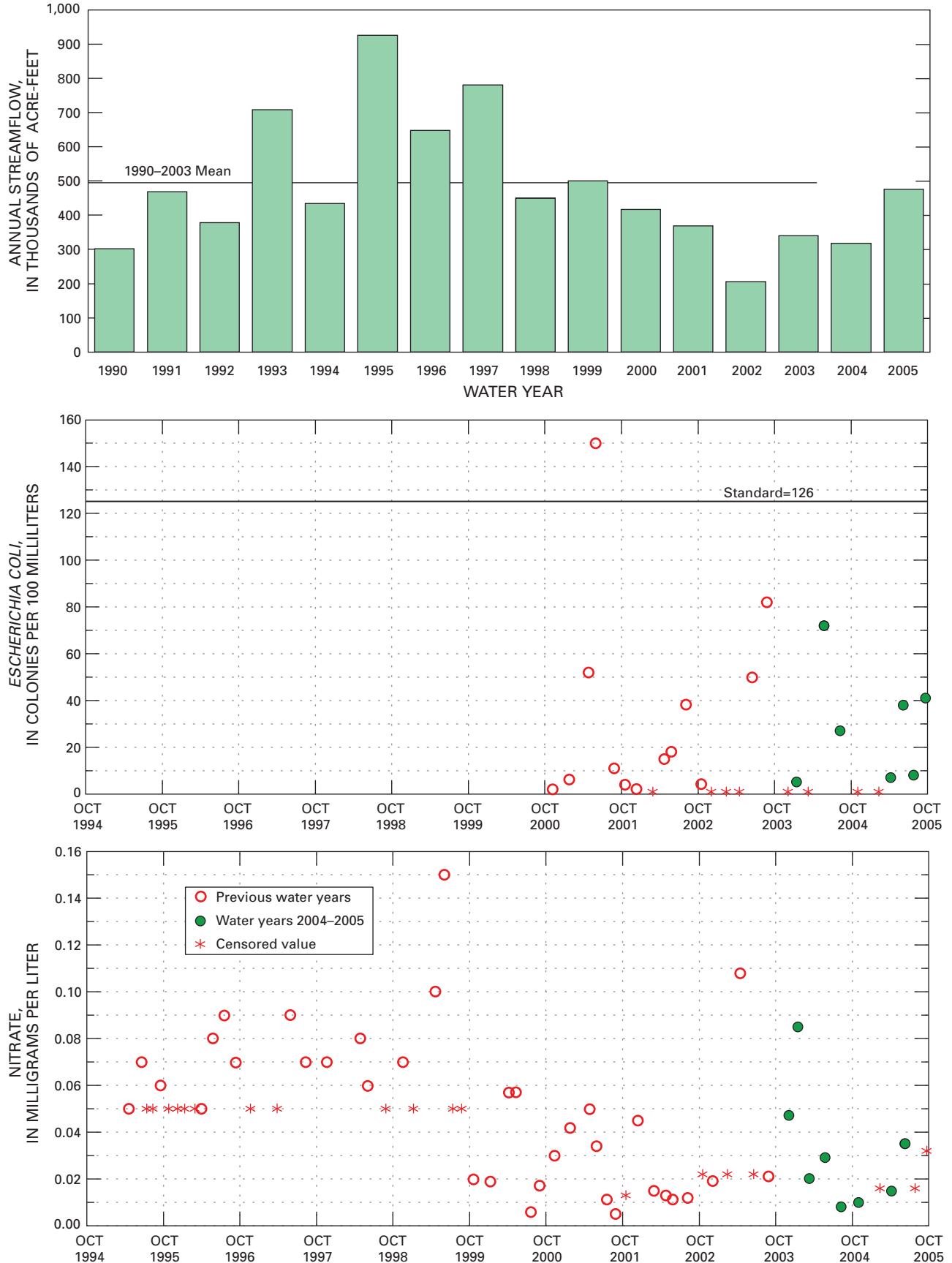


Figure 19. Annual streamflow and distribution of selected water-quality constituents relative to time for Gunnison River at Gunnison.

Table 10. 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; N/A, not applicable; mL, milliliters; LRL, laboratory reporting level; BOD, biological oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.8	13.4	02/10/05	11.1	6	0	None	Minimum=7.7 15th percentile=8.2
		1995–2003	51	0	9.4	13.0	12/04/02		0			
pH	Standard units	2004–2005	11	0	8.2	8.8	02/10/05	8.4	6.5-9.0	0	None	Minimum=7.6 15th percentile=8.0
		1995–2003	51	0	8.2	8.8	04/16/03		0			
Specific conductance	µS/cm	2004–2005	15	0	230	269	11/02/04	241	None	N/A	Up	
		1995–2003	105	0	212	330	06/17/03		N/A			
Temperature	°C	2004–2005	15	0	9.8	17.1	07/21/04	13.4	20	0	N/A	
		1995–2003	105	0	7.4	17.0	08/28/03		0			
Ammonia	mg/L	2004–2005	11	9	0	0.006	04/08/05	0.020	None	N/A	(⁵)	Current LRL=0.01
		1995–2003	51	33	0	0.050	06/04/98		N/A			
Un-ionized ammonia (computed)	mg/L	2004–2005	11	9	0	0.00249	02/10/05	0.00034	0.02	0	(⁵)	
		1995–2003	51	33	0	0.00121	11/21/96		0			
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.14	0.25	05/25/04	0.22	None	N/A	(⁵)	
		1995–2003	51	19	0.09	0.46	04/27/01		N/A			
Nitrite plus nitrate	mg/L	2004–2005	11	3	0.015	0.085	01/15/04	0.07	⁶10	0	(⁵)	Current LRL=0.016
		1995–2003	51	16	0.019	0.150	06/03/99		0			
Nitrite	mg/L	2004–2005	11	4	0.001	0.001	⁴09/22/08	0.001	0.05	0	(⁵)	Current LRL=0.002
		1995–2003	51	42	0	0.011	06/04/98		0			
Orthophosphate	mg/L	2004–2005	11	7	0	0.005	04/08/05	0.010	None	N/A	(⁵)	Current LRL=0.006
		1995–2003	51	34	0	0.030	⁴04/20/96		N/A			
Phosphorus (total)	mg/L	2004–2005	11	0	0.022	0.041	08/10/04	0.030	0.1	0	(⁵)	
		1995–2003	50	11	0.014	0.120	06/19/95		1			
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	4	7	72	05/25/04	(⁷)	126	0	(⁵)	Geometric mean=7
		2001–2003	17	4	6	150	05/30/01		1			
BOD	mg/L	2004–2005	10	8	0	2.6	02/10/05	1.2	None	N/A	(⁵)	
		1995–2003	38	31	0	2.6	09/21/95		N/A			

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1997–water year 2003; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷Use geometric mean for comparison to standard.

383126106475600 Tomichi Creek below Cochetopa Creek, CO

General Station 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: 984 mi²

HUC: 14020003

Longitude: 1064756

Stream segment: 18

USGS Data Summary:

Period of Record:

Water quality: November 2000 – September 2005

General Chemistry:

Water type: Major ion data not collected

Hardness: Moderately hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients:

