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Water-Quality Data Collected from Vallecito Reservoir, Its Inflows and Outflow, Southwestern Colorado, 1999–2002

Data Series 305

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

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Data Series 305

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

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Conversion Factors and Abbreviations

Inch/Pound to SI

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)
	Volume	
gallon (gal)	3.785	liter (L)
gallon (gal)	0.003785	cubic meter (m^3)
cubic inch (in^3)	0.01639	liter (L)
	Flow rate	
foot per second (ft/s)	0.3048	meter per second (m/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:

°F=(1.8×°C)+32

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

°C=(°F–32)/1.8

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).

Abbreviations

mg/L, milligrams per liter

µg/L, micrograms per liter

mL, milliliters

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By Anthony J. Ranalli

Abstract

The Pine River Watershed Stakeholders Group was created in December 1997 to allow local participation in addressing water-quality issues in Los Piños River watershed, including Vallecito Reservoir in southwestern Colorado. One water-quality issue identified by the stakeholder group is to increase the understanding of the current water quality of Vallecito Reservoir, its two major inflows, and its outflow. The U.S. Geological Survey (USGS), in cooperation with volunteers from the Pine River Watershed Stakeholders Group and the U.S. Environmental Protection Agency (USEPA), U.S. Bureau of Reclamation (BOR), Colorado Department of Public Health and Environment (CDPHE), Pine River Irrigation District, Southern Ute Tribe, San Juan Basin Health Department, and San Juan Resource Conservation and Development, collected water-quality samples from Vallecito Reservoir, its two major inflows, and its outflow between August 1999 and November 2002 at about monthly intervals from April through November. The water-quality samples were analyzed for total and dissolved metals (aluminum, arsenic, cadmium, copper, chromium, iron, lead, manganese, mercury, nickel, silver, and zinc), dissolved major ions (calcium, magnesium, sodium, potassium, chloride, bicarbonate, and sulfate), dissolved silica, dissolved organic carbon (DOC), ultraviolet (UV) absorbance at 254 and 280 nanometers, nutrients (total organic nitrogen, dissolved organic nitrogen, dissolved ammonia, dissolved nitrate, total phosphorus, dissolved phosphorus, and orthophosphate), chlorophyll-*a* (reservoir only), and suspended sediment (inlets to the reservoir only). Measurements of field properties (pH, specific conductance, water temperature, and dissolved oxygen) were also made at each sampling site each time a water-quality sample was collected.

This report documents (1) sampling sites and times of sample collection, (2) sample-collection methods, (3) laboratory analytical methods, and (4) responsibilities of each agency/group involved in the project. The report also provides the environmental and quality-control data collected during the project and provides an interpretation of the quality-control data (field blanks and field duplicates) to assess the quality of the environmental data. This report provides a baseline data set against which future changes in water quality can be assessed.

Introduction

The water quality of the Vallecito Reservoir watershed in southwestern Colorado was initially studied by the U.S. Geological Survey (USGS) during July 1996 to July 1997, in cooperation with the Pine River Irrigation District, to assess the suitability of the reservoir as a potential source of drinking water (Ranalli and Evans, 1999). As a result of this study, in December 1997 a group of residents in and around Bayfield, Colo., created the Pine River Watershed Stakeholders Group. The stakeholders group was created to facilitate local participation in addressing water-quality issues in Los Piños River watershed, which includes Vallecito Reservoir.

An important issue of concern to the stakeholders is the potential effect that population growth and development within the Vallecito Reservoir watershed might have on the water quality of Vallecito Reservoir, its two major inflows (Vallecito Creek and Los Piños River), and Los Piños River downstream from the reservoir (hereinafter referred to as the study area). To address this issue, the stakeholders envisioned a long-term water-quality monitoring project of the study area and initiated water-quality sampling in August 1999. The overall objectives of water-quality monitoring are to (1) characterize the current water quality of the study area and (2) periodically monitor the water quality of the study area over time to document trends in water quality and the causes for the trends if they occur. The water-quality monitoring conducted in 1999–2002 was done in cooperation with the USGS, U.S. Environmental Protection Agency (USEPA), U.S. Bureau of Reclamation (BOR), Colorado Department of Public Health and Environment (CDPHE), Pine River Irrigation District, Southern Ute Tribe, San Juan Basin Health Department, San Juan Resource Conservation and Development, and volunteers from the Pine River Watershed Stakeholders Group.

Purpose and Scope

The purpose of this report is to document the (1) sampling locations and times of sample collection, (2) sample-collection methods, (3) laboratory analytical methods, and (4) responsibilities of each agency/group involved in the project. The report also provides the environmental and quality-control data collected during the project and provides an interpretation of the

quality-control data (field blanks and field duplicates) needed to assess the quality of the environmental data. Thus, the information provided in the report facilitates assessment of the quality of the environmental data collected during 1999–2002 and allows the water-quality data collected during 1999–2002 to serve as a baseline data set against which future changes in water quality can be assessed.

Sampling Locations, Dates of Collection, and Project Responsibilities

The objectives of the water-quality characterization of the study area were achieved by analyzing water-quality samples collected approximately monthly from April through November (1999–2002) at various reservoir stages and streamflows from Vallecito Reservoir, its two major inlets, and its outlet (fig. 1 and table 1) for a variety of water-quality constituents and field properties. The water-quality constituents measured at each site are described in the Laboratory Analysis section. The USGS, USEPA, CDPHE, and the volunteers participated in the collection and analysis of the water-quality samples. The participation of each agency involved in data-collection activities and the volunteers from 1999 to 2002 is described below. The timing of any activity that did not occur continuously from 1999 to 2002 is noted.

The USGS:

1. Provided the volunteers with the equipment and training needed to collect and process nutrient, dissolved organic carbon (DOC), UV absorbance, and chlorophyll-*a* samples and to measure depth profiles of pH, specific conductance, water temperature, and dissolved oxygen in Vallecito Reservoir. The USGS also provided the volunteers with sample bottles, filter pump, and 0.45-µm capsule filters.
2. Collected and processed water-quality samples from Vallecito Creek near Bayfield, Colo., and analyzed the samples for major ions, metals, nutrients, DOC, and suspended sediment as part of the USGS Hydrologic Benchmark Network program (Cobb and Biesecker, 1971).
3. Collected and processed water-quality samples from Los Piños River above Vallecito Reservoir near Bayfield, Colo. (2000–2002) and analyzed the samples for nutrients, DOC, UV absorbance, and suspended sediment.
4. Supervised the collection of water-quality samples from Vallecito Reservoir by the volunteers and analyzed the samples for nutrients, DOC, UV absorbance, and chlorophyll-*a*.
5. Supervised the collection of water-quality samples from Los Piños River below Vallecito Reservoir near Bayfield, Colo., by the volunteers and analyzed the samples for nutrients, DOC, and UV absorbance.
6. Shipped the nutrient, DOC, UV absorbance, and chlorophyll-*a* samples collected from all sampling sites to the USGS National Water-Quality Laboratory (NWQL) in Lakewood, Colo., for analysis in thermally insulated coolers that contained sufficient ice to keep samples at less than 4 degrees Celsius for the duration of the trip.
7. Provided blank water for the field blanks. Inorganic blank water was used for the major ion, metal, and nutrient field blanks. Pesticide-grade volatile organic carbon (VOC) free water was used for the DOC and UV absorbance blanks. Both types of water were obtained from the USGS water-quality service unit in Ocala, Fla.

The USEPA:

1. Trained the volunteers on how to use the bottles and preservatives for the collection of total and dissolved metal samples and on how to fill out the required USEPA chain-of-custody forms.
2. Provided the volunteers with the sample bottles for the collection of total and dissolved metal samples that were shipped to and analyzed by the USEPA laboratory in Golden, Colo.
3. Analyzed water-quality samples collected from Los Piños River above Vallecito Reservoir near Bayfield, Colo., Los Piños River below Vallecito Reservoir near Bayfield, Colo., and Vallecito Reservoir for total and dissolved metals.

The CDPHE:

1. Collected and processed water-quality samples from Vallecito Creek near mouth and Los Piños River above Vallecito Reservoir (just upstream from where both streams empty into Vallecito Reservoir) and analyzed these samples for major ions, metals, nutrients, and fecal coliform and *E. coli* bacteria at the CDPHE laboratory in Denver, Colo.
2. Analyzed water-quality samples collected from Vallecito Reservoir for fecal coliform and *E. coli* bacteria at the San Juan Basin Health Department in Durango, Colo.

The CDPHE collected water-quality samples at the mouths of Vallecito Creek and Los Piños River where most of the development in the watershed has occurred (fig. 1). The USGS and CDPHE sampling sites on Vallecito Creek and Los Piños River bracket this development, and collecting samples upstream and downstream from potential sources of contamination associated with development could provide evidence of any adverse effects development might have on water quality.

The Volunteers:

1. Collected and processed water-quality samples from Vallecito Reservoir and Los Piños River below Vallecito Reservoir near Bayfield, Colo., according to USGS and USEPA protocols. In 1999, the volunteers collected water-quality samples for total metals only from the Vallecito Reservoir North, Vallecito Reservoir Center, and Vallecito Reservoir South sampling sites.

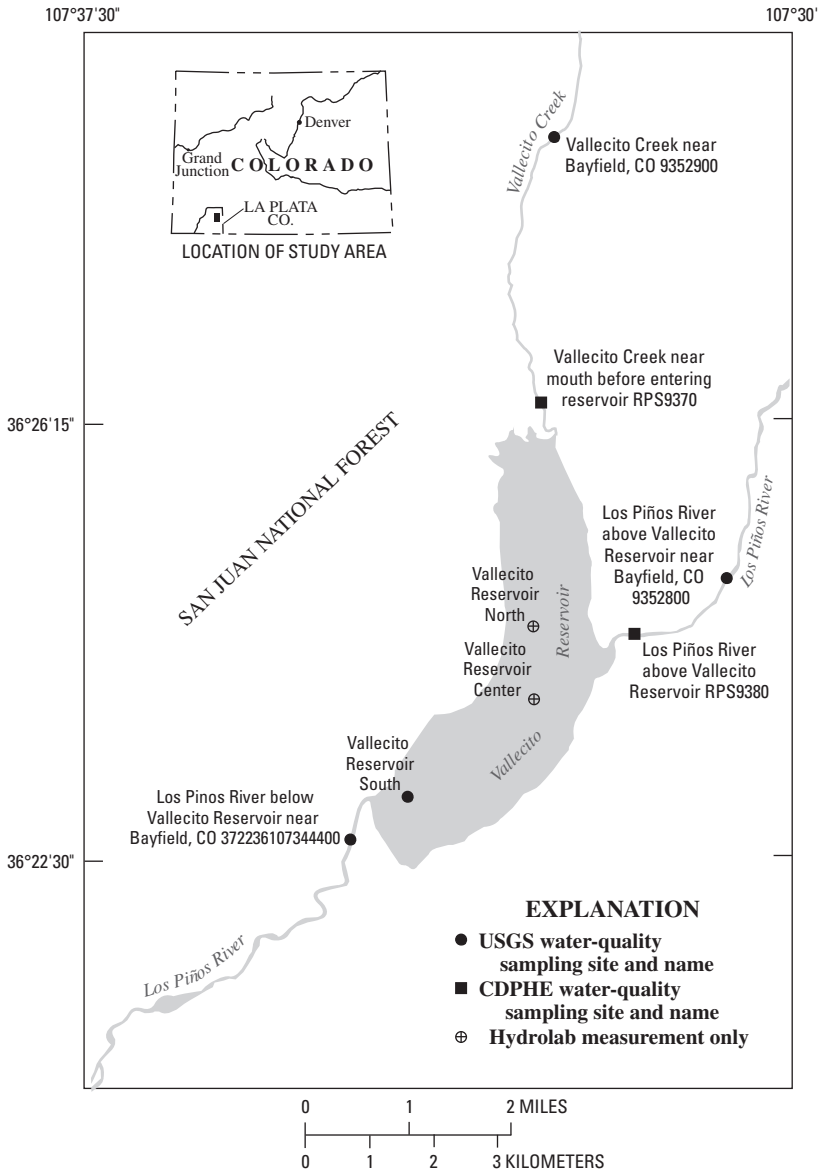

Figure 1. Water-quality sample-collection locations, 1999–2000.

2. Measured depth profiles of pH, specific conductance, water temperature, and dissolved oxygen at the Vallecito reservoir North, Center, and South sampling sites with a multiconstituent water-quality probe (Hydrolab) approximately biweekly from May to October.

3. Delivered the samples for metal, nutrient, DOC, UV absorbance, and chlorophyll-*a* analysis to USGS personnel for transport to and analysis by the USGS National Water Quality Laboratory in Denver, Colo.

4. Collected and processed water-quality samples for analysis of fecal coliform and *E. coli* bacteria from the Vallecito Reservoir South sampling site, Vallecito Reservoir just downstream from the mouth of Vallecito Creek, and Vallecito Reservoir just downstream from the mouth of Los Piños River and delivered these samples to the San Juan Basin Health Department in Durango, Colo., for analysis.

The BOR:

1. Provided funding for the collection of water-quality samples following the Missionary Ridge wildfire in June 2002. These samples were collected in July, August, September, and October 2002.

The water-quality data that were collected during this study are available in this report (tables 2–4) and in the USGS and USEPA databases. All data analyzed by the USGS and USEPA are available at *waterdata.usgs.gov/nwis/*, and all data collected and analyzed by the CDPHE is in the USEPA STORET database at *www.epa.gov/storet*. These data can be downloaded from these databases by using the site IDs listed in table 1. The fecal coliform and *E. coli* bacteria data are given in table 5. Values of pH, specific conductance, water temperature, and dissolved oxygen measured in Vallecito Reservoir are given in the Appendix.

Table 1. Water-quality sample-collection locations, 1999–2000.

Site name	Site type and sampling agency	Site ID	Latitude	Longitude	Physical description
Vallecito Creek near Bayfield, CO	Stream—USGS	9352900	37°28'39"	107°32'35"	Located at the USGS gaging station
Vallecito Creek near mouth before entering reservoir	Stream—CDPHE	RPS9370			Located at bridge on County Road 501
Los Pinos River above Vallecito Reservoir near Bayfield, CO	Stream—USGS	9352800	37°24'53"	107°30'46"	Located at the bridge leading to the Wilderness Trails Ranch
Los Pinos River above Vallecito Reservoir	Stream—CDPHE	RPS9380			Located at the bridge leading to 5 Branches Campground
Vallecito Reservoir North	Reservoir—USGS/Volunteers	372433107324300	37°24'33"	107°32'43"	
Vallecito Reservoir Center	Reservoir—USGS/Volunteers	372346107330200	37°23'46"	107°33'02"	
Vallecito Reservoir South	Reservoir—USGS/Volunteers	372300107335700	37°23'00"	107°33'57"	
Los Pinos River below Vallecito Reservoir near Bayfield, CO	Stream—Volunteers	372236107344400	37°22'36"	107°34'44"	Located about 20 yards downstream from powerplant

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Instantaneous discharge (ft^3/s)	pH, field (standard units)	Specific conductance, field (µS/cm 25 degrees C)	Water temperature (degrees C)	Dissolved oxygen (mg/L)	pH, laboratory (standard units)	Specific conductance, laboratory (µS/cm 25 degrees C)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Potassium, dissolved (mg/L)
Vallecito Creek near Bayfield, CO (9352900)											
04/21/1999	1430	150	7	63	4	10.1	7.6	69	9.09	1.91	0.52
05/13/1999	1045	240	7.7	70	3.3	10	7.9	71	9.04	1.85	0.46
06/08/1999	1045	450	7.5	53	3.5	11.6	7.3	56	6.99	1.55	0.31
06/30/1999	1045	368	6.9	41	6.3	10.3	7.7	42	4.59	1.26	0.3
08/10/1999	1130	646	7.3	54	9.5	8.8	7.2	55	6.94	1.64	0.44
08/23/1999	1300	368	7.6	67	10	9	7.9	69	9.32	1.88	0.45
05/18/2000	1145	210	7.4	61	3.1	10.4	8	64	7.79	1.76	0.46
06/06/2000	1045	292	7.3	42	5.4	9.8	7.6	43	4.88	1.26	0.37
07/11/2000	1030	55	7.5	55	10.6	8.6	7.9	57	6.73	1.54	0.42
08/22/2000	1600	59	7.4	61	14.2	8.1	7.9	65	7.69	1.71	0.5
04/12/2001	1030	50	7.6	71	0.8	10.8	7.6	78	9.92	2.03	0.62
05/17/2001	1530	764	7.2	55	5.5	9.8	7	56	6.97	1.51	0.43
06/14/2001	1100	314	7	49	2.9	10.9	7.3	50	6.21	1.48	0.36
07/17/2001	1200	144	6.1	46	8.9	9.4	7	46	5.26	1.42	0.36
08/16/2001	1030	225	7.4	59	7.8	9.7	7.5	61	7.64	1.71	0.42
09/18/2001	945	52	7.1	71	7.4	9.3	7.6	69	8.65	1.98	0.51
10/17/2001	1445	24	7.5	87	5.1	10.3	7.8	81	10.3	2.28	0.57
05/22/2002	1100	107	7.8	54	2.5	10.7	-	-	5.66	1.69	0.43
07/30/2002	1000	27	7.6	74	12	8.5	-	-	8.77	2.01	0.6
08/29/2003	830	19	7.5	70	11	8.4	-	-	9.04	1.98	0.6
09/19/2002	915	75	7.5	63	5	10.7	-	-	7.47	1.89	0.5
10/30/2002	1500	-	-	-	-	-	8.0	67	7.63	1.82	0.47

Date	Time	Sodium, dissolved (mg/L)	Alkalinity, mg/L as $CaCO_3$ laboratory	Alkalinity, mg/L as $CaCO_3$ field	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Silica, dissolved (mg/L)	Ammonia + org-N, dissolved (mg/L as N)	Ammonia + org-N, total (mg/L as N)	Ammonia, dissolved (mg/L as N)	Nitrite + nitrate, dissolved (mg/L as N)	Nitrite dissolved, (mg/L as N)
Vallecito Creek near Bayfield, CO (9352900)												
04/21/1999	1430	0.78	-	28	0.21	4.1	3.81	E0.07	0.1	0.003	0.088	<0.001
05/13/1999	1045	0.7	-	27	0.26	4.9	3.61	E0.06	0.12	0.002	0.087	<0.001
06/08/1999	1045	0.48	-	17	0.33	5.7	2.73	E0.07	<0.1	0.003	0.119	0.001
06/30/1999	1045	0.43	12	11	0.11	6.5	2.17	<0.1	E0.07	0.003	0.093	0.001
08/10/1999	1130	0.59	-	18	0.11	6.3	3	E0.1	0.17	0.007	0.063	0.001
08/23/1999	1300	0.64	-	24	0.13	6	3.66	<0.1	0.15	<0.002	0.048	<0.001
05/18/2000	1145	0.6	20	21	E0.22	5.8	3.11	E0.07	<0.1	<0.002	0.121	<0.001
06/06/2000	1045	0.42	11	12	<0.29	6	2.33	<0.1	0.1	0.005	0.125	<0.001
07/11/2000	1030	0.7	18	21	E0.14	6.5	3.17	<0.1	E0.07	0.003	0.079	<0.001
08/22/2000	1600	0.73	20	19	E0.14	8	3.19	<0.1	<0.1	<0.002	0.141	<0.001
04/12/2001	1030	1.05	-	23	0.32	7.98	4.08	<0.1	E0.06	0.005	0.132	-
05/17/2001	1530	0.5	-	18	0.2	6.3	3.1	E0.06	0.1	0.005	0.115	-
06/14/2001	1100	0.49	-	15	0.16	6.1	2.89	<0.1	E0.05	<0.002	0.1	-
07/17/2001	1200	0.52	-	14	0.11	8.63	2.62	<0.1	E0.04	0.003	0.073	-
08/16/2001	1030	0.58	-	20	0.12	7.29	3.16	E0.07	E0.05	<0.002	0.079	-
09/18/2001	945	0.81	-	23	0.21	9.58	3.62	<0.1	<0.08	<0.002	0.078	-
10/17/2001	1445	1.01	-	28	0.3	10.1	3.92	<0.1	<0.1	<0.015	0.115	-
05/22/2002	1100	0.65	-	12	0.19	10.3	3.02	<0.1	<0.1	<0.015	0.152	-
07/30/2002	1000	0.97	-	22	0.25	10.7	3.69	E0.06	<0.1	<0.015	0.143	<0.002
08/29/2003	830	1.08	24	25	0.44	9.8	3.7	<0.1	E0.06	<0.015	0.145	<0.002
09/19/2002	915	0.84	19	-	E0.28	10.3	3.6	<0.1	<0.1	<0.015	0.191	<0.002
10/30/2002	1500	0.9	-	-	E0.14	8.8	3.7	<0.1	E0.06	<0.015	0.168	<0.002

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Ortho-phosphate, dissolved (mg/L as P)	Phosphorus, dissolved (mg/L)	Phosphorus, total (mg/L)	Organic carbon, dissolved (mg/L)	Organic carbon, total (mg/L)	Ultraviolet absorbance at 254 nm	Ultraviolet absorbance at 280 nm	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Antimony, dissolved (µg/L)	Antimony, total (µg/L)
Vallecito Creek near Bayfield, CO (9352900)												
04/21/1999	1430	0.001	<0.004	0.008	1.9	-	-	-	34	-	<1	-
05/13/1999	1045	<0.001	<0.004	0.007	2.3	-	-	-	45	-	<1	-
06/08/1999	1045	<0.001	0.004	0.005	1.4	-	-	-	46	-	<1	-
06/30/1999	1045	0.001	<0.004	0.004	0.6	-	0.014	-	36	-	<1	-
08/10/1999	1130	0.001	<0.004	0.026	1.4	-	0.05	-	64	-	<1	-
08/23/1999	1300	<0.001	<0.004	<0.004	1.5	-	0.053	-	71	-	<1	-
05/18/2000	1145	<0.001	<0.006	<0.008	1.7	-	0.043	0.027	55	-	<1	-
06/06/2000	1045	<0.001	<0.006	<0.008	0.8	-	0.017	0.011	<44	-	<1	-
07/11/2000	1030	0.001	<0.006	<0.008	0.5	-	0.013	0.01	34	-	<1	-
08/22/2000	1600	<0.001	<0.006	<0.008	0.6	-	0.011	0.009	30	-	<1	-
04/12/2001	1030	<0.007	<0.006	E0.002	1.2	-	0.031	0.022	-	-	-	-
05/17/2001	1530	<0.007	<0.006	0.011	2	-	0.072	0.054	80	-	-	-
06/14/2001	1100	<0.007	<0.006	0.004	0.9	-	0.027	0.002	40	-	-	-
07/17/2001	1200	<0.007	<0.006	E0.002	0.7	-	0.01	0.007	60	-	-	-
08/16/2001	1030	<0.007	<0.006	E0.004	1.9	-	0.03	0.017	50	-	-	-
09/18/2001	945	<0.007	<0.006	<0.004	0.6	-	0.014	0.01	30	-	-	-
10/17/2001	1445	<0.007	<0.004	E0.003	0.6	-	0.009	0.004	-	-	-	-
05/22/2002	1100	<0.007	<0.004	0.004	0.8	-	0.016	0.011	30	-	-	-
07/30/2002	1000	<0.007	<0.004	<0.004	0.5	-	0.011	0.008	-	-	-	-
08/29/2003	830	<0.007	<0.004	<0.004	0.9	E0.4	0.01	0.008	18	21	-	-
09/19/2002	915	<0.007	<0.004	<0.004	0.8	0.8	0.011	0.008	32	128	-	-
10/30/2002	1500	<0.007	<0.004	<0.004	0.6	0.64	0.015	0.011	27	83	-	-

Date	Time	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Barium, dissolved (µg/L)	Barium, total (µg/L)	Beryllium, dissolved (µg/L)	Beryllium, total (µg/L)	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Copper, dissolved (µg/L)
Vallecito Creek near Bayfield, CO (9352900)												
04/21/1999	1430	<1	-	13	-	<1	-	<1	-	<1	-	<1
05/13/1999	1045	<1	-	13	-	<1	-	<1	-	<1	-	<1
06/08/1999	1045	<1	-	10	-	<1	-	<1	-	-	-	<1
06/30/1999	1045	<1	-	9	-	<1	-	<1	-	<1	-	<1
08/10/1999	1130	<1	-	12	-	<1	-	<1	-	<1	-	<1
08/23/1999	1300	<1	-	13	-	<1	-	<1	-	<1	-	<1
05/18/2000	1145	<2	-	11	-	<1	-	<1	-	<0.8	-	<1
06/06/2000	1045	<2	-	8	-	<1	-	<1	-	<0.8	-	<1
07/11/2000	1030	<2	-	11	-	<1	-	<1	-	<0.8	-	<1
08/22/2000	1600	<2	-	13	-	<1	-	<1	-	<0.8	-	<1
04/12/2001	1030	-	-	-	-	-	-	-	-	-	-	-
05/17/2001	1530	-	-	-	-	-	-	-	-	-	-	-
06/14/2001	1100	-	-	-	-	-	-	-	-	-	-	-
07/17/2001	1200	-	-	-	-	-	-	-	-	-	-	-
08/16/2001	1030	-	-	-	-	-	-	-	-	-	-	-
09/18/2001	945	-	-	-	-	-	-	-	-	-	-	-
10/17/2001	1445	-	-	-	-	-	-	-	-	-	-	-
05/22/2002	1100	-	-	-	-	-	-	-	-	-	-	-
07/30/2002	1000	-	-	-	-	-	-	-	-	-	-	-
08/29/2003	830	E0.2	<2	-	-	-	-	<0.04	<0.04	-	-	0.4
09/19/2002	915	E0.1	<2	-	-	-	-	<0.04	E0.02	-	-	0.5
10/30/2002	1500	<0.3	<2	-	-	-	-	<0.04	<0.04	-	-	0.4

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft³/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Molybdenum, dissolved (µg/L)	Molybdenum, total (µg/L)
Vallecito Creek near Bayfield, CO (9352900)												
04/21/1999	1430	-	11	-	<1	-	3.4	-	-	-	<1	-
05/13/1999	1045	-	11	-	<1	-	8.1	-	-	-	<1	-
06/08/1999	1045	-	13	-	<1	-	20	-	-	-	<1	-
06/30/1999	1045	-	<10	-	<1	-	22.2	-	-	-	<1	-
08/10/1999	1130	-	E6	-	<1	-	18.6	-	-	-	<1	-
08/23/1999	1300	-	<10	-	<1	-	12	-	-	-	<1	-
05/18/2000	1145	-	E10	-	<1	-	24.1	-	-	-	<1	-
06/06/2000	1045	-	<10	-	<1	-	24.6	-	-	-	<1	-
07/11/2000	1030	-	<10	-	<1	-	3.8	-	-	-	<1	-
08/22/2000	1600	-	<10	-	<1	-	6.9	-	-	-	1	-
04/12/2001	1030	-	-	-	-	-	-	-	-	-	-	-
05/17/2001	1530	-	30	-	-	-	23.4	-	-	-	-	-
06/14/2001	1100	-	<10	-	-	-	20.6	-	-	-	-	-
07/17/2001	1200	-	<10	-	-	-	19.9	-	-	-	-	-
08/16/2001	1030	-	<10	-	-	-	15.9	-	-	-	-	-
09/18/2001	945	-	<10	-	-	-	10	-	-	-	-	-
10/17/2001	1445	-	-	-	-	-	-	-	-	-	-	-
05/22/2002	1100	-	<10	-	-	-	40.5	-	-	-	-	-
07/30/2002	1000	-	<10	-	-	-	-	-	-	-	-	-
08/29/2003	830	E0.4	<10	<12	<0.08	<1	0.7	1.8	-	-	-	-
09/19/2002	915	<0.6	<10	51	<0.08	<1	16.7	17.7	-	-	-	-
10/30/2002	1500	0.8	<10	40	<0.08	<0.06	11.2	12.6	-	-	-	-

Date	Time	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Selenium, dissolved (µg/L)	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)	Uranium (natural), dissolved (µg/L)	Uranium (natural), total (µg/L)	Suspended sediment (mg/L)
Vallecito Creek near Bayfield, CO (9352900)												
04/21/1999	1430	<1	-	<1	-	<1	-	<1	-	<1	-	-
05/13/1999	1045	<1	-	<1	-	<1	-	1.2	-	<1	-	-
06/08/1999	1045	1.48	-	<1	-	<1	-	3	-	<1	-	-
06/30/1999	1045	2.54	-	<1	-	<1	-	3.8	-	<1	-	-
08/10/1999	1130	2.01	-	<1	-	<1	-	2	-	<1	-	-
08/23/1999	1300	1.72	-	<1	-	<1	-	1.7	-	<1	-	-
05/18/2000	1145	1.6	-	<2	-	<1	-	4.9	-	<1	-	1.6
06/06/2000	1045	2.25	-	<2	-	<1	-	6.5	-	<1	-	6.5
07/11/2000	1030	1.43	-	<2	-	<1	-	1.2	-	<1	-	1.1
08/22/2000	1600	<1	-	<2	-	<1	-	<1	-	<1	-	0.4
04/12/2001	1030	-	-	-	-	-	-		-	-	-	1.6
05/17/2001	1530	-	-	-	-	-	-	2.5	-	-	-	9.5
06/14/2001	1100	-	-	-	-	-	-	3.1	-	-	-	3.0
07/17/2001	1200	-	-	-	-	-	-	3.3	-	-	-	1.3
08/16/2001	1030	-	-	-	-	-	-	2.1	-	-	-	1.4
09/18/2001	945	-	-	-	-	-	-	1.7	-	-	-	0.7
10/17/2001	1445	-	-	-	-	-	-		-	-	-	1.8
05/22/2002	1100	-	-	-	-	-	-	5.2	-	-	-	1.1
07/30/2002	1000	-	-	-	-	-	-		-	-	-	0.2
08/29/2003	830	-	-	-	-	-	-	1.4	2	-	-	0.1
09/19/2002	915	-	-	-	-	-	-	3.3	4	-	-	0.8
10/30/2002	1500	-	-	-	-	-	-	2.2	3	-	-	0.1

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Instantaneous discharge (ft^3/s)	pH, field (standard units)	Specific conductance, field (µS/cm 25 degrees C)	Water temperature (degrees C)	Dissolved oxygen (mg/L(	pH, laboratory (standard units)	Specific conductance, laboratory (µS/cm 25 degrees C)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Potassium, dissolved (mg/L)
Los Piños River above Vallecito Reservoir near Bayfield, CO (9352800)											
05/18/2000	1430	296	7.5	66	9.0	9.2	-	-	-	-	0.86
06/06/2000	1330	289	7.6	56	12.7	8.4	-	-	-	-	-
07/11/2000	1415	53.5	7.9	93	21.0	7.1	-	-	-	-	1.01
08/22/2000	1315	52.1	8.0	88	18.6	7.5	-	-	-	-	-
04/12/2001	1430	84.5	7.8	100	3.5	10.4	-	-	-	-	-
05/17/2001	1215	1100	7.5	54	6	9.5	-	-	-	-	-
06/14/2001	1330	500	7.4	50	8.3	9.3	-	-	-	-	-
07/17/2001	1445	131	6.5	71	15.2	7.7	-	-	-	-	-
08/16/2001	1245	232	7.7	60	13.8	7.9	-	-	-	-	-
09/18/2001	1245	60.6	7.9	84	13.1	8.0	-	-	-	-	-
10/17/2001	1015	38.6	7.4	95	5.5	10.4	-	-	-	-	-
05/22/2002	1400	79.8	7.9	62	12	8.8	-	-	-	-	-
07/30/2002	1315	19.6	8.1	107	20.8	6.9	-	-	-	-	-
08/29/2002	1045	14.2	8.3	105	16	7.9	-	-	16.6	2.43	1.16
09/19/2002	1200	47.7	8.1	81	11.5	8.8	-	-	11.3	1.82	1.02
10/30/2002	1235	46	-	-	-	-	6.5	80.8	10.8	1.7	0.89