Phosphorus: Concern

E. coli: Low concern

Trace Elements/Metals: Low concern

Other constituents of concern: None

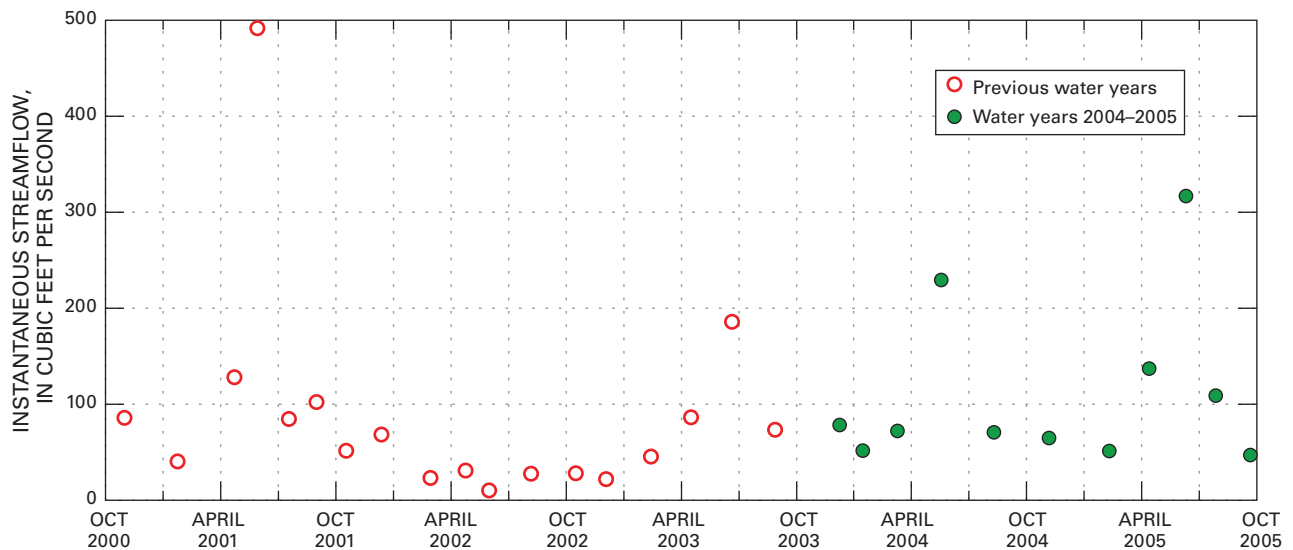


Figure 20. Time distribution and streamflow of water-quality samples for Tomichi Creek below Cochetopa Creek.

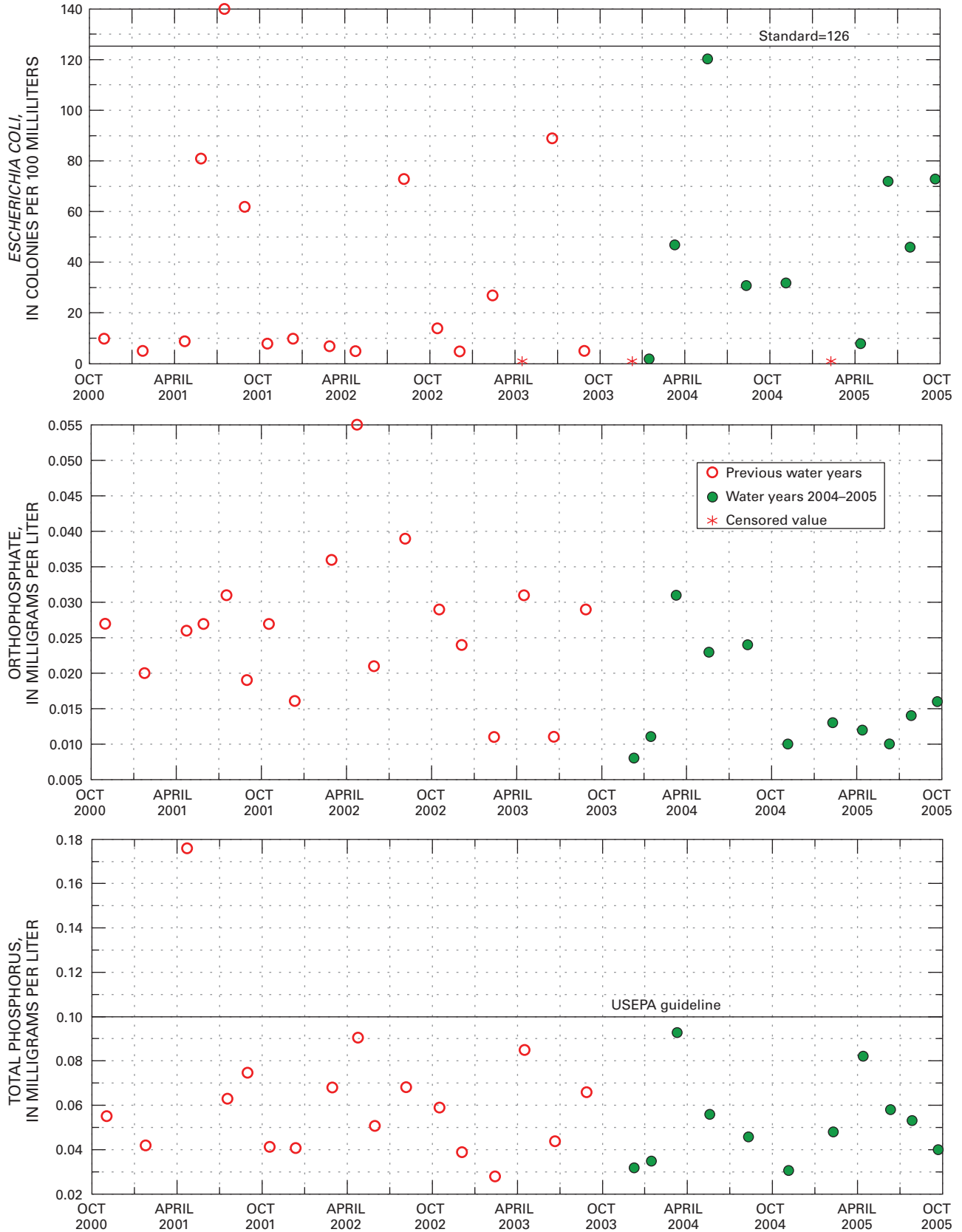


Figure 21. Distribution of selected water-quality constituents relative to time for Tomichi Creek below Cochetopa Creek.

Table 11. 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; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.5	11.1	08/10/04	10.7	6	0	None	Minimum=7.5
		2001–2003	17	0	9.4	11.0	01/24/01			0		15th percentile=8.6
pH	Standard	2004–2005	11	0	8.2	9.0	07/27/05	8.4	6.5–9.0	0	None	Minimum=7.7
	units	2001–2003	18	0	8.2	8.8	08/06/02			0		15th percentile=7.8
Specific conductance	µS/cm	2004–2005	11	0	275	320	09/21/05	320	None	N/A	None	
		2001–2003	18	0	260	420	05/31/02			N/A		
Temperature	°C	2004–2005	11	0	7.0	21.8	07/27/05	15.5	20	1	N/A	
		2001–2003	17	0	7.5	21.4	08/06/02			1		
Hardness (computed)	mg/L	2004–2005	7	0	138	149	11/05/04	164	None	N/A	None	
	as CaCO ₃	2001–2003	12	0	125	196	05/31/02			N/A		
Calcium	mg/L	2004–2005	7	0	39	42	11/05/04	46	None	N/A	None	
		2001–2003	12	0	36	54	05/31/02			N/A		
Magnesium	mg/L	2004–2005	7	0	10.2	11.4	06/10/05	11.9	None	N/A	None	
		2001–2003	12	0	8.6	14.9	05/31/02			N/A		
Ammonia	mg/L	2004–2005	11	7	0	0.016	02/09/05	0.008	None	N/A	(⁵)	Current LRL=0.01
		2001–2003	18	13	0	0.011	01/24/01			N/A		
Un-ionized ammonia (computed)	mg/L	2004–2005	11	7	0	0.00188	07/27/05	0.00007	0.02	0	(⁵)	
		2001–2003	17	13	0	0.00041	07/18/01			0		
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.33	0.49	05/19/04	0.47	None	N/A	None	
		2001–2003	17	0	0.25	0.55	06/20/03			N/A		
Nitrite plus nitrate	mg/L	2004–2005	11	8	0	0.083	01/15/04	0.029	⁶ 10	0	(⁵)	Current LRL=0.016
		2001–2003	18	10	0	0.088	01/24/01			0		
Nitrite	mg/L	2004–2005	11	4	0.001	0.003	02/09/05	0.001	0.05	0	(⁵)	Current LRL=0.002
		2001–2003	18	15	0	0.002	02/28/02			0		
Orthophosphate	mg/L	2004–2005	11	0	0.013	0.031	03/10/04	0.031	None	N/A	Down	
		2001–2003	18	0	0.027	0.055	04/24/02			N/A		
Phosphorus (total)	mg/L	2004–2005	11	0	0.048	0.093	03/10/04	0.082	0.1	0	Down	Concern
		2001–2003	17	0	0.059	0.176	04/23/01			1		
Aluminum	µg/L	2004–2005	7	0	1	3	⁴ 05/19/04	2	87 (ch)	0	(⁵)	
		2001–2003	12	10	0	2	⁴ 08/28/03			0		

Table 11. 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; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Cadmium	µg/L	2004–2005	7	5	0	0.02	⁴ 06/10/05	0	2.4 (ch)	0	(⁵)	Current LRL=0.4
		2001–2003	12	12	0	⁷ <0.2	--		0			
Copper	µg/L	2004–2005	7	0	0.90	1.9	06/10/05	1.5	9.5 (ch)	0	(⁵)	
		2001–2003	12	6	0.35	1.8	05/29/01		0			
Iron	µg/L	2004–2005	7	0	73	87	05/19/04	98	300	0	None	Water supply standard
		2001–2003	12	0	79	157	04/17/03		0			
Lead	µg/L	2004–2005	7	0	0.08	0.17	06/10/05	0.11	2.7 (ch)	0	(⁵)	
		2001–2003	11	11	0	⁷ <1	--		0			
Manganese	µg/L	2004–2005	7	0	40	76	06/10/05	72	1,689(ch)	0	None	Water supply standard is 50
		2001–2003	12	0	38	117	05/31/02		0			
Silver	µg/L	2004–2005	7	7	0	⁷ <0.2	--	0	0.36 (ch)	0	(⁵)	Current LRL=0.2
		2001–2003	12	12	0	⁷ <0.3	--		0			
Zinc	µg/L	2004–2005	7	0	1.2	2.2	06/10/05	2.2	125 (ch)	0	(⁵)	
		2001–2003	12	9	0	13	04/32/01		0			
Suspended sediment	mg/L	2004–2005	7	0	10	20	04/13/05	20	None	N/A	None	
		2001–2003	12	0	6	104	04/23/01		N/A			
Turbidity	NTU	2004–2005	7	1	3	8	04/13/05	11	None	N/A	(⁵)	
		2001–2003	12	0	4	37	04/23/01		N/A			
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	2	32	120	05/19/04	(⁸)	126	0	None	Geometric mean = 15
		2001–2003	17	1	10	140	07/18/01		1			

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 2001–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

⁸Use geometric mean for comparison to standard.

09119000 Tomichi Creek at Gunnison, CO

Current Reason for Inclusion: This station represents contribution of entire the 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 site

Latitude: 383118

Drainage area: 1,061 mi²

HUC: 14020003

Longitude: 1065625

Stream segment: 18

USGS Data Summary:

Period of Record:

Water quality:

October 1990–September 1993

April 1995–September 2005

Streamflow gaging: October 1937–September 2005

General Chemistry:

Water type: Calcium carbonate

Hardness: Moderately hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients:

Total phosphorus: Concern

E. coli: Low concern

Trace Elements/Metals: Low concern

Other constituents of concern: None

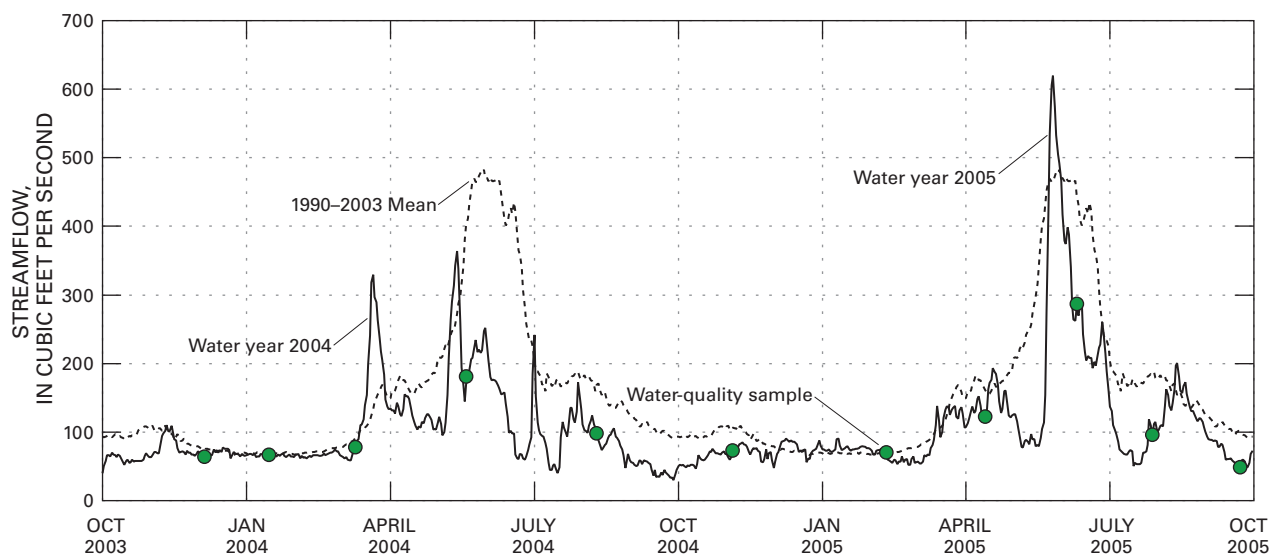


Figure 22. Streamflow and time distribution of water-quality samples for Tomichi Creek at Gunnison.

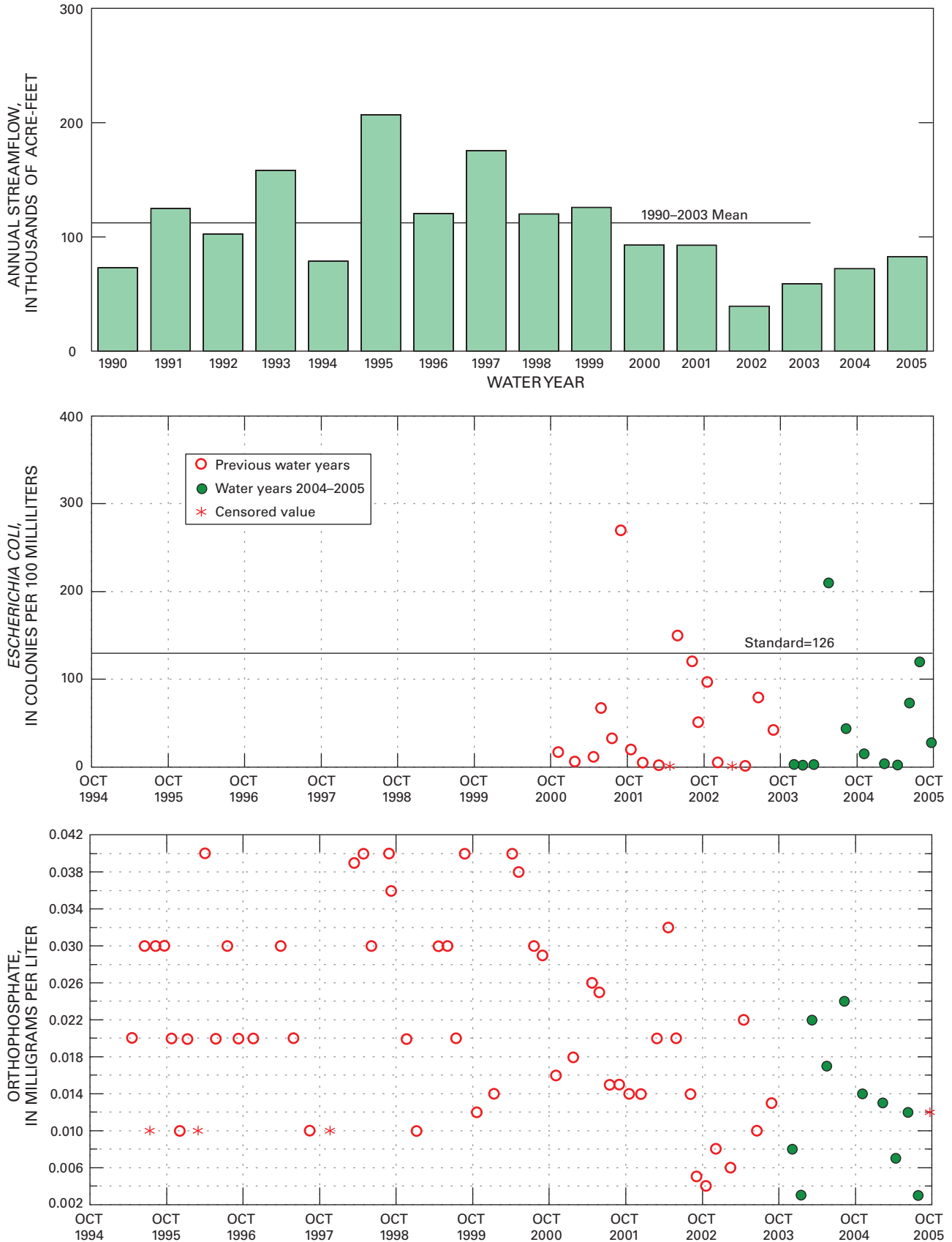


Figure 23. Annual streamflow and distribution of selected water-quality constituents relative to time for Tomichi Creek at Gunnison.