Date	Time	Sodium, dissolved (mg/L)	Alkalinity, laboratory (mg/L as $CaCO_3$)	Alkalinity, field (mg/L as $CaCO_3$)	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Silica, dissolved (mg/L)	Ammonia + org-N, dissolved (mg/L as N)	Ammonia + org-N, total (mg/L as N)	Ammonia, dissolved (mg/L as N)	Nitrite + nitrate, dissolved (mg/L as N)	Nitrite, dissolved (mg/L as N)
Los Piños River above Vallecito Reservoir near Bayfield, CO (9352800)												
05/18/2000	1430	-	-	29	-	-	-	0.109	0.105	<0.002	0.007	0.001
06/06/2000	1330	-	-	24	-	-	-	E0.063	0.126	0.039	0.020	<0.001
07/11/2000	1415	-	-	40	-	-	-	E0.074	E0.086	<0.002	0.009	<0.001
08/22/2000	1315	-	-	37	-	-	-	E0.069	E0.084	0.005	0.015	<0.001
04/12/2001	1430	-	-	34	-	-	-	E0.07	0.1	0.007	0.094	0.001
05/17/2001	1215	-	-	23	-	-	-	0.15	0.18	0.006	0.033	<0.001
06/14/2001	1330	-	-	20	-	-	-	E0.1	0.12	0.002	0.016	<0.001
07/17/2001	1445	-	-	30	-	-	-	E0.06	0.09	0.002	0.012	0.002
08/16/2001	1245	-	-	28	-	-	-	E0.09	0.09	0.003	0.015	<0.001
09/18/2001	1245	-	-	34	-	-	-	E0.08	0.1	0.003	0.056	0.001
10/17/2001	1015	-	-	39	-	-	-	<0.1	<0.1	<0.015	0.019	<0.002
05/22/2002	1400	-	-	28	-	-	-	0.12	E0.07	<0.015	0.018	<0.002
07/30/2002	1315	-	-	48	-	-	-	E0.08	0.1	<0.015	<0.013	<0.002
08/29/2002	1045	2.04	53	50	0.95	3.6	8.2	<0.1	E0.05	<0.015	E0.009	<0.002
09/19/2002	1200	1.6	E39	-	0.99	3.4	7.4	E0.07	E0.05	<0.015	0.015	<0.002
10/30/2002	1235	1.56	-	-	E0.19	3.7	7.7	E0.06	E0.07	<0.015	E0.015	<0.002

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft³/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Ortho-phosphate, dissolved (mg/L as P)	Phosphorus, dissolved (mg/L)	Phosphorus, total (mg/L)	Organic carbon, dissolved (mg/L)	Organic carbon, total (mg/L)	Ultraviolet absorbance at 254 nm	Ultraviolet absorbance at 280 nm	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Antimony, dissolved (µg/L)	Antimony, total (µg/L)
Los Piños River above Vallecito Reservoir near Bayfield, CO (9352800)												
05/18/2000	1430	0.001	0.003	0.012	2.6	-	0.076	0.050	20	69	-	-
06/06/2000	1330	<0.001	0.003	0.013	2.0	-	0.070	0.054	-	-	-	-
07/11/2000	1415	0.002	<0.006	<0.008	1.2	-	0.031	0.024	15	18	-	-
08/22/2000	1315	0.001	<0.006	E0.005	1.3	-	0.032	0.024	<10	21	-	-
04/12/2001	1430	<0.007	<0.006	0.005	1.7	-	0.038	0.028	-	-	-	-
05/17/2001	1215	<0.007	E0.005	0.043	3.0	-	0.122	0.091	-	-	-	-
06/14/2001	1330	<0.007	E0.004	0.019	2.1	-	0.078	0.059	28	144	-	-
07/17/2001	1445	<0.007	E0.004	0.007	1.4	-	0.035	0.026	-	-	-	-
08/16/2001	1245	<0.007	E0.003	0.024	2.0	-	0.055	0.041	-	-	-	-
09/18/2001	1245	<0.007	E0.003	E0.003	-	-	-	-	-	-	-	-
10/17/2001	1015	<0.007	<0.004	<0.004	0.8	-	0.020	0.012	-	-	-	-
05/22/2002	1400	<0.007	E0.003	0.007	1.5	-	0.043	0.032	<20	-	-	-
07/30/2002	1315	0.013	0.017	0.026	1.0	-	0.031	0.023	-	-	-	-
08/29/2002	1045	E0.006	0.008	0.011	0.9	1.4	0.021	0.017	5	43	-	-
09/19/2002	1200	<0.007	E0.003	0.005	1.1	1.2	0.025	0.019	4	30	-	-
10/30/2002	1235	<0.007	E0.002	E0.003	1.0	1.0	0.025	0.019	3	64	-	-

Date	Time	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Barium, dissolved (µg/L)	Barium, total (µg/L)	Beryllium, dissolved (µg/L)	Beryllium, total (µg/L)	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Copper, dissolved (µg/L)
Los Piños River above Vallecito Reservoir near Bayfield, CO (9352800)												
05/18/2000	1430	-	-	-	-	-	-	<0.2	<0.2	<0.4	<0.4	<2
06/06/2000	1330	-	-	-	-	-	-	-	-	-	-	-
07/11/2000	1415	<1	<1	-	-	-	-	<0.2	<0.2	<0.4	<0.4	<2
08/22/2000	1315	<1	<1	-	-	-	-	<0.2	<0.2	<0.4	<0.4	<2
04/12/2001	1430	-	-	-	-	-	-	-	-	-	-	-
05/17/2001	1215	-	-	-	-	-	-	-	-	-	-	-
06/14/2001	1330	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	<0.4	1.1
07/17/2001	1445	-	-	-	-	-	-	-	-	-	-	-
08/16/2001	1245	-	-	-	-	-	-	-	-	-	-	-
09/18/2001	1245	-	-	-	-	-	-	-	-	-	-	-
10/17/2001	1015	-	-	-	-	-	-	-	-	-	-	-
05/22/2002	1400	-	-	-	-	-	-	-	-	-	-	-
07/30/2002	1315	-	-	-	-	-	-	-	-	-	-	-
08/29/2002	1045	0.2	<2	-	-	-	-	<0.04	<0.04	-	-	0.3
09/19/2002	1200	E0.1	<2	-	-	-	-	<0.04	<0.04	-	-	0.3
10/30/2002	1235	E0.1	<2	-	-	-	-	<0.04	<0.04	-	-	E0.2

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Molybdenum, dissolved (µg/L)	Molybdenum, total (µg/L)
Los Piños River above Vallecito Reservoir near Bayfield, CO (9352800)												
05/18/2000	1430	<2	39.0	113	<1.5	<1.5	2.6	7.2	-	<0.02	-	-
06/06/2000	1330	-	-	-	-	-	-	-	-	-	-	-
07/11/2000	1415	<2	15.2	31	<1.5	<1.5	4.6	4.1	-	<0.02	-	-
08/22/2000	1315	<2	19.5	49.9	<1.5	<1.5	5.5	7.7	-	<0.04	-	-
04/12/2001	1430	-	-	-	-	-	-	-	-	-	-	-
05/17/2001	1215	-	-	-	-	-	-	-	-	-	-	-
06/14/2001	1330	5.8	21.3	162.6	<2	<2	4.2	10.2	-	<0.1	-	-
07/17/2001	1445	-	-	-	-	-	-	-	-	-	-	-
08/16/2001	1245	-	-	-	-	-	-	-	-	-	-	-
09/18/2001	1245	-	-	-	-	-	-	-	-	-	-	-
10/17/2001	1015	-	-	-	-	-	-	-	-	-	-	-
05/22/2002	1400	-	16	-	-	-	E2.8	-	-	-	-	-
07/30/2002	1315	-	-	-	-	-	-	-	-	-	-	-
08/29/2002	1045	E0.3	15	66	<0.08	<1	10	12.7	-	-	-	-
09/19/2002	1200	<0.6	25	62	<0.08	<1	6.2	7.7	-	-	-	-
10/30/2002	1235	E0.4	19	101	<0.08	0.09	4.3	7.2	-	-	-	-

Date	Time	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Selenium, dissolved (µg/L)	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)	Uranium (natural), dissolved (µg/L)	Uranium (natural), total (µg/L)	Suspended sediment (µg/L)
Los Piños River above Vallecito Reservoir near Bayfield, CO (9352800)												
05/18/2000	1430	0.4	0.6	-	-	<0.8	<0.8	<2	3.7	-	-	3.9
06/06/2000	1330	-	-	-	-	-	-	-	-	-	-	3.6
07/11/2000	1415	0.5	<0.4	-	-	<0.8	<0.8	<2	4.2	-	-	1.5
08/22/2000	1315	0.5	0.6	-	-	<0.8	<0.8	<2	<2	-	-	0.7
04/12/2001	1430	-	-	-	-	-	-	-	-	-	-	1.7
05/17/2001	1215	-	-	-	-	-	-	-	-	-	-	59.7
06/14/2001	1330	<0.4	0.4	-	-	<0.8	<0.8	<2	8.2	-	-	6.1
07/17/2001	1445	-	-	-	-	-	-	-	-	-	-	1.7
08/16/2001	1245	-	-	-	-	-	-	-	-	-	-	10.8
09/18/2001	1245	-	-	-	-	-	-	-	-	-	-	1.2
10/17/2001	1015	-	-	-	-	-	-	-	-	-	-	1.3
05/22/2002	1400	-	-	-	-	-	-	1	-	-	-	1.1
07/30/2002	1315	-	-	-	-	-	-	-	-	-	-	5.7
08/29/2002	1045	-	-	-	-	-	-	<1	1	-	-	2.3
09/19/2002	1200	-	-	-	-	-	-	<1	<1	-	-	1.7
10/30/2002	1235	-	-	-	-	-	-	<1	E1	-	-	0.5

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Instantaneous discharge (ft^3/s)	pH, field (standard units)	Specific conductance, field (µS/cm 25 degrees C)	Water temperature (degrees C)	Dissolved oxygen (mg/L)	pH, laboratory (standard units)	Specific conductance, laboratory (µS/cm 25 degrees C)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Potassium, dissolved (mg/L)
Los Piños River below Vallecito Reservoir near Bayfield, CO (372236107344400)											
05/19/2000	1200	-	-	-	-	-	-	-	-	-	0.80
06/06/2000	1130	-	-	-	-	-	-	-	-	-	0.78
07/11/2000	1130	-	6.8	79	7.6	9.1	-	-	-	-	0.74
08/22/2000	1100	-	-	-	-	-	-	-	-	-	0.80
05/17/2001	1100	-	7.7	78	7.9	8.5	-	-	-	-	0.74
06/14/2001	1000	-	7.6	67	9.9	8.4	-	-	-	-	0.67
07/17/2001	1030	-	7.1	66	11	6.6	-	-	-	-	0.63
08/16/2001	1100	-	7.2	64	14.5	7	-	-	-	-	0.70
09/18/2001	1100	-	-	-	-	-	-	-	-	-	0.69
10/17/2001	1100	-	-	-	-	-	-	-	-	-	1.05
05/22/2002	1000	-	7.2	90	12.1	7.2	-	-	-	-	-
07/31/2002	1000	-	-	-	-	-	-	-	-	-	-
08/29/2002	1030	-	9.1	123	17.6	7.3	-	441	18.6	2.8	1.1
09/19/2002	1000	-	7.5	135	15.2	7.2	-	133	19.0	2.8	1.2
11/01/2002	1300	-	-	120	8.9	-	6.9	117	16.4	2.55	0.89

Date	Time	Sodium, dissolved (mg/L)	Alkalinity, mg/L as $CaCO_3$ laboratory	Alkalinity, mg/L as $CaCO_3$ field	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Silica, dissolved (mg/L)	Ammonia + org-N, dissolved (mg/L as N)	Ammonia + org-N, total (mg/L as N)	Ammonia, dissolved (mg/L as N)	Nitrite + nitrate, dissolved (mg/L as N)	Nitrite, dissolved (mg/L as N)
Los Piños River below Vallecito Reservoir near Bayfield, CO (372236107344400)												
05/19/2000	1200	-	-	-	-	-	-	E0.068	E0.096	0.008	0.005	<0.001
06/06/2000	1130	-	-	-	-	-	-	E0.063	0.123	0.013	0.014	<0.001
07/11/2000	1130	-	-	-	-	-	-	E0.09	0.117	0.008	0.013	0.001
08/22/2000	1100	-	-	-	-	-	-	E0.084	0.126	0.005	0.008	<0.001
05/17/2001	1100	-	-	-	-	-	-	0.13	0.19	0.013	0.048	0.001
06/14/2001	1000	-	-	-	-	-	-	E0.08	0.13	0.007	0.044	<0.001
07/17/2001	1030	-	-	-	-	-	-	0.2	0.12	0.012	0.044	0.004
08/16/2001	1100	-	-	-	-	-	-	E0.1	0.11	0.003	0.039	<0.001
09/18/2001	1100	-	-	-	-	-	-	<0.1	E0.04	0.004	0.011	0.001
10/17/2001	1100	-	-	-	-	-	-	E0.1	0.13	<0.015	<0.013	<0.002
05/22/2002	1000	-	-	-	-	-	-	E0.07	E0.07	<0.015	<0.013	<0.002
07/31/2002	1000	-	-	-	-	-	-	E0.09	0.16	0.017	<0.013	E0.002
08/29/2002	1030	1.5	57	-	0.6	6.4	2.3	0.1	0.2	<0.015	<0.013	E0.002
09/19/2002	1000	1.5	E57	-	0.4	6.8	3.2	0.2	0.2	0.040	0.037	0.003
11/01/2002	1300	1.41	-	-	0.31	6.9	4.5	0.1	0.2	E0.008	0.028	0.003

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Ortho-phosphate, dissolved (mg/L as P)	Phosphorus, dissolved (mg/L)	Phosphorus, total (mg/L)	Organic carbon, dissolved (mg/L)	Organic carbon, total (mg/L)	Ultraviolet absorbance at 254 nm	Ultraviolet absorbance at 280 nm	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Antimony, dissolved (µg/L)	Antimony, total (µg/L)
Los Piños River below Vallecito Reservoir near Bayfield, CO (372236107344400)												
05/19/2000	1200	<0.001	<0.006	E0.005	1.9	-	0.040	0.020	20	64	-	-
06/06/2000	1130	<0.001	<0.006	E0.004	1.9	-	0.055	0.042	21	65	-	-
07/11/2000	1130	0.003	0.008	E0.005	1.8	-	0.052	0.039	15	27	-	-
08/22/2000	1100	0.001	<0.006	0.009	1.6	-	0.033	0.023	24	32	-	-
05/17/2001	1100	<0.007	E0.003	0.011	2.3	-	0.069	0.051	24	144	-	-
06/14/2001	1000	<0.007	<0.006	0.006	2.3	-	0.078	0.059	45	93	-	-
07/17/2001	1030	<0.007	<0.006	0.004	2.4	-	0.068	0.051	32	51	-	-
08/16/2001	1100	<0.007	<0.006	0.005	1.9	-	0.047	0.034	13	34	-	-
09/18/2001	1100	<0.007	<0.006	<0.004	-	-	-	-	19	39	-	-
10/17/2001	1100	<0.007	<0.004	0.005	1.6	-	0.036	0.022	<10	30	-	-
05/22/2002	1000	<0.007	<0.004	0.006	1.4	-	0.028	0.019	-	-	-	-
07/31/2002	1000	<0.007	0.006	0.015	1.3	-	0.044	0.034	50.7	-	-	-
08/29/2002	1030	E0.004	0.009	0.022	1.6	2.0	0.042	0.030	7.4	30.3	-	-
09/19/2002	1000	0.020	0.029	0.041	1.8	2.3	0.053	0.038	11.6	82.7	-	-
11/01/2002	1300	0.008	0.014	0.025	1.6	1.6	0.045	0.033	7.4	57	-	-