Table 12. 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; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than; BOD, biochemical oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.7	11.9	08/10/04	10.7	6	0	None	Minimum=6.0
		1995–2003	54	0	9.4	12.1	11/20/97			0		15th percentile=7.8
pH	Standard units	2004–2005	11	0	8.2	8.8	08/10/04	8.4	6.5–9.0	0	None	Minimum=7.4
		1995–2003	54	0	8.2	8.7	⁴ 08/27/98			0		15th percentile=7.9
Specific conductance	µS/cm	2004–2005	11	0	276	327	09/22/05	340	None	N/A	None	
		1995–2003	54	0	254	399	05/31/02			N/A		
Temperature	°C	2004–2005	11	0	9.6	19.8	08/10/04	17.0	20	0	N/A	
		1995–2003	54	0	10.6	21.5	07/18/01			6		
Hardness (computed)	mg/L	2004–2005	7	0	152	164	09/22/05	167	None	N/A	(⁵)	
Calcium	as CaCO ₃ mg/L	1995–2003	36	0	114	191	05/31/02			N/A		
		2004–2005	7	0	42	48	09/22/05	47	None	N/A	(⁵)	
Magnesium	mg/L	1995–2003	36	0	32	57	05/31/02			N/A		
		2004–2005	7	0	11	12	⁴ 05/19/04	12	None	N/A	(⁵)	
Ammonia	mg/L	1995–2003	36	0	8	13	⁴ 08/07/02			N/A		
		2004–2005	11	7	0	0.018	02/10/05	0.017	None	N/A	(⁵)	Current LRL=0.01
Un-ionized ammonia (computed)	mg/L	1995–2003	54	34	0	0.050	⁴ 04/01/96			N/A		
		2004–2005	11	7	0	0.00028	05/19/04	0.00036	0.02	0	(⁵)	
Ammonia plus organic nitrogen (total)	mg/L	1995–2003	54	34	0	0.00158	07/19/96			0		
		2004–2005	11	0	0.34	0.60	05/19/04	0.53	None	N/A	(⁵)	
Nitrite plus nitrate	mg/L	1995–2003	54	6	0.28	1.2	04/07/00			N/A		
		2004–2005	11	7	0	0.090	02/10/05	0.060	⁶ 10	0	(⁵)	Current LRL=0.016
Nitrite	mg/L	1995–2003	54	30	0	0.106	01/12/00			0		
		2004–2005	11	2	0.001	0.003	02/10/05	0.001	0.05	0	(⁵)	Current LRL=0.002
Orthophosphate	mg/L	1995–2003	54	43	0	0.020	⁴ 11/21/96			0		
		2004–2005	11	1	0.012	0.024	08/10/04	0.030	None	N/A	Down	Current LRL=0.012
Phosphorus (total)	mg/L	1995–2003	54	3	0.020	0.040	⁴ 04/07/00			N/A		
		2004–2005	11	0	0.050	0.121	03/10/04	0.073	0.1	1	None	Concern
Aluminum	µg/L	1995–2003	54	1	0.043	0.270	04/07/00			3		
		2004–2005	7	0	2	2	⁴ 05/19/04	2	87 (ch)	0	(⁵)	
		1995–2003	29	23	0	80	06/19/95			0		

Table 12. Summary of measured constituents and properties for Tomichi Creek at Gunnison station 09119000.—Continued

[mg/L, milligrams per liter; $\mu\text{S/cm}$, microsiemens per centimeter at 25° Celsius; $\mu\text{g/L}$, 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; <, less than; BOD, biochemical oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Cadmium	$\mu\text{g/L}$	2004–2005	7	7	0	⁷ <0.04	--	0	2.5 (ch)	0	(⁵)	Current LRL=0.04
		1995–2003	29	29	0	⁷ <0.1	--			0		
Copper	$\mu\text{g/L}$	2004–2005	7	0	1	2.1	04/13/05	1.5	10.0 (ch)	0	(⁵)	
		1995–2003	29	15	0	2.0	⁴ 06/19/95			0		
Iron	$\mu\text{g/L}$	2004–2005	7	0	62	78	06/10/05	110	300	0	(⁵)	Water supply standard
		1995–2003	24	0	66	190	06/19/95			0		
Lead	$\mu\text{g/L}$	2004–2005	7	0	0.09	0.22	04/13/05	0.06	2.9 (ch)	0	(⁵)	
		1995–2003	29	28	0	0.09	09/04/02			0		
Manganese	$\mu\text{g/L}$	2004–2005	7	0	40	92	06/10/05	85	1,721	0	(⁵)	Water supply standard=50
		1995–2003	24	0	31	124	04/22/02			0		
Silver	$\mu\text{g/L}$	2004–2005	7	7	0	⁷ <0.2	--	0	0.40 (ch)	0	(⁵)	Current LRL=0.2
		1995–2003	17	17	0	⁷ <0.3	--			0		
Zinc	$\mu\text{g/L}$	2004–2005	7	0	0.8	1.0	06/10/05	0.9	132 (ch)	0	(⁵)	
		1995–2003	29	25	0	12	04/23/01			0		
Suspended sediment	mg/L	2004–2005	7	0	6	17	04/13/05	24	None	N/A	(⁵)	
		1995–2003	34	0	10	135	03/27/97			N/A		
Turbidity	NTU	2004–2005	7	0	3.3	6.8	03/10/04	8.7	None	N/A	(⁵)	
		1995–2003	13	0	3.5	14.0	05/29/01			N/A		
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	0	15	210	05/19/04	(⁸)	126	1	(⁵)	Geometric mean = 12
		1995–2003	19	2	20	270	08/31/01			2		
BOD	mg/L	2004–2005	0	--	--	--	--	2.4	None	--	(⁵)	
		1995–2003	32	25	0	2.7	04/07/00			N/A		

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006); and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1996–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

⁸Use geometric mean for comparison to standard.

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 Gunnison River at Gunnison and Tomichi Creek at Gunnison, this site should give insight to the change in water quality due to point and nonpoint sources in the City of Gunnison. Characterize water-quality conditions upstream from Curecanti National Recreation Area. Long-term monitoring.

General Station 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: 2,128 mi²

HUC: 14020002

Longitude: 1065942

Stream segment: 14

USGS Data Summary:

Period of Record:

Water quality: December 1994 to September 2005

General Chemistry:

Water type: Calcium carbonate

Hardness: Moderately hard

pH: Low concern

Dissolved oxygen: Low concern

Nutrients:

Total phosphorus: Concern

E. coli: Low concern

Trace Elements/Metals: Low concern

Other constituents of concern: None

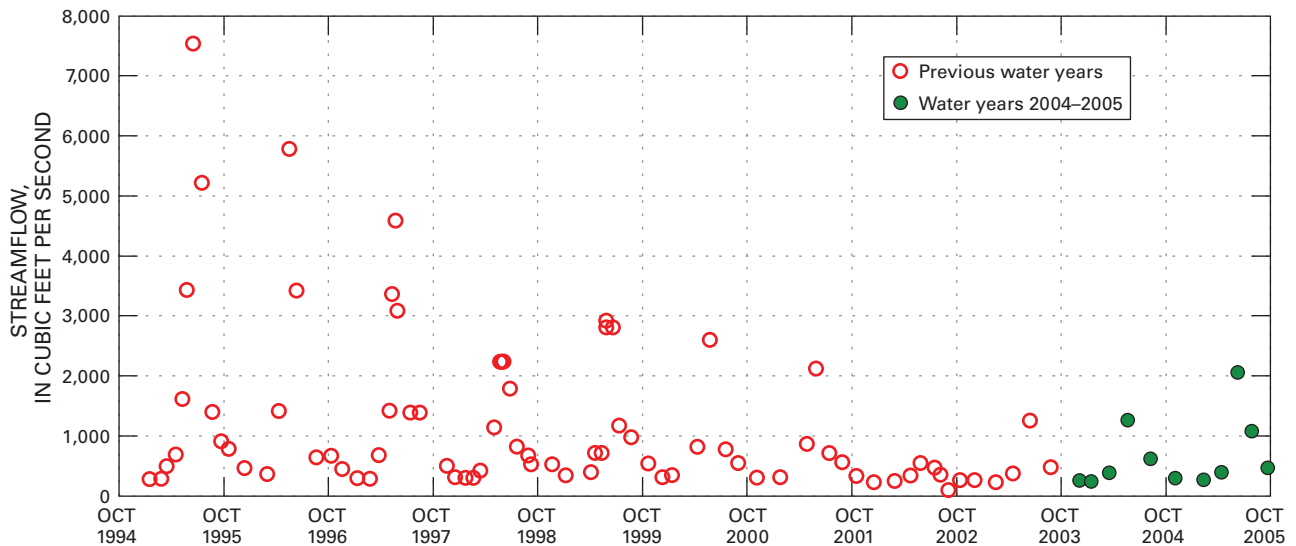


Figure 24. Time distribution and streamflow of water-quality samples for Gunnison River at County Road 32 below Gunnison.

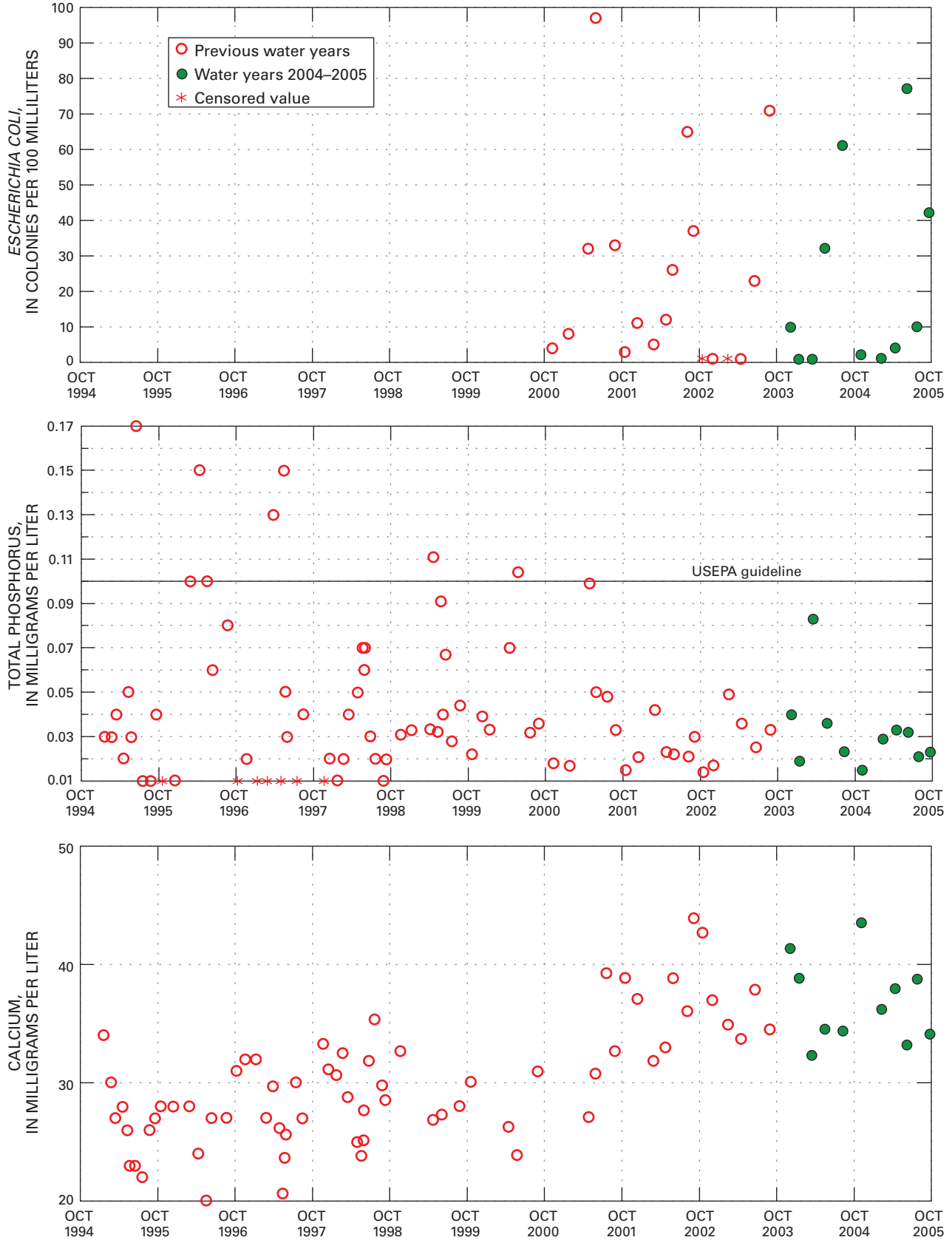


Figure 25. Distribution of selected water-quality constituents relative to time for Gunnison River at County Road 32 below Gunnison.

Table 13. Summary of measured constituents and properties for Gunnison River at County Road 32 station 383103106594200.

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than; BOD, biological oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	11	0	9.5	12.8	02/10/05	11.2	6	0	None	Minimum=7.0 15th percentile=8.3
		1995–2003	77	0	9.3	12.5	12/17/97		0			
pH	Standard Units	2004–2005	11	0	8.5	8.8	02/10/05	8.5	6.5–9.0	0	None	Minimum=7.6 15th percentile=8.0
		1995–2003	77	0	8.2	8.6	⁴ 01/19/95					
Specific conductance	µS/cm	2004–2005	11	0	232	276	04/13/05	255	None	N/A	Up	
		1995–2003	78	0	224	288	09/05/02					
Temperature	°C	2004–2005	11	0	9.8	14.5	05/19/04	14.4	20	0	N/A	
		1995–2003	78	0	7.6	17.3	07/20/98					
Hardness (computed)	mg/L as CaCO ₃	2004–2005	11	0	123	145	11/04/04	126	None	N/A	Up	
		1995–2003	66	0	100	147	09/05/02					
Calcium	mg/L	2004–2005	11	0	36	44	11/04/04	37	None	N/A	Up	
		1995–2003	66	0	29	44	09/05/02					
Magnesium	mg/L	2004–2005	11	0	7.9	9.0	11/04/04	7.9	None	N/A	Up	
		1995–2003	66	0	6.5	9.1	09/05/02					
Ammonia	mg/L	2004–2005	11	5	0.005	0.008	⁴ 04/13/05	0.020	None	N/A	(°)	Current LRL=0.01
		1995–2003	77	45	0	0.070	05/22/98					
Un-ionized ammonia (computed)	mg/L	2004–2005	11	5	0.0001	0.00040	02/10/05	0.00032	0.02	0	(°)	
		1995–2003	77	45	0	0.00317	09/09/98					
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	11	0	0.20	0.43	03/17/04	0.35	None	N/A	(°)	
		1995–2003	77	19	0.18	0.60	⁴ 06/19/95					
Nitrite plus nitrate	mg/L	2004–2005	11	1	0.038	0.127	01/15/05	0.104	⁶ 10	0	(°)	Current LRL=0.016
		1995–2003	77	12	0.060	0.178	03/01/02					
Nitrite	mg/L	2004–2005	11	2	0.001	0.002	⁴ 02/10/05	0.002	0.05	0	(°)	Current LRL=0.002
		1995–2003	77	48	0	0.020	⁴ 06/13/96					
Orthophosphate	mg/L	2004–2005	11	3	0.005	0.027	03/17/04	0.020	None	N/A	(°)	Current LRL=0.006
		1995–2003	77	10	0.010	0.030	⁴ 02/20/98					
Phosphorus (total)	mg/L	2004–2005	11	0	0.029	0.083	03/17/04	0.070	0.1	0	None	Concern
		1995–2003	77	7	0.032	0.170	06/16/95					

Table 13. Summary of measured constituents and properties for Gunnison River at County Road 32 station 383103106594200.—Continued