Date	Time	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Barium, dissolved (µg/L)	Barium, total (µg/L)	Beryllium, dissolved (µg/L)	Beryllium, total (µg/L)	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Copper, dissolved (µg/L)
Los Piños River below Vallecito Reservoir near Bayfield, CO (372236107344400)												
05/19/2000	1200	<1	<1	-	-	-	-	<0.2	<0.2	<0.4	<0.4	<2
06/06/2000	1130	<1	<1	-	-	-	-	<0.2	0.2	<0.4	<0.4	<2
07/11/2000	1130	<1	<1	-	-	-	-	<0.2	<0.2	<0.4	<0.4	<2
08/22/2000	1100	<1	<1	-	-	-	-	<0.2	<0.2	<0.4	<0.4	<2
05/17/2001	1100	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	<0.4	1.3
06/14/2001	1000	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	<0.4	1.2
07/17/2001	1030	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	<0.4	1.0
08/16/2001	1100	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	<0.4	<0.6
09/18/2001	1100	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	0.5	1.4
10/17/2001	1100	<1	<1	-	-	-	-	<0.3	<0.3	<0.4	<0.4	2.9
05/22/2002	1000	-	-	-	-	-	-	-	-	-	-	-
07/31/2002	1000	-	-	-	-	-	-	-	-	-	-	-
08/29/2002	1030	0.7	<2	-	-	-	-	<0.04	<0.04	-	-	0.4
09/19/2002	1000	0.7	<2	-	-	-	-	<0.04	<0.04	-	-	0.5
11/01/2002	1300	0.7	<2	-	-	-	-	<0.04	0.04	-	-	0.5

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft³/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Molybdenum, dissolved (µg/L)
Los Piños River below Vallecito Reservoir near Bayfield, CO (372236107344400)											
05/19/2000	1200	<2	5.0	49.0	<1.5	<1.5	0.7	11.9	-	<0.02	-
06/06/2000	1130	5.9	11	59.0	<1.5	<1.5	1.6	12.4	-	<0.02	-
07/11/2000	1130	<2	8.3	41.2	<1.5	<1.5	32.5	54.4	-	<0.02	-
08/22/2000	1100	<2	6.0	39.4	<1.5	<1.5	14.9	56.5	-	<0.04	-
05/17/2001	1100	2.1	14.6	142.3	<2	<2	2.4	17.6	-	<0.1	-
06/14/2001	1000	1.7	17.1	63.9	<2	<2	2.0	7.3	-	<0.1	-
07/17/2001	1030	1.2	15.9	40.5	<2	<2	7.8	14.7	-	<0.2	-
08/16/2001	1100	1.2	15.4	52.5	<2	<2	11.8	38.4	-	<0.2	-
09/18/2001	1100	4.4	4.4	36.0	<2	<2	1.9	19.7	-	<0.2	-
10/17/2001	1100	1.6	6.8	42.7	<2	<2	2.5	21.8	-	<0.2	-
05/22/2002	1000	-	E6	-	-	-	E1.8	-	-	-	-
07/31/2002	1000	-	<10	-	-	-	8.3	-	-	-	-
08/29/2002	1030	E0.41	E9	53.9	<0.08	<1	16.6	71.4	-	-	-
09/19/2002	1000	<0.6	15.7	107	<0.08	<1	28.9	42.8	-	-	-
11/01/2002	1300	0.6	<10	78	<0.08	0.13	3.3	94.7	-	-	-

Date	Time	Molybdenum, total (µg/L)	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Selenium, dissolved (µg/L)	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)	Uranium (natural), dissolved (µg/L)	Uranium (natural), total (µg/L)
Los Piños River below Vallecito Reservoir near Bayfield, CO (372236107344400)												
05/19/2000	1200	-	0.6	1.1	-	-	<0.8	<0.8	<2	6.1	-	-
06/06/2000	1130	-	0.8	6.2	-	-	<0.8	<0.8	4.7	7.6	-	-
07/11/2000	1130	-	1.1	1.0	-	-	<0.8	<0.8	<2	5.0	-	-
08/22/2000	1100	-	0.7	0.9	-	-	<0.8	<0.8	<2	2.7	-	-
05/17/2001	1100	-	0.6	0.6	-	-	<0.8	<0.8	<2	4.1	-	-
06/14/2001	1000	-	0.7	0.7	-	-	<0.8	<0.8	<2	<2	-	-
07/17/2001	1030	-	1.3	1.1	-	-	<0.8	<0.8	<2	<2	-	-
08/16/2001	1100	-	1.0	1.1	-	-	<0.8	<0.8	<2	2.9	-	-
09/18/2001	1100	-	0.9	0.9	-	-	<0.8	<0.8	<2	<2	-	-
10/17/2001	1100	-	0.5	0.9	-	-	<0.8	<0.8	<2	<2	-	-
05/22/2002	1000	-	-	-	-	-	-	-	2.9	-	-	-
07/31/2002	1000	-	-	-	-	-	-	-	1.1	-	-	-
08/29/2002	1030	-	-	-	-	-	-	-	3.2	<1	-	-
09/19/2002	1000	-	-	-	-	-	-	-	<1	<1	-	-
11/01/2002	1300	-	-	-	-	-	-	-	<1	E2	-	-

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	pH	Specific conductance (µS/cm)	Dissolved oxygen (mg/L)	Water temperature (degrees C)	*Escherichia coli* (#/100 mL)	Fecal coliform (#/100 mL)	Total coliform (#/100 mL)	Dissolved solids, filterable (mg/L)	Total suspended solids, non-filterable (mg/L)	Hardness, (Ca + Mg) (mg/L)	Alkalinity, (mg/L)
Vallecito Creek near mouth before entering reservoir—RPS9370												
01/20/1999	1520	7.3	-	11.6	1	-	Non-detect	-	42	Non-detect	39	32
02/24/1999	1225	7.7	88	12	2.1	-	Non-detect	-	68	Non-detect	38	-
03/17/1999	1410	-	88	10.1	4.5	-	Non-detect	-	62	Non-detect	36	32
04/14/1999	1430	-	81	10.5	7.1	-	Non-detect	-	43	Non-detect	34	34
05/13/1999	1115	-	82	10.6	5	-	0	-	55	Non-detect	34	32
06/17/1999	1000	8	52	10.2	5.2	-	2	-	32	Non-detect	21	20
07/14/1999	1350	7.5	52	8.5	10.5	-	Non-detect	-	35	Non-detect	20	18
08/24/1999	1010	8	76	8.8	9.7	-	4	-	44	Non-detect	32	28
10/21/1999	1235	7.6	97	10.6	5.8	-	Non-detect	-	62	Non-detect	39	36
11/08/1999	1635	7.6	101	9.8	6.1	-	Non-detect	-	58	Non-detect	43	38
12/14/1999	1155	7.7	-	11	1.5	-	4	-	52	Non-detect	46	30
01/19/2000	1225	7.52	106	11.3	2.4	-	Non-detect	-	57	10	47	42
02/15/2000	1210	8.1	110	10.92	4.6	-	Non-detect	-	68	Non-detect	48	46
04/18/2000	1310	8.02	71	9.41	6.1	-	Non-detect	-	43	Non-detect	30	24
05/18/2000	1110	7.32	68	10.17	4.3	-	Non-detect	-	37	Non-detect	28	20
06/06/2000	930	7.16	45	9.61	5.7	-	Non-detect	-	22	Non-detect	17	12
07/26/2000	845	7.53	78	8.14	11.2	-	9	-	69	Non-detect	32	26
08/16/2000	1455	7.6	82	7.5	18.1	-	15	-	58	Non-detect	34	28
09/27/2000	1625	7.08	62	8.32	9.3	-	15	-	37	Non-detect	26	16
01/19/2001	1535	7.34	84	11.55	0.1	-	-	-	46	Non-detect	35	28
02/12/2001	1625	8.27	82	10.78	0.3	-	Non-detect	-	41	Non-detect	32	26
03/14/2001	1125	7.67	85	9.96	2.9	-	Non-detect	-	54	Non-detect	32	28
04/17/2001	1300	7.28	77	10.78	5.9	-	Non-detect	-	49	Non-detect	33	28
05/17/2001	920	7.08	59	10.88	4.4	Non-detect	Non-detect	44	47	Non-detect	25	20
06/14/2001	1120	7.49	55	10.36	4.1	Non-detect	-	30.5	35	Non-detect	23	16
07/26/2001	1140	7.53	53	8.48	12	20.2	-	58.1	37	Non-detect	21	16
08/16/2001	925	7.33	65	8.63	8.7	14.6	-	816.4	40	Non-detect	26	20
09/18/2001	1700	7.3	76	7.78	12.8	3.1	-	-	40	Non-detect	31	24
11/06/2001	1445	8.1	83	9.61	8.1	1	-	-	64	Non-detect	36	31
12/18/2001	1005	7.28	82	11.21	0.9	Non-detect	-	41	44	Non-detect	36	30
01/15/2002	1125	7.87	94	11.6	1.1	1	-	21.6	53	Non-detect	41	34
02/13/2002	1115	7.91	100	10.99	1.9	Non-detect	-	17.3	53	Non-detect	42	38
03/13/2002	850	7.16	97	10.92	1.3	Non-detect	-	-	52	Non-detect	41	32
05/15/2002	1015	7.58	52	9.76	5.9	-	-	-	26	Non-detect	20	6
06/06/2002	1000	8.06	58	9.21	9.1	-	-	-	33	Non-detect	23	26
07/23/2002	1155	8.65	112	8.57	16.1	-	-	-	54	Non-detect	45	40
08/21/2002	1240	7.88	98	5.95	15.6	25.6	-	1,413.6	54	Non-detect	41	32

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Sulfate, total (mg/L)	Nitrogen, $NH_3 + NH_4$ (mg/L as N)	Nitrogen, $NO_2 + NO_3$ (mg/L as N)	Nitrogen, total Kjeldahl (mg/L as N)	Phosphorus, total (mg/L as P)	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)
Vallecito Creek near mouth before entering reservoir—RPS9370										
01/20/1999	1520	8	Non-detect	0.21	Non-detect	Non-detect	Non-detect	-	Non-detect	-
02/24/1999	1225	7	Non-detect	0.14	Non-detect	Non-detect	Non-detect	-	Non-detect	-
03/17/1999	1410	6	Non-detect	0.19	Non-detect	Non-detect	Non-detect	-	Non-detect	-
04/14/1999	1430	5	Non-detect	0.12	Non-detect	Non-detect	57	-	Non-detect	-
05/13/1999	1115	5	Non-detect	0.16	Non-detect	0.01	81	-	Non-detect	-
06/17/1999	1000	6	Non-detect	0.2	Non-detect	Non-detect	51	-	Non-detect	-
07/14/1999	1350	6	Non-detect	0.16	Non-detect	Non-detect	69	-	Non-detect	-
08/24/1999	1010	5	0.01	0.1	-	0.01	88	150	Non-detect	Non-detect
10/21/1999	1235	7	Non-detect	0.18	-	0.02	Non-detect	-	Non-detect	-
11/08/1999	1635	6	Non-detect	0.15	-	0.03	Non-detect	-	Non-detect	-
12/14/1999	1155	7	Non-detect	0.19	-	Non-detect	Non-detect	-	Non-detect	-
01/19/2000	1225	6	Non-detect	0.19	-	0.01	Non-detect	-	Non-detect	-
02/15/2000	1210	7	Non-detect	0.19	-	0.03	Non-detect	-	Non-detect	-
04/18/2000	1310	Non-detect	Non-detect	0.32	-	0.01	92	-	Non-detect	-
05/18/2000	1110	Non-detect	Non-detect	0.13	-	Non-detect	65	-	Non-detect	-
06/06/2000	930	5	Non-detect	0.17	-	0.05	Non-detect	-	Non-detect	-
07/26/2000	845	9	Non-detect	0.14	-	0.01	Non-detect	-	Non-detect	-
08/16/2000	1455	Non-detect	Non-detect	0.13	-	0.03	Non-detect	-	Non-detect	-
09/27/2000	1625	8	Non-detect	0.17	-	0.02	Non-detect	-	Non-detect	-
01/19/2001	1535	7	Non-detect	0.21	-	0.03	Non-detect	-	Non-detect	-
02/12/2001	1625	7	Non-detect	0.21	-	0.02	Non-detect	-	Non-detect	-
03/14/2001	1125	7	Non-detect	0.19	-	Non-detect	Non-detect	-	Non-detect	-
04/17/2001	1300	6	Non-detect	0.15	-	0.02	87	-	Non-detect	-
05/17/2001	920	Non-detect	Non-detect	0.15	-	0.01	59	-	Non-detect	-
06/14/2001	1120	6	Non-detect	0.14	-	Non-detect	Non-detect	-	Non-detect	-
07/26/2001	1140	7	Non-detect	Non-detect	-	0.04	Non-detect	-	Non-detect	-
08/16/2001	925	6	Non-detect	Non-detect	-	0.02	47	-	Non-detect	-
09/18/2001	1700	12	Non-detect	Non-detect	-	0.07	57	-	Non-detect	-
11/06/2001	1445	10	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
12/18/2001	1005	9	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
01/15/2002	1125	10	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
02/13/2002	1115	10	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
03/13/2002	850	10	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
05/15/2002	1015	9	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
06/06/2002	1000	8	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
07/23/2002	1155	10	0.07	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
08/21/2002	1240	9	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)
Vallecito Creek near mouth before entering reservoir—RPS9370										
01/20/1999	1520	Non-detect	-	Non-detect	-	-	15	Non-detect		Non-detect
02/24/1999	1225	Non-detect	-	Non-detect	-	-	22	Non-detect		Non-detect
03/17/1999	1410	Non-detect	-	Non-detect	-	-	16	Non-detect		Non-detect
04/14/1999	1430	Non-detect	-	Non-detect	-	-	750	Non-detect		Non-detect
05/13/1999	1115	Non-detect	-	Non-detect	-	-	180	Non-detect		6
06/17/1999	1000	Non-detect	-	Non-detect	-	-	140	Non-detect		22
07/14/1999	1350	Non-detect	-	Non-detect	-	-	45	Non-detect		9
08/24/1999	1010	Non-detect	Non-detect	Non-detect	Non-detect	17	56	Non-detect	Non-detect	10
10/21/1999	1235	Non-detect	-	Non-detect	-	Non-detect	13	Non-detect		Non-detect
11/08/1999	1635	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
12/14/1999	1155	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
01/19/2000	1225	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
02/15/2000	1210	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
04/18/2000	1310	Non-detect	-	Non-detect	-	43	59	Non-detect		4
05/18/2000	1110	Non-detect	-	Non-detect	-	19	72	Non-detect		17
06/06/2000	930	Non-detect	-	Non-detect	-	Non-detect	56	Non-detect		19
07/26/2000	845	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
08/16/2000	1455	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
09/27/2000	1625	Non-detect	-	Non-detect	-	Non-detect	27	Non-detect		11
01/19/2001	1535	Non-detect	-	Non-detect	-	Non-detect	15	Non-detect		Non-detect
02/12/2001	1625	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
03/14/2001	1125	Non-detect	-	Non-detect	-	11	19	Non-detect		Non-detect
04/17/2001	1300	Non-detect	-	Non-detect	-	40	89	Non-detect		4
05/17/2001	920	Non-detect	-	Non-detect	-	43	310	Non-detect		18
06/14/2001	1120	Non-detect	-	Non-detect	-	Non-detect	46	Non-detect		15
07/26/2001	1140	Non-detect	-	Non-detect	-	Non-detect	22	Non-detect		7
08/16/2001	925	Non-detect	-	4	-	Non-detect	56	Non-detect		11
09/18/2001	1700	Non-detect	-	Non-detect	-	Non-detect	19	Non-detect		7
11/06/2001	1445	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
12/18/2001	1005	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
01/15/2002	1125	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
02/13/2002	1115	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
03/13/2002	850	Non-detect	-	Non-detect	-	Non-detect	Non-detect	Non-detect		Non-detect
05/15/2002	1015	Non-detect	-	Non-detect	-	Non-detect	140	Non-detect		26
06/06/2002	1000	Non-detect	-	Non-detect	-	8	46	Non-detect		12
07/23/2002	1155	Non-detect	-	Non-detect	-	Non-detect	24	Non-detect		3
08/21/2002	1240	Non-detect	-	Non-detect	-	4	20	Non-detect		3

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft³/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Selenium, dissolved (µg/L)	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)
Vallecito Creek near mouth before entering reservoir—RPS9370										
01/20/1999	1520	-	-	Non-detect	Non-detect	-	Non-detect	-	11	-
02/24/1999	1225	-	-	Non-detect	Non-detect	-	Non-detect	-	12	-
03/17/1999	1410	-	-	Non-detect	Non-detect	-	Non-detect	-	15	-
04/14/1999	1430	-	-	Non-detect	Non-detect	-	Non-detect	-	11	-
05/13/1999	1115	-	-	Non-detect	Non-detect	-	Non-detect	-	12	-
06/17/1999	1000	-	-	Non-detect	Non-detect	-	Non-detect	-	11	-
07/14/1999	1350	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
08/24/1999	1010	12	-	Non-detect	Non-detect	Non-detect	Non-detect	Non-detect	12	13
10/21/1999	1235	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
11/08/1999	1635	-	-	Non-detect	Non-detect	-	Non-detect	-	13	-
12/14/1999	1155	-	-	Non-detect	Non-detect	-	Non-detect	-	16	-
01/19/2000	1225	-	-	Non-detect	Non-detect	-	Non-detect	-	19	-
02/15/2000	1210	-	-	Non-detect	Non-detect	-	Non-detect	-	15	-
04/18/2000	1310	-	-	Non-detect	Non-detect	-	Non-detect	-	14	-
05/18/2000	1110	-	-	Non-detect	Non-detect	-	Non-detect	-	11	-
06/06/2000	930	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
07/26/2000	845	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
08/16/2000	1455	-	-	Non-detect	Non-detect	-	Non-detect	-	13	-
09/27/2000	1625	-	-	Non-detect	Non-detect	-	Non-detect	-	15	-
01/19/2001	1535	-	Non-detect	-	Non-detect	-	Non-detect	-	14	-
02/12/2001	1625	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
03/14/2001	1125	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
04/17/2001	1300	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
05/17/2001	920	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
06/14/2001	1120	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
07/26/2001	1140	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
08/16/2001	925	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
09/18/2001	1700	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
11/06/2001	1445	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
12/18/2001	1005	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
01/15/2002	1125	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
02/13/2002	1115	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
03/13/2002	850	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
05/15/2002	1015	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
06/06/2002	1000	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
07/23/2002	1155	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
08/21/2002	1240	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	pH	Specific conductance (µS/cm)	Dissolved oxygen (mg/L)	Water temperature (degrees C)	*Escherichia coli* (#/100 mL)	Fecal coliform (#/100 mL)	Total coliform (#/100 mL)	Dissolved solids, filterable (mg/L)	Total suspended solids, non-filterable (mg/L)	Hardness (Ca + Mg) (mg/L)
Los Piños River above Vallecito Reservoir—RPS9380											
02/24/1999	1305	7.5	111	12.3	0.4	-	Non-detect	-	82	Non-detect	50
03/17/1999	1445		112	10	4.6	-	Non-detect	-	80	Non-detect	45
04/14/1999	1510		103	9.6	9.2	-	Non-detect	-	58	Non-detect	43
05/13/1999	1030		88	10.7	5.2	-	4	-	64	Non-detect	37
06/17/1999	-	7.6		9.8	6.3	-	26	-	37	Non-detect	20
07/14/1999	1420	7.9	74	7.91	13.8	-	23	-	51	Non-detect	29
08/24/1999	1100	7.94	76	9.5	11.7	-	43	-	52	Non-detect	33
10/21/1999	1310	8	98	10.9	4.9	-	Non-detect	-	64	Non-detect	38
11/08/1999	1705	7.9	116	9.9	6.6	-	9	-	58	Non-detect	50
12/14/1999	1230	7.3	126	12.2	0.1	-	Non-detect	-	76	Non-detect	58
01/19/2000	1310	7	111	12.76	0.1	-	Non-detect	-	62	Non-detect	52
02/15/2000	1255	7.65	117	12.33	1.1	-	4	-	78	Non-detect	52
04/18/2000	1350	8.54	93	9.23	6.8	-	Non-detect	-	58	Non-detect	40
05/18/2000	1200	7.84	68	8.2	6.1	-	Non-detect	-	44	Non-detect	28
06/06/2000	1015	7.43	56	9.3	8.5	-	4	-	34	Non-detect	22
07/26/2000	930	7.96	107	8.14	12.7	-	150	-	84	Non-detect	45
08/16/2000	1530	8.61	102	7.29	20.1	-	23	-	72	Non-detect	42
09/27/2000	1655	7.89	87	7.85	12.7	-	15	-	53	Non-detect	37
01/19/2001	1620	7.13	107	12.14	0	-	Non-detect	-	61	Non-detect	44
02/12/2001	1715	7.25	97	10.86	0	-	Non-detect	-	60	Non-detect	43
03/14/2001	1220	7.07	105	10.24	2.5	-	Non-detect	-	64	Non-detect	41
04/17/2001	1345	7.28	103	10.14	8.4	-	Non-detect	-	69	Non-detect	44
05/17/2001	1000	7.8	55	10.96	4.5	5	43	91	55	10	22
06/14/2001	1030	7.5	52	9.59	5.9	2	-	204.6	42	Non-detect	21
07/26/2001	1305	8.27	86	7.86	15.6	14.2	-	533.5	63	Non-detect	35
08/16/2001	1010	7.49	63	7.95	11.1	45.2	-	Present >QL	49	Non-detect	25
09/18/2001	1730	7.79	89	7.66	15.2	Non-detect	-	-	62	Non-detect	38
11/06/2001	1515	7.82	100	10.45	6.3	9.7	-	-	73	Non-detect	43
12/18/2001	1055	7.11	107	11.76	0	3.1	-	150	66	Non-detect	48
01/15/2002	1200	7.73	111	12.33	0	1	-	38.8	63	Non-detect	50
02/13/2002	1200	7.6	120	11.9	0	Non-detect	-	42.8	75	Non-detect	54
03/13/2002	945	8.02	110	11.72	0.1	4.1	-	-	67	Non-detect	49
05/15/2002	1120	7.63	56	8.93	9.3	-	-	-	40	Non-detect	22
07/23/2002	1240	8.74	113	6.54	17.3	-	-	-	69	Non-detect	47
08/21/2002	1330	8.36	117	5.48	17.5	10.4	-	1,553.07	73	Non-detect	49
11/13/2002	1400	8.11	94	10.5	2.26	2	-	131.7	63	Non-detect	41

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Alkalinity (mg/L)	Sulfate, total (mg/L)	Nitrogen, $NH_3 + NH_4$ (mg/L as N)	Nitrogen, $NO_2 + NO_3$ (mg/L as N)	Nitrogen, total Kjeldahl (mg/L as N)	Phosphorus, total (mg/L as P)	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)
Los Piños River above Vallecito Reservoir—RPS9380											
02/24/1999	1305	50	5	Non-detect	Non-detect	Non-detect	Non-detect	Non-detect	-	Non-detect	-
03/17/1999	1445	46	Non-detect	Non-detect	0.06	Non-detect	Non-detect	Non-detect	-	Non-detect	-
04/14/1999	1510	48	Non-detect	0.24	0.06	Non-detect	Non-detect	Non-detect	-	Non-detect	-
05/13/1999	1030	40	5	Non-detect	0.08	Non-detect	0.02	65	-	Non-detect	-
06/17/1999	-	28	Non-detect	Non-detect	0.11	Non-detect	Non-detect	Non-detect	-	Non-detect	-
07/14/1999	1420	34	Non-detect	Non-detect	0.06	Non-detect	Non-detect	Non-detect	-	Non-detect	-
08/24/1999	1100	38	Non-detect	0.01	Non-detect	-	0.01	Non-detect	62	Non-detect	Non-detect
10/21/1999	1310	42	Non-detect	Non-detect	0.06	-	0.13	Non-detect	-	Non-detect	-
11/08/1999	1705	50	Non-detect	Non-detect	0.06	-	0.03	Non-detect	-	Non-detect	-
12/14/1999	1230	54	5	Non-detect	0.12	-	0.01	Non-detect	-	Non-detect	-
01/19/2000	1310	50	Non-detect	Non-detect	0.12	-	Non-detect	Non-detect	-	Non-detect	-
02/15/2000	1255	48	5	Non-detect	0.11	-	0.02	Non-detect	-	Non-detect	-
04/18/2000	1350	40	Non-detect	Non-detect	0.05	-	0.01	90	-	Non-detect	-
05/18/2000	1200	28	Non-detect	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
06/06/2000	1015	22	Non-detect	Non-detect	Non-detect	-	0.05	Non-detect	-	Non-detect	-
07/26/2000	930	46	Non-detect	Non-detect	Non-detect	-	0.02	Non-detect	-	Non-detect	-
08/16/2000	1530	42	6	Non-detect	Non-detect	-	0.01	Non-detect	-	Non-detect	-
09/27/2000	1655	38	Non-detect	Non-detect	0.05	-	0.02	Non-detect	-	Non-detect	-
01/19/2001	1620	48	Non-detect	Non-detect	0.13	-	0.04	Non-detect	-	Non-detect	-
02/12/2001	1715	46	Non-detect	Non-detect	0.11	-	0.02	Non-detect	-	Non-detect	-
03/14/2001	1220	42	Non-detect	Non-detect	0.09	-	Non-detect	Non-detect	-	Non-detect	-
04/17/2001	1345	46	Non-detect	Non-detect	0.1	-	0.02	87	-	Non-detect	-
05/17/2001	1000	22	Non-detect	Non-detect	0.07	-	0.04	72	-	Non-detect	-
06/14/2001	1030	20	Non-detect	Non-detect	0.06	-	Non-detect	Non-detect	-	Non-detect	-
07/26/2001	1305	40	Non-detect	Non-detect	Non-detect	-	0.01	Non-detect	-	Non-detect	-
08/16/2001	1010	28	Non-detect	Non-detect	Non-detect	-	0.02	Non-detect	-	Non-detect	-
09/18/2001	1730	38	3	Non-detect	Non-detect	-	0.07	Non-detect	-	Non-detect	-
11/06/2001	1515	45	5	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
12/18/2001	1055	48	10	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
01/15/2002	1200	48	5	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
02/13/2002	1200	56	6	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
03/13/2002	945	50	5	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
05/15/2002	1120	22	Non-detect	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
07/23/2002	1240	46	4	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-
08/21/2002	1330	52	4	Non-detect	Non-detect	-	0.02	Non-detect	-	Non-detect	-
11/13/2002	1400	38	5	Non-detect	Non-detect	-	Non-detect	Non-detect	-	Non-detect	-

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft^3/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Maganese, dissolved (µg/L)
Los Piños River above Vallecito Reservoir—RPS9380										
02/24/1999	1305	Non-detect	-	Non-detect	-	-	62	Non-detect	-	Non-detect
03/17/1999	1445	Non-detect	-	Non-detect	-	-	47	Non-detect	-	Non-detect
04/14/1999	1510	Non-detect	-	Non-detect	-	-	100	Non-detect	-	Non-detect
05/13/1999	1030	Non-detect	-	Non-detect	-	-	560	Non-detect	-	Non-detect
06/17/1999	-	Non-detect	-	Non-detect	-	-	140	Non-detect	-	Non-detect
07/14/1999	1420	Non-detect	-	Non-detect	-	-	110	Non-detect	-	Non-detect
08/24/1999	1100	Non-detect	Non-detect	Non-detect	Non-detect	56	110	Non-detect	Non-detect	Non-detect
10/21/1999	1310	Non-detect	-	Non-detect	-	20	37	Non-detect	-	Non-detect
11/08/1999	1705	Non-detect	-	Non-detect	-	13	20	Non-detect	-	Non-detect
12/14/1999	1230	Non-detect	-	Non-detect	-	Non-detect	18	Non-detect	-	4
01/19/2000	1310	Non-detect	-	Non-detect	-	11	29	Non-detect	-	Non-detect
02/15/2000	1255	Non-detect	-	Non-detect	-	Non-detect	15	Non-detect	-	Non-detect
04/18/2000	1350	Non-detect	-	Non-detect	-	65	160	Non-detect	-	Non-detect
05/18/2000	1200	Non-detect	-	Non-detect	-	51	110	Non-detect	-	Non-detect
06/06/2000	1015	Non-detect	-	Non-detect	-	29	97	Non-detect	-	Non-detect
07/26/2000	930	Non-detect	-	Non-detect	-	11	15	Non-detect	-	Non-detect
08/16/2000	1530	Non-detect	-	Non-detect	-	18	26	Non-detect	-	Non-detect
09/27/2000	1655	Non-detect	-	Non-detect	-	19	55	Non-detect	-	4
01/19/2001	1620	Non-detect	-	Non-detect	-	12	12	Non-detect	-	Non-detect
02/12/2001	1715	Non-detect	-	Non-detect	-	13	20	Non-detect	-	Non-detect
03/14/2001	1220	Non-detect	-	Non-detect	-	17	27	Non-detect	-	Non-detect
04/17/2001	1345	Non-detect	-	Non-detect	-	54	140	Non-detect	-	Non-detect
05/17/2001	1000	Non-detect	-	Non-detect	-	57	560	Non-detect	-	Non-detect
06/14/2001	1030	Non-detect	-	Non-detect	-	24	150	Non-detect	-	Non-detect
07/26/2001	1305	Non-detect	-	Non-detect	-	17	37	Non-detect	-	Non-detect
08/16/2001	1010	Non-detect	-	Non-detect	-	27	240	Non-detect	-	2
09/18/2001	1730	Non-detect	-	Non-detect	-	20	36	Non-detect	-	4
11/06/2001	1515	Non-detect	-	Non-detect	-	Non-detect	22	Non-detect	-	4
12/18/2001	1055	Non-detect	-	Non-detect	-	Non-detect	15	Non-detect	-	3
01/15/2002	1200	Non-detect	-	Non-detect	-	Non-detect	20	Non-detect	-	4
02/13/2002	1200	Non-detect	-	Non-detect	-	Non-detect	16	Non-detect	-	4
03/13/2002	945	Non-detect	-	Non-detect	-	Non-detect	19	Non-detect	-	6
05/15/2002	1120	Non-detect	-	4	-	21	81	Non-detect	-	Non-detect
07/23/2002	1240	Non-detect	-	Non-detect	-	9	15	Non-detect	-	Non-detect
08/21/2002	1330	Non-detect	-	Non-detect	-	16	78	Non-detect	-	8
11/13/2002	1400	Non-detect	-	Non-detect	-	21	500	Non-detect	-	3

Table 2. Water-quality data collected from the inflows and outflow of Vallecito Reservoir, 1999–2000.—Continued

[ft³/s, cubic feet per second; µS/m, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; mL, milliliters; -, no data; <, less than; E, estimated]

Date	Time	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Selenium, dissolved (µg/L)	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)
Los Piños River above Vallecito Reservoir—RPS9380										
02/24/1999	1305	-	-	Non-detect	Non-detect	-	Non-detect	-	19	-
03/17/1999	1445	-	-	Non-detect	Non-detect	-	Non-detect	-	14	-
04/14/1999	1510	-	-	Non-detect	Non-detect	-	Non-detect	-	11	-
05/13/1999	1030	-	-	Non-detect	Non-detect	-	Non-detect	-	14	-
06/17/1999	-	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
07/14/1999	1420	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
08/24/1999	1100	7	-	Non-detect	Non-detect	-	Non-detect	Non-detect	11	12
10/21/1999	1310	-	-	Non-detect	Non-detect	-	Non-detect	-	17	-
11/08/1999	1705	-	-	Non-detect	Non-detect	-	Non-detect	-	16	-
12/14/1999	1230	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
01/19/2000	1310	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
02/15/2000	1255	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
04/18/2000	1350	-	-	Non-detect	Non-detect	-	Non-detect	-	17	-
05/18/2000	1200	-	-	Non-detect	Non-detect	-	Non-detect	-	11	-
06/06/2000	1015	-	-	Non-detect	Non-detect	-	Non-detect	-	Non-detect	-
07/26/2000	930	-	-	Non-detect	Non-detect	-	Non-detect	-	17	-
08/16/2000	1530	-	-	Non-detect	Non-detect	-	Non-detect	-	15	-
09/27/2000	1655	-	-	Non-detect	Non-detect	-	Non-detect	-	17	-
01/19/2001	1620	-	Non-detect	-	Non-detect	-	Non-detect	-	11	-
02/12/2001	1715	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
03/14/2001	1220	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
04/17/2001	1345	-	Non-detect	-	Non-detect	-	Non-detect	-	12	-
05/17/2001	1000	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
06/14/2001	1030	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
07/26/2001	1305	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
08/16/2001	1010	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
09/18/2001	1730	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
11/06/2001	1515	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
12/18/2001	1055	-	Non-detect	-	Non-detect	-	Non-detect	-	11	-
01/15/2002	1200	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
02/13/2002	1200	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
03/13/2002	945	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
05/15/2002	1120	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
07/23/2002	1240	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
08/21/2002	1330	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-
11/13/2002	1400	-	Non-detect	-	Non-detect	-	Non-detect	-	Non-detect	-

Table 3. Total metals data collected from Vallecito Reservoir in 1999.