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than; BOD, biological oxygen demand]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Selenium	µg/L	2004–2005	11	9	0	0.3	01/15/04	0.3	4.6 (ch)	00	(⁵)	
		2001–2003	16	11	0	0.5	04/25/02		00			
Cadmium	µg/L	2004–2005	11	9	0	0.03	⁴ 06/09/05	0	2.4(ch)	0	(⁵)	Current LRL=0.04
		1995–2003	34	33	0	0.02	06/19/03		0			
Copper	µg/L	2004–2005	11	0	0.9	1.8	06/09/05	1.0	9.6(ch)	0	(⁵)	
		1995–2003	34	17	0.2	1.9	06/01/98		0			
Lead	µg/L	2004–2005	11	6	0	0.2	03/17/04	0.07	2.7(ch)	0	(⁵)	Current LRL=0.08
		1995–2003	34	29	0	3.0	08/07/02		1			
Manganese	µg/L	2004–2005	11	0	15	36	03/17/04	21	1,691	0	None	Water supply standard=50
		1995–2003	66	0	15	38	03/16/95		0			
Silver	µg/L	2004–2005	11	11	0	⁷ <0.2	--	0	0.36(ch)	0	(⁵)	Current LRL=0.2
		1999–2003	26	26	0	⁷ <0.2	--		0			
Zinc	µg/L	2004–2005	11	0	1.4	8.6	06/09/05	5.0	123 (ch)	0	(⁵)	
		1995–2003	34	20	0	16	04/27/01		0			
Turbidity	NTU	2004–2005	11	0	2.8	4.5	03/17/04	5.0	None	N/A	(⁵)	
		2001–2003	17	0	3.7	14.0	04/27/01		N/A			
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	11	0	10	77	06/09/05	(⁸)	126	0	(⁵)	Geometric mean=8
		2001–2003	18	2	12	97	05/31/01		0			
BOD	mg/L	2004–2005	11	8	0	2.6	⁴ 02/10/05	1.5	None	N/A	(⁵)	
		1995–2003	29	25	0	2.8	03/01/02		N/A			

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006) and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1996–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

⁸Use geometric mean for comparison to standard.

380133107190000 Henson Creek at Mouth at Lake City

Current Reason for Inclusion: To collect baseline data, characterize effects from mining, and facilitate remediation of the affected surface waters.

General Station Information:

Location: Highway 149 road bridge over Henson Creek in Lake City.

Station Type: USGS water quality

Latitude: 380133

Drainage area: 83 mi²

HUC: 14020002

Longitude: 1070900

Stream segment: 30

USGS Data Summary:

Period of Record:

Water quality: December 2003 to September 2005

General Chemistry:

Water type: Insufficient major-ion data

pH: Low concern

Dissolved oxygen: Low concern

Nutrients: Low concern

Trace Elements/Metals:

Aluminum and zinc: Concern

Other constituents of concern: None

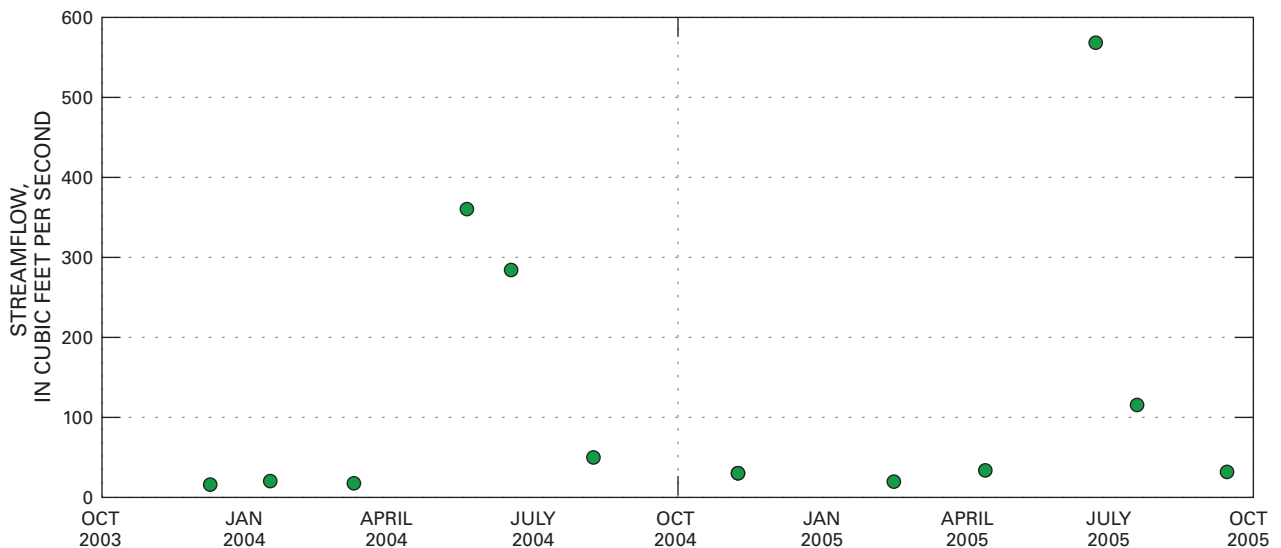


Figure 26. Time distribution and streamflow of water-quality samples for Henson Creek at mouth at Lake City.

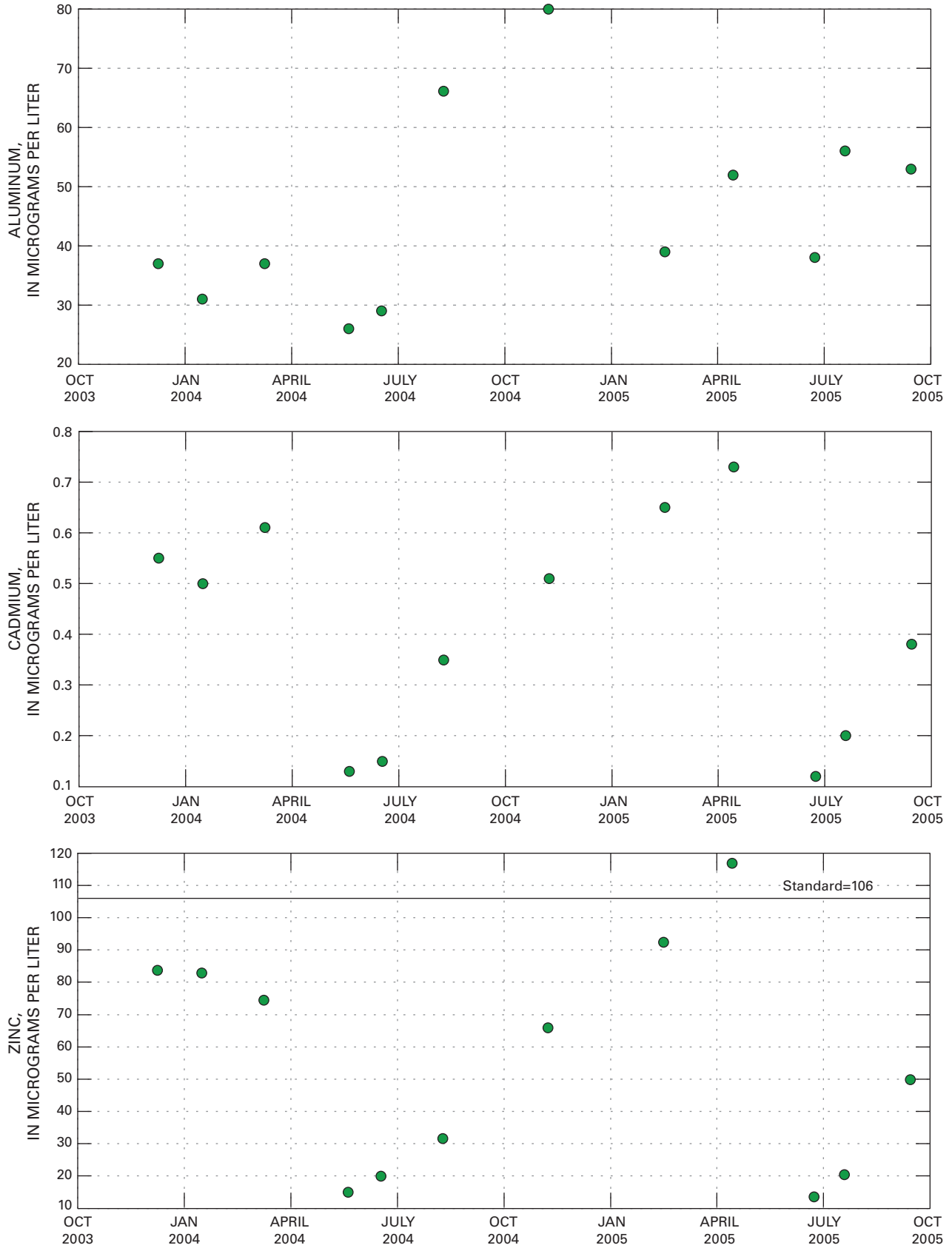


Figure 27. Distribution of selected water-quality constituents relative to time for Henson Creek at mouth at Lake City.