[µg/L, micrograms per liter; <, less than]

Site name	Date	Time	Sampling depth (feet)	Aluminum, total (µg/L)	Arsenic, total (µg/L)	Cadmium, total (µg/L)
Vallecito Reservoir North	08/24/1999	0930	2	59	<2	<0.1
Vallecito Reservoir North	08/24/1999	0930	16	52	<2	<0.1
Vallecito Reservoir North	08/24/1999	0930	31.5	50	<2	<0.1
Vallecito Reservoir North	09/21/1999	1130	2	49	<2	<0.1
Vallecito Reservoir North	09/21/1999	1132	15	47	<2	<0.1
Vallecito Reservoir North	09/21/1999	1134	24	53	<2	<0.1
Vallecito Reservoir North	10/19/1999	1010	2	72	<1	<0.1
Vallecito Reservoir North	10/19/1999	1012	15	69	<1	<0.1
Vallecito Reservoir North	11/30/1999	1200	2	<10	<1	<0.2
Vallecito Reservoir North	11/30/1999	1150	23	30	<1	<0.2
Vallecito Reservoir Center	08/24/1999	0900	2	62	<2	<0.1
Vallecito Reservoir Center	08/24/1999	0900	20	57	<2	<0.1
Vallecito Reservoir Center	08/24/1999	0900	66	120	<2	<0.1
Vallecito Reservoir Center	09/21/1999	1045	2	47	<2	<0.1
Vallecito Reservoir Center	09/21/1999	1047	30	45	<2	<0.1
Vallecito Reservoir Center	09/21/1999	1049	53	<45	<2	<0.1
Vallecito Reservoir Center	10/19/1999	0945	2	62	<1	<0.1
Vallecito Reservoir Center	10/19/1999	0947	52	75	<1	<0.1
Vallecito Reservoir Center	11/30/1999	1140	2	<10	<1	<0.2
Vallecito Reservoir Center	11/30/1999	1130	40	19	<1	<0.2
Vallecito Reservoir South	08/24/1999	0805	2	63	<2	<0.1
Vallecito Reservoir South	08/24/1999	0805	23	65	<2	<0.1
Vallecito Reservoir South	08/24/1999	0805	92	<45	<2	<0.1
Vallecito Reservoir South	09/21/1999	0930	2	<45	<2	<0.1
Vallecito Reservoir South	09/21/1999	0932	53	<45	<2	<0.1
Vallecito Reservoir South	09/21/1999	0934	73	<45	<2	<0.1
Vallecito Reservoir South	10/19/1999	0930	2	62	<1	<0.1
Vallecito Reservoir South	10/19/1999	0932	64	67	<1	<0.1
Vallecito Reservoir South	11/30/1999	1050	2	<10	<1	<0.2
Vallecito Reservoir South	11/30/1999	1100	73	445	<1	<0.2

Table 3. Total metals data collected from Vallecito Reservoir in 1999.—Continued

[µg/L, micrograms per liter; <, less than]

Chromium, total (µg/L)	Copper, total (µg/L)	Iron, total (µg/L)	Lead, total (µg/L)	Manganese, total (µg/L)	Mercury, total (µg/L)	Nickel, total (µg/L)	Potassium, total (mg/L)	Silver, total (µg/L)	Zinc, total (µg/L)
<5	<1	30	<1	2	-	<5	0.7	<0.1	<5
<5	<1	30	<1	2	-	<5	0.7	<0.1	<5
<5	<1	70	<1	7	-	<5	0.7	<0.1	<5
<5	<1	30	<1	8	<0.1	<5	0.6	<0.1	<5
<5	<1	50	<1	8	<0.1	<5	0.6	<0.1	<5
<5	<1	40	<1	8	<0.1	<5	0.6	<0.1	<5
<5	<1	40	2	18	<0.1	<5	1.3	<0.1	<5
<5	<1	50	<1	19	<0.1	<5	1.5	<0.1	36
<0.4	<0.6	26	<1.5	7	<0.5	<0.4	0.44	<0.8	7.5
1.4	2.8	39	100.1	7.8	<0.5	<0.4	0.51	<0.8	34.7
<5	<1	30	<1	2	-	<5	0.7	<0.1	<5
<5	<1	30	<1	2	-	<5	0.7	<0.1	<5
<5	<1	20	<1	46	-	<5	0.7	<0.1	<5
<5	<1	30	<1	5	<0.1	<5	0.6	<0.1	<5
<5	<1	40	<1	14	<0.1	<5	0.6	<0.1	<5
<5	<1	50	<1	20	<0.1	<5	0.6	<0.1	<5
<5	<1	40	<1	18	<0.1	<5	1.1	<0.1	15
5	<1	80	<1	17	<0.1	<5	1.1	<0.1	20
<0.4	<0.6	24	<1.5	6.8	<0.05	0.4	0.42	<0.8	7.6
0.4	4.2	34	<1.5	8.0	<0.05	<0.4	0.50	<0.8	10.9
<5	<1	30	<1	2	-	<5	0.7	<0.1	<5
<5	<1	30	<1	2	-	<5	0.7	<0.1	<5
<5	<1	50	<1	44	-	<5	0.7	<0.1	<5
<5	<1	40	<1	5	<0.1	<5	0.6	<0.1	<5
<5	<1	50	<1	20	<0.1	<5	0.7	<0.1	<5
<5	<1	60	<1	39	0.2	<5	0.7	<0.1	6
<5	<1	40	<1	20	<0.1	<5	1.2	<0.1	7
<5	<1	40	<1	20	<0.1	<5	1.2	<0.1	<5
<0.4	2.2	28	<1.5	6.8	<0.05	<0.4	0.39	<0.8	13.8
<0.4	1.8	796	<1.5	58.0	<0.05	0.9	0.52	<0.8	16.8

Table 4. Water-quality data collected from Vallecito Reservoir South, 2000–2002.

[µS/cm, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; nm, nanometers; mL, milliliters; <, less than; -, no data]

Date	Time	Sampling depth (feet)	pH, field (standard units)	Specific conductance, field (µS/cm 25 degrees C)	Water temperature (degrees C)	Dissolved oxygen (mg/L)	pH, laboratory (standard units)	Specific conductance, laboratory (µS/cm 25 degrees C)
05/19/2000	1100	2	7.9	87	10.7	9.3	-	-
05/19/2000	1110	85	7.1	81	8.6	7.0	-	-
06/06/2000	1000	2	8.3	84	16.0	8.3	-	-
06/06/2000	1015	25	7.5	77	11.3	7.8	-	-
06/06/2000	1030	98	7.1	81	8.6	7.0	-	-
07/11/2000	0930	2	7.8	86	19.7	7.0	-	-
07/11/2000	1000	25	7.3	82	18.5	7.2	-	-
07/11/2000	1030	78	6.3	81	9.8	4.9	-	-
08/22/2000	0930	2	6.9	84	19.5	7.2	-	-
08/22/2000	1000	43	6.6	86	18.5	5.1	-	-
08/22/2000	1015	70	6.2	82	9.7	0.7	-	-
05/17/2001	1000	2	8.2	81	12.7	8.7	-	-
05/17/2001	1015	25	-	-	-	-	-	-
05/17/2001	1030	70	7.4	89	6.2	7.8	-	-
06/14/2001	0915	2	7.8	64	13.4	7.8	-	-
06/14/2001	0900	45	7.6	64	10.3	8	-	-
06/14/2001	0845	85	7.5	70	8.6	7.3	-	-
07/17/2001	0930	2	8.2	67	19.3	7	-	-
07/17/2001	0940	40	7.1	62	12.5	5.8	-	-
07/17/2001	1000	88	7.8	67	9.9	5.4	-	-
08/16/2001	1000	5	8.4	68	19.4	6.9	-	-
08/16/2001	1015	65	7.0	64	12.1	4.4	-	-
08/16/2001	1025	85	6.8	66	10.3	3.4	-	-
09/18/2001	1000	2	-	-	-	-	-	-
09/18/2001	1020	-	-	-	-	-	-	-
09/18/2001	1030	73	-	-	-	-	-	-
10/17/2001	1000	2	8	68	12.2	7.2	-	-
10/17/2001	1010	35	7.8	68	12.2	6.9	-	-
10/17/2001	1020	70	-	-	-	-	-	-
05/22/2002	0900	2	7.9	87	12.4	7.2	-	-
05/22/2002	0910	-	-	-	-	-	-	-
05/22/2002	0920	65	7.3	89	10.2	6.6	-	-
07/31/2002	0900	2	-	-	-	-	-	-
07/31/2002	0915	20	-	-	-	-	-	-
07/31/2002	0930	40	-	-	-	-	-	-
08/29/2002	0900	2	8.8	123	17.6	6.2	-	130
08/29/2002	0930	28	9.4	122	17.4	5.5	-	219
09/19/2002	0900	2	7.3	136	15.2	6.4	-	133
09/19/2002	0930	40	7.1	123	14.4	4.4	-	124
10/29/2002	0900	2	-	-	-	-	7.7	118
10/29/2002	0930	40	-	-	-	-	6.3	115

Table 4. Water-quality data collected from Vallecito Reservoir South, 2000–2002.—Continued

[µS/cm, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; nm, nanometers; mL, milliliters; <, less than; -, no data]

Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Alkalinity, mg/L as $CaCO_3$ laboratory	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Silica, dissolved (mg/L)	Ammonia + org-N, dissolved (mg/L as N)	Ammonia + org-N, total (mg/L as N)
-	-	0.80	-	-	-	-	-	0.1	0.12
-	-	0.81	-	-	-	-	-	E0.08	0.1
-	-	0.76	-	-	-	-	-	E0.07	0.13
-	-	0.75	-	-	-	-	-	<0.1	0.16
-	-	0.78	-	-	-	-	-	E0.07	0.11
-	-	0.85	-	-	-	-	-	0.16	0.11
-	-	0.74	-	-	-	-	-	0.31	0.14
-	-	0.76	-	-	-	-	-	0.11	0.13
-	-	0.87	-	-	-	-	-	0.14	0.15
-	-	0.83	-	-	-	-	-	0.11	0.12
-	-	0.84	-	-	-	-	-	0.13	0.16
-	-	0.73	-	-	-	-	-	0.12	1.1
-	-	0.74	-	-	-	-	-	E0.1	0.14
-	-	0.78	-	-	-	-	-	E0.08	0.13
-	-	0.65	-	-	-	-	-	0.1	0.11
-	-	0.67	-	-	-	-	-	E0.09	0.15
-	-	0.69	-	-	-	-	-	0.1	0.13
-	-	0.64	-	-	-	-	-	E0.06	0.09
-	-	0.63	-	-	-	-	-	E0.09	0.1
-	-	0.62	-	-	-	-	-	E0.09	0.08
-	-	0.68	-	-	-	-	-	0.1	0.09
-	-	0.70	-	-	-	-	-	E0.09	0.11
-	-	0.73	-	-	-	-	-	E0.1	0.118
-	-	0.67	-	-	-	-	-	E0.06	0.1
-	-	0.70	-	-	-	-	-	E0.07	E0.07
-	-	0.69	-	-	-	-	-	E0.06	E0.04
-	-	0.73	-	-	-	-	-	E0.07	E0.1
-	-	0.71	-	-	-	-	-	<0.1	E0.09
-	-	0.74	-	-	-	-	-	0.14	E0.1
-	-	-	-	-	-	-	-	E0.07	E0.07
-	-	-	-	-	-	-	-	E0.07	E0.06
-	-	-	-	-	-	-	-	E0.06	E0.07
-	-	-	-	-	-	-	-	<0.1	0.14
-	-	-	-	-	-	-	-	E0.05	0.12
-	-	-	-	-	-	-	-	0.17	0.23
18.8	2.8	1.1	1.6	58	0.65	6.4	2.3	0.1	0.2
18.3	2.8	1.1	1.5	57	0.65	6.2	2.6	0.1	0.2
18.7	2.7	1.2	1.5	E57	0.46	6.8	3.3	0.167	0.222
17.2	2.6	1.1	1.4	E51	0.42	7.1	3.9	0.215	0.268
16.1	2.52	0.97	1.41	-	0.32	6.8	4.4	<0.1	0.170
16.7	2.59	0.97	1.44	-	0.31	6.7	4.5	0.110	0.172

Table 4. Water-quality data collected from Vallecito Reservoir South, 2000–2002.—Continued

[µS/cm, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; nm, nanometers; mL, milliliters; <, less than; -, no data]

Date	Time	Ammonia, dissolved (mg/L as N)	Nitrite + nitrate, dissolved (mg/L as N)	Nitrite, dissolved (mg/L as N)	Ortho-phosphate, dissolved (mg/L as P)	Phosphorus, dissolved (mg/L)	Phosphorus, total (mg/L)	Organic carbon, dissolved (mg/L)
05/19/2000	1100	0.003	<0.005	<0.001	<0.001	<0.006	0.008	2.0
05/19/2000	1110	0.009	<0.005	<0.001	<0.001	<0.006	E0.006	1.8
06/06/2000	1000	0.009	<0.005	<0.001	<0.001	<0.006	E0.006	2.1
06/06/2000	1015	0.006	<0.005	<0.001	<0.001	<0.006	0.009	-
06/06/2000	1030	0.014	0.012	<0.001	<0.001	<0.006	E0.004	1.9
07/11/2000	0930	0.012	0.005	0.001	0.003	<0.006	E0.006	1.8
07/11/2000	1000	0.013	0.011	0.001	0.013	0.022	E0.004	1.7
07/11/2000	1030	0.017	0.018	0.001	0.002	<0.006	E0.004	1.8
08/22/2000	0930	0.006	<0.005	<0.001	0.002	<0.006	E0.006	1.6
08/22/2000	1000	0.016	0.008	0.002	0.002	<0.006	E0.007	1.6
08/22/2000	1015	0.031	0.112	<0.001	0.002	E0.005	0.015	1.7
05/17/2001	1000	0.006	0.009	0.001	<0.007	<0.006	0.008	2.5
05/17/2001	1015	0.01	0.033	0.001	<0.007	<0.006	0.011	2.3
05/17/2001	1030	0.009	0.057	0.001	<0.007	<0.006	0.016	1.8
06/14/2001	0915	<0.002	0.021	<0.001	<0.007	E0.004	0.009	2.2
06/14/2001	0900	0.007	0.036	<0.001	<0.007	<0.006	0.007	2.3
06/14/2001	0845	0.003	0.025	<0.001	<0.007	E0.003	0.011	2.3
07/17/2001	0930	<0.002	0.007	0.002	<0.007	<0.006	<0.004	3.1
07/17/2001	0940	0.019	0.032	0.003	<0.007	<0.006	0.004	3.4
07/17/2001	1000	0.002	0.010	0.002	<0.007	<0.006	E0.002	2.6
08/16/2001	1000	0.002	0.005	<0.001	<0.007	<0.006	E0.003	2.2
08/16/2001	1015	0.002	0.064	<0.001	<0.007	<0.006	0.004	2.1
08/16/2001	1025	0.005	0.095	<0.001	<0.007	<0.006	0.006	2.2
09/18/2001	1000	0.002	0.009	0.001	<0.007	<0.006	E0.002	-
09/18/2001	1020	0.005	0.01	0.001	<0.007	<0.006	<0.004	-
09/18/2001	1030	<0.002	0.013	0.001	<0.007	<0.006	E0.003	-
10/17/2001	1000	<0.015	<0.013	<0.002	<0.007	<0.004	0.006	1.5
10/17/2001	1010	<0.015	<0.013	<0.002	<0.007	E0.004	0.008	1.4
10/17/2001	1020	<0.015	<0.013	<0.002	<0.007	<0.004	0.005	1.6
05/22/2002	0900	<0.015	<0.013	<0.002	<0.007	E0.003	0.006	1.5
05/22/2002	0910	<0.015	<0.013	<0.002	<0.007	<0.004	0.005	1.5
05/22/2002	0920	<0.015	<0.013	<0.002	<0.007	<0.004	0.006	1.5
07/31/2002	0900	<0.015	<0.013	<0.002	<0.007	0.005	0.01	1.4
07/31/2002	0915	<0.015	<0.013	<0.002	<0.007	E0.004	0.011	1.5
07/31/2002	0930	0.089	E0.012	0.008	0.007	0.009	0.019	1.4
08/29/2002	0900	<0.015	<0.013	<0.002	<0.007	0.008	0.019	1.7
08/29/2002	0930	0.022	0.015	0.003	0.007	0.012	0.023	1.6
09/19/2002	0900	0.044	0.039	0.003	0.021	0.029	0.040	1.8
09/19/2002	0930	0.098	0.072	0.004	0.023	0.031	0.050	1.8
10/29/2002	0900	E0.014	0.030	0.003	0.008	0.014	0.020	1.5
10/29/2002	0930	0.015	0.031	0.003	0.009	0.016	0.023	1.6