Table 14. Summary of measured constituents and properties for Henson Creek at Mouth at Lake City station 380133107190000.

[mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25° Celsius; µg/L, micrograms per liter; °C, degrees Celsius; CaCO₃, calcium carbonate; N/A, not applicable; NTU, nephelometric turbidity units; (ch), chronic standard; mL, milliliters; --, no value; LRL, laboratory reporting level; <, less than]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	12	0	9.8	10.7	12/09/03	10.5	6	0	(⁵)	Minimum=7.7 15th percentile=8.3
pH	Standard units	2004–2005	12	0	7.7	8.4	03/09/04	8.0	6.5–9.0	0	(⁵)	Minimum=7.1 15th percentile=7.4
Specific conductance	µS/cm	2004–2005	12	0	194	220	02/15/05	216	None	N/A	(⁵)	
Temperature	°C	2004–2005	12	0	2	14.9	07/19/05	13.5	20	0	N/A	
Hardness (computed)	mg/L as CaCO ₃	2004–2005	12	0	86	98	01/16/04	98	None	N/A	(⁵)	
Calcium	mg/L	2004–2005	12	0	30	34	02/15/05	34	None	N/A	(⁵)	
Magnesium	mg/L	2004–2005	12	0	2.9	3.6	03/09/04	3.5	None	N/A	(⁵)	
Ammonia	mg/L	2004–2005	12	10	0	0.013	07/19/05	0.006	None	N/A	(⁵)	Current LRL=0.01
Un-ionized ammonia (computed)	mg/L	2004–2005	12	10	0	0.00022	07/19/05	0.00005	0.02	0	(⁵)	
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	12	4	0.06	0.20	05/20/04	0.09	None	N/A	(⁵)	Current LRL=0.01
Nitrite plus nitrate	mg/L	2004–2005	12	0	0.116	0.184	05/20/04	0.16	⁶ 10	0	(⁵)	
Nitrite	mg/L	2004–2005	12	6	0.0005	0.001	⁴ 09/14/05	0.001	0.05	0	(⁵)	Current LRL=0.002
Orthophosphate	mg/L	2004–2005	12	12	0	⁷ <0.006	--	0	None	N/A	(⁵)	Current LRL=0.006
Phosphorus (total)	mg/L	2004–2005	12	0	0.012	0.088	05/20/04	0.045	0.1	0	(⁵)	
Aluminum	µg/L	2004–2005	12	0	38	80	11/08/04	66	87 (ch)	0	(⁵)	Concern
Cadmium	µg/L	2004–2005	12	0	0.44	0.73	04/14/05	0.65	2.0 (ch)	0	(⁵)	
Copper	µg/L	2004–2005	12	0	1.9	2.7	04/14/05	2.3	8.0 (ch)	0	(⁵)	
Iron	µg/L	2004–2005	12	2	5.5	22	08/09/04	18	300 (WS)		(⁵)	Current LRL=6
Lead	µg/L	2004–2005	12	0	0.20	0.56	08/09/04	0.30	2.2 (ch)	0	(⁵)	
Manganese	µg/L	2004–2005	12	0	30	48	04/14/05	47	1,583	0	(⁵)	Water supply standard=50
Silver	µg/L	2004–2005	12	12	0	⁷ <0.2	--	0	0.26 (ch)	0	(⁵)	Current LRL=0.2
Zinc	µg/L	2004–2005	12	0	58	117	04/14/05	92	106 (ch)	1	(⁵)	Concern
Turbidity	NTU	2004–2005	12	4	2.7	15	05/20/04	7.9	None	N/A	(⁵)	Current LRL=2
Sediment	mg/L	2004–2005	12	0	4.5	79	05/20/04	36	None	N/A	(⁵)	

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006) and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1996–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

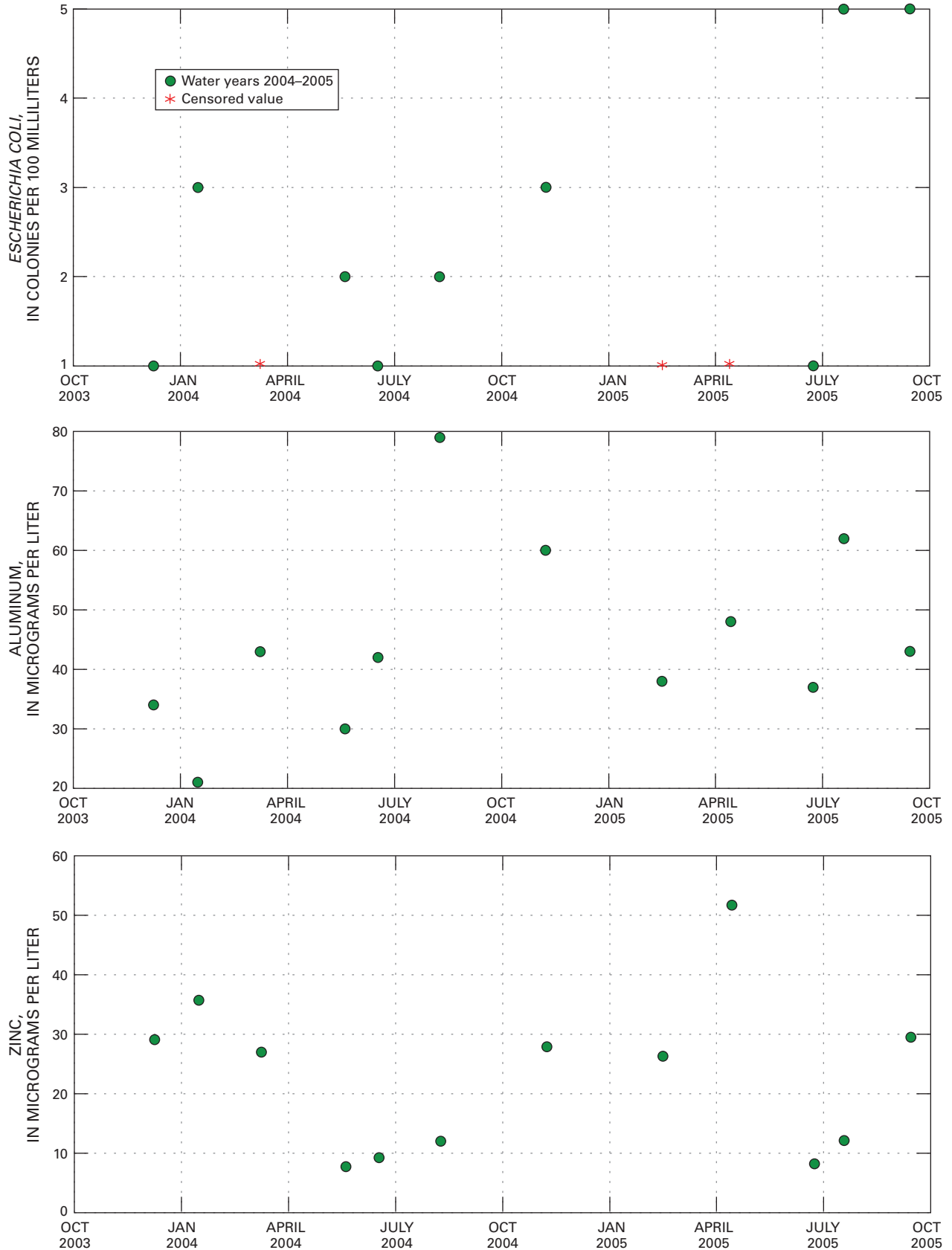


Figure 29. Distribution of selected water-quality constituents relative to time for Lake Fork Gunnison River near Lake City.

Table 15. Summary of measured constituents and properties for Lake Fork Gunnison River near Lake City station 380233107180701.

[mg/L, milligrams per liter; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25° Celsius; $\mu\text{g}/\text{L}$, 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; <, less than]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard ²		Trend ³	Comment
						Value	Date		Value	Number of exceedances		
Dissolved oxygen	mg/L	2004–2005	12	0	9.0	10.4	⁴ 02/15/05	10.4	6	0	(⁵)	Minimum=7.6 15th percentile=7.6
pH	Standard Units	2004–2005	12	0	8.0	8.4	03/09/04	8.2	6.5–9.0	0	(⁵)	Minimum=7.6 15th percentile=7.8
Specific conductance	$\mu\text{S}/\text{cm}$	2004–2005	12	0	187	218	03/09/04	203	None	N/A	(⁵)	
Temperature	°C	2004–2005	12	0	6.2	17.5	08/09/04	16.7	20	0	N/A	
Hardness (computed)	mg/L as CaCO_3	2004–2005	12	0	81	90	⁴ 03/09/04	90	None	N/A	(⁵)	
Calcium	mg/L	2004–2005	12	0	28	30	⁴ 01/16/04	30	None	N/A	(⁵)	
Magnesium	mg/L	2004–2005	12	0	3.0	3.8	03/09/04	3.6	None	N/A	(⁵)	
Ammonia	mg/L	2004–2005	12	5	0.008	0.039	01/16/04	0.031	None	N/A	(⁵)	Current LRL=0.01
Un-ionized ammonia (computed)	mg/L	2004–2005	12	5	0.00007	0.00104	08/09/04	0.00082	0.02	0	(⁵)	
Ammonia plus organic nitrogen (total)	mg/L	2004–2005	12	1	0.08	0.17	03/09/04	0.16	None	N/A	(⁵)	Current LRL=0.01
Nitrite plus nitrate	mg/L	2004–2005	12	0	0.059	0.109	05/20/04	0.102	⁶ 10	0	(⁵)	
Nitrite	mg/L	2004–2005	12	5	0.001	0.005	09/14/05	0.003	0.05	0	(⁵)	Current LRL=0.002
Orthophosphate	mg/L	2004–2005	12	11	0	0.003	08/09/04	0	None	N/A	(⁵)	Current LRL=0.006
Phosphorus (total)	mg/L	2004–2005	12	0	0.013	0.047	05/20/04	0.030	0.1	0	(⁵)	
Aluminum	$\mu\text{g}/\text{L}$	2004–2005	12	0	42	79	08/09/04	62	87 (ch)	0	(⁵)	Concern
Cadmium	$\mu\text{g}/\text{L}$	2004–2005	12	0	0.20	0.36	04/14/05	0.26	1.9 (ch)	0	(⁵)	
Copper	$\mu\text{g}/\text{L}$	2004–2005	12	0	1.6	2.0	04/14/05	1.9	7.6 (ch)	0	(⁵)	
Iron	$\mu\text{g}/\text{L}$	2004–2005	12	1	8.5	20	08/09/04	15	300 (WS)	0	(⁵)	Current LRL=6
Lead	$\mu\text{g}/\text{L}$	2004–2005	12	1	0.18	0.33	08/09/04	0.28	2.0 (ch)	0	(⁵)	Current LRL=0.08
Manganese	$\mu\text{g}/\text{L}$	2004–2005	12	0	25	42	05/20/04	33	1,543	0	(⁵)	Water supply standard=50
Silver	$\mu\text{g}/\text{L}$	2004–2005	12	12	0	⁷ <0.2	--	0	0.23 (ch)	0	(⁵)	Current LRL=0.2
Zinc	$\mu\text{g}/\text{L}$	2004–2005	12	0	27	52	04/14/05	36	100 (ch)	1	(⁵)	
<i>Escherichia coli</i>	Colonies per 100 mL	2004–2005	12	3	1.5	5	⁴ 07/19/05	(⁸)	126	0	(⁵)	Geometric mean=2
Turbidity	NTU	2004–2005	12	5	2.1	6.8	05/20/04	4.5	None	N/A	(⁵)	Current LRL=2
Sediment	mg/L	2004–2005	12	0	2.5	116	06/17/04	35	None	N/A	(⁵)	

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See “Definitions of Terms” section.

²Colorado Department of Public Health and Environment, classification and numeric standards for Gunnison and Lower Dolores River Basins (2006) and USEPA, Quality criteria for water (1986).

³Period of record for trend analysis is water year 1996–water year 2005; flow-adjusted seasonal Kendall method, Helsel and Hirsch, Statistical Methods in Water Resources (1993).

⁴Multiple dates for maximum.

⁵Statistic cannot be computed due to number of censored values or insufficient data.

⁶Instream standard for nitrate.

⁷All values censored, current LRL used for maximum.

⁸Use geometric mean for comparison to standard.

385229106583100 Crested Butte Wastewater Treatment Plant

Current Reason for Inclusion: Describe phosphorus concentrations.

General Station Information:

Station Type: USGS water quality

USGS Data Summary:

Period of Record:

Water quality: December 2001 to September 2005

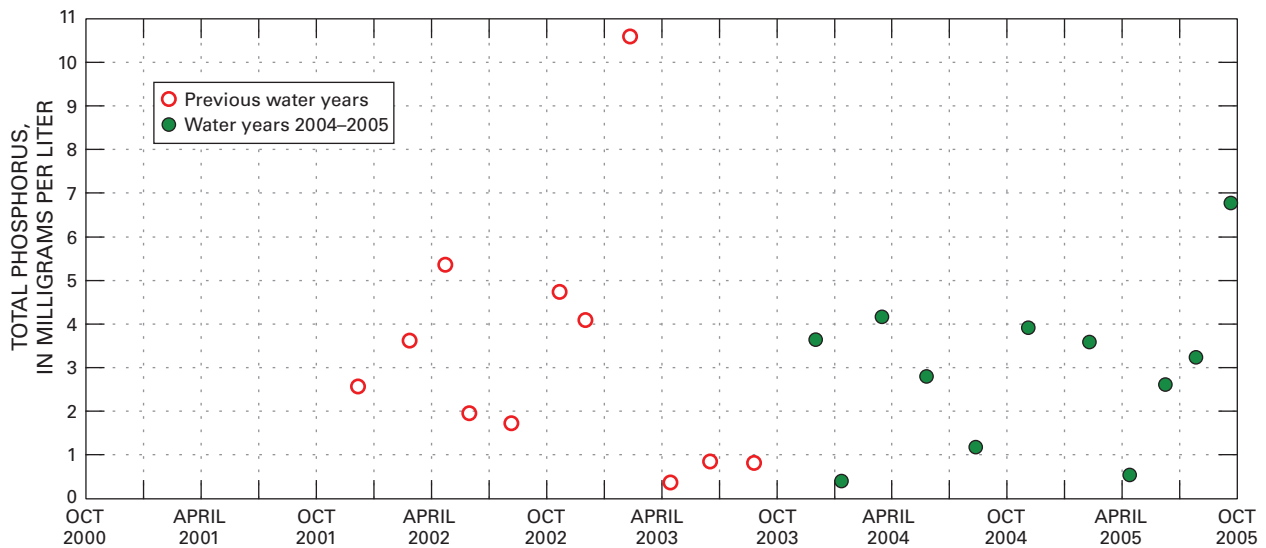


Figure 30. Distribution of total phosphorus samples relative to time for Crested Butte Wastewater Treatment Plant.

Table 16. Summary of total phosphorus for Crested Butte Wastewater Treatment Plant site 385229106583100.

[mg/L, milligrams per liter; N/A, not applicable]

Constituent or property	Units	Period (water year)	Number of samples	Number of censored values	Median ¹	Maximum		85th percentile ¹	Standard		Trend ²
						Value	Date		Value	Number of exceedances	
Phosphorus (total)	mg/L	2004–2005	11	0	3.2	6.8	09/20/05	4.8	N/A	N/A	(²)
		2002–2003	11	0	2.6	10.6	02/11/03		N/A	N/A	

¹Censored values were replaced with 0 to compute median and 85th percentiles (coliform censored values replaced with 1). See definitions section.

²Statistic cannot be computed due to number of censored values or insufficient data.

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