Table 4. Water-quality data collected from Vallecito Reservoir South, 2000–2002.—Continued

[µS/cm, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; nm, nanometers; mL, milliliters; <, less than; -, no data]

Organic carbon, total (mg/L)	Ultraviolet absorbance at 254 nm	Ultraviolet absorbance at 280 nm	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)
-	0.054	0.032	27	43	<1	<1	<0.2	<0.2
-	0.037	0.018	12	24	<1	<1	<0.2	<0.2
-	0.056	0.041	45	59	<1	<1	<0.2	<0.2
-	-	-	30	64	<1	<1	<0.2	<0.2
-	0.051	0.039	18	47	<1	<1	<0.2	<0.2
-	0.044	0.032	36	49	<1	<1	<0.2	<0.2
-	0.052	0.039	17	24	<1	<1	<0.2	<0.2
-	0.053	0.039	15	23	<1	<1	<0.2	<0.2
-	0.033	0.023	24	44	<1	<1	<0.2	<0.2
-	0.032	0.022	<10	36	<1	<1	<0.2	<0.2
-	0.044	0.032	<10	33	<1	<1	<0.2	<0.2
-	0.065	0.048	21	85	<1	<1	<0.3	<0.3
-	0.071	0.054	24	96	<1	<1	<0.3	<0.3
-	0.048	0.036	<10	61	<1	<1	<0.3	<0.3
-	0.073	0.055	57	91	<1	<1	<0.3	<0.3
-	0.076	0.057	46	91	<1	<1	<0.3	<0.3
-	0.074	0.055	46	137	<1	<1	<0.3	<0.3
-	0.053	0.04	49	62	<1	<1	<0.3	<0.3
-	0.060	0.045	42	49	<1	<1	<0.3	<0.3
-	0.056	0.040	27	50	<1	<1	<0.3	<0.3
-	0.038	0.026	43	61	<1	<1	<0.3	<0.3
-	0.051	0.037	11	31	<1	<1	<0.3	<0.3
-	0.056	0.041	16	29	<1	<1	<0.3	<0.3
-	-	-	26	38	<1	<1	<0.3	0.7
-	-	-	25	41	<1	<1	<0.3	0.3
-	-	-	<10	23	<1	<1	<0.3	0.3
-	0.036	0.022	11	21	<1	<1	<0.3	<0.3
-	0.037	0.024	11	21	<1	<1	<0.3	<0.3
-	0.036	0.023	<10	22	<1	<1	<0.3	<0.3
-	0.028	0.019	20	-	-	-	-	-
-	0.03	0.02	20	-	-	-	-	-
-	0.028	0.019	<20	-	-	-	-	-
-	0.036	0.027	E10	-	-	-	-	-
-	0.037	0.027	<20	-	-	-	-	-
-	0.039	0.028	<20	-	-	-	-	-
1.9	0.042	0.030	6.7	26.1	0.7	4	<0.04	<0.04
2.0	0.042	0.030	8.8	25.0	0.8	<2	<0.04	<0.04
2.7	0.053	0.038	11.2	84.2	0.7	<2	<0.04	<0.04
2.2	0.056	0.041	10.3	115.4	0.7	<2	<0.04	<0.04
1.6	0.044	0.032	10.9	36.9	0.6	<2	<0.04	0.04
2.0	0.044	0.032	10.6	35.9	0.6	<2	<0.04	<0.04

Table 4. Water-quality data collected from Vallecito Reservoir South, 2000–2002.—Continued

[µS/cm, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; nm, nanometers; mL, milliliters; <, less than; -, no data]

Date	Time	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)
05/19/2000	1100	<0.4	<0.4	<2	<2	6.0	43.0	<1.5
05/19/2000	1110	<0.4	<0.4	<2	<2	4.0	26.0	<1.5
06/06/2000	1000	<0.4	0.6	<2	2.7	9	39.0	<1.5
06/06/2000	1015	<0.4	<0.4	<2	<2	11	55	<1.5
06/06/2000	1030	<0.4	<0.4	<2	<2	7	54.0	<1.5
07/11/2000	0930	<0.4	<0.4	<2	<2	<4	22.9	<1.5
07/11/2000	1000	<0.4	<0.4	<2	<2	9.0	33.9	<1.5
07/11/2000	1030	<0.4	<0.4	<2	<2	10.0	47.6	<1.5
08/22/2000	0930	<0.4	<0.4	<2	<2	7.3	36.1	<1.5
08/22/2000	1000	<0.4	<0.4	<2	<2	7.2	50.6	<1.5
08/22/2000	1015	<0.4	<0.4	<2	<2	9.0	85.5	<1.5
05/17/2001	1000	<0.4	<0.4	1.3	0.8	10.0	67.2	<2
05/17/2001	1015	<0.4	<0.4	0.8	1.5	12.7	97.1	<2
05/17/2001	1030	<0.4	<0.4	1.0	1.6	7.8	71.1	<2
06/14/2001	0915	<0.4	<0.4	1.2	1.8	14.4	42.8	<2
06/14/2001	0900	<0.4	<0.4	1.3	1.7	17.5	58.9	<2
06/14/2001	0845	<0.4	<0.4	2.1	1.5	21.0	107.8	<2
07/17/2001	0930	<0.4	<0.4	1.6	1.1	8.7	22.1	<2
07/17/2001	0940	<0.4	<0.4	1.2	1.7	11.7	31.5	<2
07/17/2001	1000	<0.4	<0.4	0.9	1.9	17.2	45.1	<2
08/16/2001	1000	<0.4	<0.4	<0.6	1.0	4.1	17.2	<2
08/16/2001	1015	<0.4	<0.4	<0.6	<0.6	14.7	43.3	<2
08/16/2001	1025	<0.4	<0.4	1.4	<0.6	13.8	51.7	<2
09/18/2001	1000	<0.4	<0.4	4.1	1.3	5.1	26.8	<2
09/18/2001	1020	<0.4	<0.4	0.8	2.4	4.6	26.9	<2
09/18/2001	1030	<0.4	<0.4	1.2	2.0	5.6	42.4	<2
10/17/2001	1000	<0.4	<0.4	2.0	1.0	7.8	38.7	<2
10/17/2001	1010	<0.4	<0.4	0.5	2.7	6.5	37.3	<2
10/17/2001	1020	<0.4	<0.4	0.7	2.1	7.0	40.9	<2
05/22/2002	0900	-	-	-	-	E9	-	-
05/22/2002	0910	-	-	-	-	E10	-	-
05/22/2002	0920	-	-	-	-	<10	-	-
07/31/2002	0900	-	-	-	-	<10	-	-
07/31/2002	0915	-	-	-	-	<10	-	-
07/31/2002	0930	-	-	-	-	<10	-	-
08/29/2002	0900	-	-	0.4	E0.55	E7	52.2	<0.08
08/29/2002	0930	-	-	0.4	E0.43	<10	45.4	<0.08
09/19/2002	0900	-	-	0.5	<0.6	20.5	116.6	E0.07
09/19/2002	0930	-	-	0.5	0.63	35.5	215.7	<0.08
10/29/2002	0900	-	-	0.4	1.1	E10	71.5	<0.08
10/29/2002	0930	-	-	0.5	0.65	11.7	65.7	<0.08

Table 4. Water-quality data collected from Vallecito Reservoir South, 2000–2002.—Continued

[µS/cm, microsiemens per centimeter; C, Celsius; mg/L, milligrams per liter; nm, nanometers; mL, milliliters; <, less than; -, no data]

Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)
<1.5	1.0	8.1	-	<0.02	0.8	0.9	<0.8	<0.8	2.0	10.0
<1.5	0.3	6.7	-	<0.02	0.5	1.8	<0.8	<0.8	2.3	5.3
<1.5	1.3	5.9	-	0.12	0.9	1.8	<0.8	<0.8	<2	2.5
<1.5	0.7	8.4	-	<0.02	1.1	0.8	<0.8	<0.8	5.4	40.7
<1.5	0.6	11.4	-	<0.02	0.8	0.6	<0.8	<0.8	2.5	9.2
<1.5	0.5	10.5	-	<0.02	1.0	0.9	<0.8	<0.8	<2	<2
<1.5	24.3	43.8	-	<0.02	0.9	0.9	<0.8	<0.8	<2	<2
<1.5	66.0	105.0	-	0.39	1.0	1.0	<0.8	<0.8	2.0	2.6
<1.5	1.0	14.6	-	<0.04	0.6	0.9	<0.8	<0.8	4.3	3.4
<1.5	21.1	41.3	-	0.15	0.8	0.7	<0.8	<0.8	<2	2.1
<1.5	986.8	1,036	-	0.10	0.9	1.0	<0.8	<0.8	3.3	6.7
<2	0.7	8.0	<0.1	<0.1	0.8	<0.4	<0.8	<0.8	<2	3.7
<2	0.4	9.6	<0.1	<0.1	0.7	0.5	<0.8	<0.8	<2	3.8
<2	1.2	15.5	<0.1	0.10	0.6	0.4	<0.8	<0.8	<2	3.6
<2	1.5	4.1	<0.1	<0.1	0.9	0.7	<0.8	<0.8	<2	<2
<2	2.0	6.5	<0.1	<0.1	1.1	0.6	<0.8	<0.8	<2	<2
<2	4.7	8.6	<0.1	<0.1	0.8	0.9	<0.8	<0.8	<2	<2
<2	3.9	5.6	<0.2	<0.2	1.2	1.2	<0.8	<0.8	<2	<2
<2	7.0	12.0	<0.2	<0.2	1.2	1.2	<0.8	<0.8	<2	<2
<2	10.6	19.9	<0.2	<0.2	1.0	1.1	<0.8	<0.8	<2	<2
<2	<0.4	3.0	-	<0.2	1.1	1.2	<0.8	<0.8	<2	2.8
<2	4.7	29.1	-	<0.2	0.8	1.1	<0.8	<0.8	<2	2.5
<2	15.8	116.7	-	<0.2	1.1	0.9	<0.8	<0.8	<2	<2
<2	0.9	9.1	-	<0.2	0.7	0.7	<0.8	<0.8	<2	4.5
<2	0.5	8.2	-	<0.2	0.7	0.6	<0.8	<0.8	<2	<2
<2	0.5	110.0	-	<0.2	0.5	0.5	<0.8	<0.8	<2	<2
<2	0.6	21.3	<0.2	<0.2	1.0	1.0	<0.8	<0.8	<2	<2
<2	0.5	20.8	<0.2	<0.2	0.8	0.8	<0.8	<0.8	<2	<2
<2	1.7	39.2	<0.2	<0.2	0.7	0.9	<0.8	<0.8	<2	<2
-	3.8	-	-	-	-	-	-	-	<1	-
-	3.9	-	-	-	-	-	-	-	3.5	-
-	<2	-	-	-	-	-	-	-	4.4	-
-	12.7	-	-	-	-	-	-	-	<1	-
-	14.1	-	-	-	-	-	-	-	<1	-
-	E2.1	-	-	-	-	-	-	-	<1	-
<1	9.6	63.9	-	-	-	-	-	-	1.8	<1
<1	10.8	153.7	-	-	-	-	-	-	1.1	<1
<1	16.7	44.6	-	-	-	-	-	-	1.8	1.3
<1	34.5	146	-	-	-	-	-	-	1.0	<1
0.13	81.2	103.8	-	-	-	-	-	-	<1	<2
0.07	81.3		-	-	-	-	-	-	<1	<2

Table 5. Fecal coliform and *E. coli* data collected from sites in and near Vallecito Reservoir, 2000–2002.

Date	Vallecito Reservoir South	Vallecito Reservoir near mouth of Los Pinos River	Vallecito Reservoir near mouth of Vallecito Creek	Bacteria type
	Fecal coliform and *E. coli* colonies per 100 mL			
05/19/2000	<3	<3	<3	Fecal
06/06/2000	<3	<3	<3	Fecal
07/17/2001	<1	<1	<1	*E. coli*
08/16/2001	<1	3.1	<1	*E. coli*
09/18/2001	-	1.0	<1	*E. coli*
10/17/2001	<3	<1	<3	Fecal
05/22/2002	<1	<1	<1	*E. coli*
07/31/2002	1.0	8.6	7.4	*E. coli*
08/29/2002	<1	1.0	2.0	*E. coli*
09/19/2002	1.0	<1	3.1	*E. coli*
10/29/2002	<1	6.3	1.0	*E. coli*

Methods of Data Collection

Water-quality samples were collected for the analysis of total and dissolved metals, total and dissolved nutrients, DOC, UV absorbance, suspended sediment, chlorophyll-*a*, and fecal coliform bacteria. Field measurements of pH, specific conductance, water temperature and dissolved oxygen also were made. This section describes how the water-quality samples were collected and how the field measurements were made.

Stream Samples and Field Properties

USGS personnel collected water-quality samples from Vallecito Creek near Bayfield, Colo., and from Los Piños River above Vallecito Reservoir near Bayfield, Colo., by using the equal-width-increment sampling method as described in section 4.1.1.A of Wilde and Radtke (1998). A stream discharge measurement was made at each site on each sampling date as described in Rantz and others (1982). Samples for suspended sediment were collected using the equal-width-increment sampling method described in Edwards and Glysson (1988).

Field measurements of pH, specific conductance, water temperature, and dissolved oxygen were done at each site on each sampling date. Water-quality samples were collected in a 4-liter churn, and samples for the determination of pH and specific conductance were drawn off from the spigot of the churn (before filtering of the water sample) and placed into 250-mL beakers. A Beckman pH meter using a Markson M788B pH probe was used to measure pH. Specific conductance was measured with a WTW, Model LF 318 specific-conductance meter. The pH and specific-conductance meters were calibrated once a day using standards obtained from the USGS water-quality service unit in Ocala, Fla., following the procedures described in USGS TWRI book 9, National Field Manual for the Collection of Water-Quality Data (Wilde and Radtke, 1998). The pH of the buffers used for the calibration of the pH meter was 7.00 and 10.00. Following calibration a pH buffer of 4.00 was measured as a check on the calibration. The values of the specific-conductance standards used for calibration were 50 µS/cm, 100 µS/cm, and 252 µS/cm. Water temperature and dissolved oxygen were measured in-situ. An ASTM certified mercury thermometer was used for measuring water temperature. A YSI model 50B meter was used for measuring dissolved oxygen and was calibrated at each site.

CDPHE personnel collected water-quality samples from Vallecito Creek near the mouth and Los Piños River near the mouth just upstream from the point where both streams empty into Vallecito Reservoir monthly from 1999 to 2002. The methods used by the CDPHE to collect and process the water-quality samples are described in the quality-assurance project plan for the Colorado nonpoint-source monitoring program (1994).

The volunteers collected water-quality samples from Los Piños River below Vallecito Reservoir near Bayfield, Colo. Because of the high streamflow velocity at this site, discharge measurements were not made, and water-quality samples were collected from the streambank by immersing the churn splitter into the stream. Field measurements of pH, specific conductance, water temperature, and dissolved oxygen were made by immersing the Hydrolab at a point in the stream near the streambank where the probes were fully under the water and allowed to stabilize for 1 to 2 minutes before the readings were recorded.

Reservoir Samples and Field Properties

The volunteers used a Kemmerer sampler to collect water-quality samples 2 feet below the surface (epilimnion) and 2 feet from the bottom (hypolimnion) of the Vallecito Reservoir South sampling site. Water-quality samples were also collected from within the thermocline (the area between the epilimnion and the hypolimnion characterized by a steep decline in temperature with depth; also known as the metalimnion) when the reservoir was thermally stratified (about June–September). The volunteers also collected samples for chlorophyll-*a* analysis; measured the depth of light penetration in the reservoir with a Secchi disk (20-centimeter-diameter black-and-white disk); and measured depth profiles of pH, specific conductance, water temperature, and dissolved oxygen, with a Hydrolab. The volunteers calibrated the Hydrolab each day before sample collection according to the methods described by Hydrolab Corporation (1993). The pH standards used in the calibration of the Hydrolab had values of 7.00 and 10.00 pH units. The specific-conductance standard used in the calibration of the Hydrolab had a value of 100 microsiemens per centimeter at 25 degrees Celsius.

Chlorophyll-*a* measurements are an indication of the algal biomass in the reservoir. The amount of algal growth in a reservoir can be directly influenced by human activities that release nutrients into the reservoir, such as effluents from sewage-treatment plants, leakage from septic systems, and runoff of fertilizers from lawns and agricultural

fields. Samples for chlorophyll-a analysis were collected from the Vallecito Reservoir South sampling site using a Kemmerer sampler. One liter of sample was filtered through a 47-millimeter glass-fiber filter that was placed on a filter funnel attached to a hand pump.

The depth of light penetration in the reservoir was determined by lowering the Secchi disk into the reservoir from the shaded side of the boat until the disk disappeared. The Secchi disk was then raised until it became visible again. The depth at which the Secchi disk became visible was recorded as the depth of light penetration. The chlorophyll-*a* data, the Secchi-disk depth data, and the total phosphorus concentration measured within 2 feet of the surface (table 6) can be used to evaluate the trophic status of the reservoir according to Carlson's Trophic State Index (Carlson, 1977).

Whenever water-quality samples were collected from the Vallecito Reservoir South sampling site, depth profiles of pH, specific conductance, water temperature, and dissolved oxygen were measured with the Hydrolab at the south, center, and north sampling sites in Vallecito Reservoir (fig. 1). Measurements of pH, specific conductance, water temperature, and dissolved oxygen were made at about 3-ft intervals with the Hydrolab; the probe was allowed to equilibrate for 1 to 2 minutes at each measurement point until stabilized readings were obtained. Depth profiles of these field properties were also monitored about biweekly from the peak of snowmelt runoff in June to the fall turnover of the reservoir in October. In August 1996 the concentration of dissolved oxygen was near zero near the bottom of the reservoir at the south sampling site. Therefore, the biweekly depth profiles were completed to document the onset and duration of low dissolved-oxygen conditions.

Table 6. Data needed for the calculation of the Carlson Trophic State Index in Vallecito Reservoir, 2000–2002.

[<, less than; E, estimated; -, no data; µg/L, micrograms per liter; mg/L, milligrams per liter]

Date	Secchi disk depth (feet)	Chlorophyll-*a* (µg/L)	Total phosphorus (mg/L as P)
05/19/2000	-	-	0.008
06/06/2000	15	0.67	E0.006
07/11/2000	9.5	<0.1	E0.006
08/22/2000	17	0.84	E0.006
05/17/2001	7	1.04	0.008
06/14/2001	13	0.82	0.009
07/17/2001	13	1.22	<0.004
08/16/2001	12	0.96	E0.0029
09/18/2001	19	<0.10	E0.0022
10/17/2001	14	0.48	0.006
05/22/2002	14	0.46	0.006
07/31/2002	5.5	-	0.010
08/29/2002	12	0.92	0.019
09/19/2002	5.5	0.34	0.040
10/29/2002	-	E0.31	0.020

Sample Processing and Shipment

Samples collected by USGS personnel from Vallecito Creek near Bayfield, Colo., and from Los Piños River above Vallecito Reservoir near Bayfield, Colo., for the analysis of inorganic constituents were processed as described in Horowitz and others (1994). In 2000, water-quality samples for DOC and UV absorbance analysis were collected and processed as described in section 5.2.2.C of Wilde and others (1998). Beginning in 2001, DOC and UV absorbance samples were processed as described in the USGS Office of Water Quality Technical Memorandum 2000.08, "New method for particulate carbon and particulate nitrogen" (*http://water.usgs.gov/admin/memo/QW/qw00.08.html*). Processing of the samples collected from both of these sites occurred in the field immediately after sample collection.

Samples collected by CDPHE personnel from Vallecito Creek near the mouth and Los Piños River near the mouth were processed according to the quality-assurance project plan for the Colorado nonpoint-source monitoring program (1994). Processing of the samples collected from both of these sites occurred in the field immediately after sample collection.

Initial processing of water-quality samples collected from Vallecito Reservoir occurred while the volunteers were on the boat. Samples for total metal analyses were poured from the Kemmerer sampler into a 1-liter cubitainer provided by the USEPA. Samples for total nutrient analyses were poured from the Kemmerer sampler into a 125-mL translucent polyethylene bottle provided by the USGS. Samples to be analyzed for dissolved metals, dissolved nutrients, DOC, and UV absorbance were poured from the Kemmerer sampler into 1-liter Teflon bottles provided by the USGS. Back on shore, samples collected by the volunteers from the Vallecito Reservoir South sampling site and from Los Pinos River below Vallecito Reservoir near Bayfield, Colo., were processed in the garage of one of the volunteers. The samples for dissolved constituents were filtered from the Teflon bottle into other sample bottles using the equipment and techniques described by Horowitz and others (1994). The dissolved metal samples were filtered into a 1-liter cubitainer. The total and dissolved metal samples were preserved by adding 1 mL of concentrated nitric acid to the sample. The dissolved nutrient samples were filtered into a 125-mL brown polyethylene bottle. The DOC samples were filtered into a 125-mL amber glass bottle, and the UV absorbance samples were filtered into a separate 125-mL amber glass bottle.

All samples that were to be analyzed by the USGS and USEPA laboratories were placed in disposable trash bags, sealed, and then placed in coolers filled with enough ice to keep the temperature below 4 degrees Celsius. The glass-fiber filter to be analyzed for chlorophyll-*a* was wrapped in aluminum foil and placed into a separate cooler filled with dry ice. Samples were driven back to Denver, Colo., by USGS personnel and delivered to the USGS and USEPA laboratories the day after samples were collected.

Laboratory Analysis

All water-quality samples were analyzed for pH, specific conductance, alkalinity, dissolved and total metals, dissolved and total nutrients (nitrogen and phosphorus), DOC, UV absorbance at 254 and 280 nanometers, and suspended sediment (inflow sites only) by either the USGS, USEPA, or CDPHE (table 7).

USGS personnel at the NWQL in Lakewood, Colo., analyzed water-quality samples collected from (1) Vallecito Creek near Bayfield, Colo., for major cations and anions, metals, nutrients, DOC, UV absorbance, and suspended sediment; (2) Los Piños River above Vallecito Reservoir near Bayfield, Colo., for nutrients, DOC, UV absorbance, and suspended sediment; (3) Vallecito Reservoir for nutrients, DOC, UV absorbance, and chlorophyll-*a*; and (4) Los Piños River below Vallecito Reservoir near Bayfield, Colo., for nutrients, DOC, and UV absorbance. All USGS laboratory analytical methods are described in Fishman (1993). Chlorophyll-*a* concentrations were measured by the NWQL using high-performance liquid chromatography followed by fluorometry as described in Britton and Greeson (1987).

USEPA personnel analyzed water-quality samples collected from Los Piños River above Vallecito Reservoir near Bayfield, Colo., Vallecito Reservoir South sampling site, and Los Piños River below Vallecito Reservoir near Bayfield, Colo., downstream from the dam for major ions and metals at the USEPA laboratory in Golden, Colo. A description of the analytical methods used by the USEPA is in Keith (1996).

CDPHE personnel analyzed water-quality samples collected from Vallecito Creek near mouth before entering Vallecito Reservoir and Los Piños River above Vallecito Reservoir at the CDPHE laboratory in Denver, Colo. The analytical methods used by the CDPHE are described in the quality-assurance project plan for the Colorado nonpoint-source monitoring program (1994). The fecal coliform and *E. coli* bacteria analyses were completed by the San Juan Basin Health Department, a division of the CDPHE, using the multiple-tube fermentation technique described in Standard Methods (American Public Health Association, 1998).

Field Blank and Field Replicate Data Collection and Interpretation

Field blanks and field replicates were collected during this study to quantify the errors involved in collecting, processing, transporting, and analyzing the samples (tables 8 and 9). Any measurement has an error associated with it that cannot be eliminated, but the error can be quantified so that appropriate interpretations of the environmental data can be made. Bias and variability are two components of the error associated with any water-quality measurement. Bias is the systematic error inherent in a method or measurement system and may be either positive (contamination) or negative (loss). Variability is the random error in independent measurements that results from repeated application of the measurement process under specified conditions.

In water-quality studies, two types of samples are needed: environmental samples and quality-control samples. Environmental samples fulfill the scientific objective(s) of the study. Quality-control samples provide estimates of the bias and variability of the environmental data. Field blanks are samples that are intended to be free of the analyte(s) of interest. Field blanks are analyzed to test for bias that could occur from the introduction of contamination into environmental samples in any stage of the sample-collection, processing, transportation, and analysis processes. Field replicates are samples that are collected in the same manner as the environmental samples and intended to be identical in composition. Field replicates are used to estimate the variability of the sample-collection and analysis process.

Since 1963, the USGS has been collecting and analyzing water-quality samples from Vallecito Creek as part of the Hydrologic Benchmark Network program (Cobb and Biesecker, 1971). Although water-quality sample-collection methods and laboratory analysis methods have changed over the years, sample collection and analysis have been done in a consistent manner since the USGS began using a parts per billion sampling protocol at Vallecito Creek in 1993 (Horowitz and others, 1994). The USGS parts per billion sampling protocol is a set of guidelines and procedures developed by the USGS to produce filtered inorganic-constituent data that are defensible and interpretable at the microgram-per-liter level.

The field blank and field replicate data collected from Vallecito Reservoir and the stream sampling sites were analyzed separately because the equipment used to collect samples from Vallecito Reservoir was different from the equipment used to collect samples from the stream sites as described previously. However, the water-quality sample-collection procedures and the laboratory analysis have been done consistently since 1993. Therefore, field blanks and field replicates collected in the 1996–97 study and in this study from the Vallecito Reservoir South sampling site were pooled together, and field blanks and field replicates collected in the 1996–97 study and in this study from the stream-sampling sites (Vallecito Creek near Bayfield, Colo., Los Piños River above Vallecito Reservoir near Bayfield, Colo., and Los Piños River below Vallecito Reservoir near Bayfield, Colo.) study were pooled to determine the magnitude of bias and variability in the environmental data. Field blank data and field replicate data should only be pooled together from sampling sites at which similar equipment was used. However, as the analysis in the next section will show, except for total nickel and total zinc in samples collected from the Vallecito Reservoir South sampling site, there is a lack of evidence of contamination affecting the interpretation of the environmental data. Therefore, the environmental data collected from all sampling sites (Vallecito Reservoir and the three stream sites) can be considered comparable. The CDPHE did not collect field blanks from Vallecito Creek near mouth and Los Piños River above Vallecito Reservoir but did collect a few field replicates from these sampling sites. It should also be noted that if data collection resumes at some point in the future using similar sample collection and analysis methods then all of the field blank and field replicate data collected since 1993, including the field blanks and field replicates collected in this study, could be pooled together.

Table 7. Constituents and properties measured in the water-quality monitoring of Vallecito Reservoir, its inflows and outflow, 1999–2002.

[µS/cm, microsiemens per centimeter at 25º Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; --, no data]

Constituents and properties	Reporting limit	Analytical laboratory and method
Vallecito Creek near Bayfield, Colorado		
pH	0.10 pH units	USGS National Water-Quality Laboratory, Fishman, 1993
Specific conductance	2.6 µS/cm	USGS National Water-Quality Laboratory, Fishman, 1993
Alkalinity	1 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Aluminum, dissolved	1.000 µg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Calcium, dissolved	0.020 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Chloride, dissolved	0.29 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Iron, dissolved	10.000 µg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Magnesium, dissolved	0.12 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Manganese, dissolved	1.000 µg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Potassium, dissolved	0.24 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Silica, dissolved	0.09 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Sodium, dissolved	0.09 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Sulfate, dissolved	0.31 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Zinc, dissolved	1.000 µg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Dissolved organic carbon	0.33 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Ultraviolet absorbance at 254 nm	-	USGS National Water-Quality Laboratory, Fishman, 1993
Nitrogen, ammonia dissolved	0.002 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Nitrogen, ammonia + organic nitrogen, total	0.10 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Nitrogen, ammonia + organic nitrogen, dissolved	0.10 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Nitrogen, nitrite + nitrate, dissolved	0.005 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Total phosphorus	0.008 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Phosphorus, dissolved	0.006 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Phosphorus, phosphate, ortho, dissolved	0.001 mg/L	USGS National Water-Quality Laboratory, Fishman, 1993
Suspended sediment	0.5 mg/L	USGS Sediment Laboratory
Vallecito Creek near mouth before entering reservoir		
Aluminum, dissolved	50 µg/L	CDPHE—USEPA Method 200.7
Arsenic, dissolved	1 µg/L	CDPHE—USEPA Method 200.8
Cadmium, dissolved	0.3 µg/L	CDPHE—USEPA Method 200.8
Copper, dissolved	4 µg/L	CDPHE—USEPA Method 200.8
Hardness	-	CDPHE—USEPA Method 200.7
Iron, total recoverable	10 µg/L	CDPHE—USEPA Method 200.7
Iron, dissolved	10 µg/L	CDPHE—USEPA Method 200.7
Lead, dissolved	1 µg/L	CDPHE—USEPA Method 200.8
Manganese, dissolved	4 µg/L	CDPHE—USEPA Method 200.8
Mercury, dissolved	-	CDPHE—USEPA Method 245.1
Mercury, total	0.2 µg/L	CDPHE—USEPA Method 245.1
Selenium, dissolved	1 µg/L	CDPHE—USEPA Method 200.8
Silver, dissolved	0.2 µg/L	CDPHE—USEPA Method 200.8
Sulfate, total	-	CDPHE—USEPA Method 300
Zinc, dissolved	10 µg/L	CDPHE—USEPA Method 200.8
Dissolved solids	-	CDPHE—USEPA Method 160.1
Total suspended solids	10 mg/L	CDPHE—USEPA Method 160.2
Total Kjeldahl nitrogen	-	CDPHE—USEPA Method 351.2
Ammonia, total	0.05 mg/L	CDPHE—USEPA Method 350.1
Nitrate + nitrite, total	-	CDPHE—USEPA Method 353.2
Phosphorus, total	-	CDPHE—USEPA Method 365.1
Los Piños River above Vallecito Reservoir near Bayfield, CO		
Alkalinity	5 mg/L	EPA Method 310.1
Aluminum, dissolved and total	45 µg/L	EPA Method 200.7 (ICP)
Arsenic, dissolved and total	1 µg/L	EPA Method 200.8 (ICP/MS) or 200.9 (AAGF)
Cadmium, dissolved and total	0.5 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Chloride, dissolved and total	0.5 mg/L	EPA Method 300
Copper dissolved and total	1 µg/L	EPA Method 200.8 (ICP/MS) or 200.9 (AAGF)
Chromium, dissolved and total	0.8 µg/L	EPA Method 200.7 (ICP)

Table 7. Constituents and properties measured in the water-quality monitoring of Vallecito Reservoir, its inflows and outflow, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter at 25º Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; --, no data]

Constituents and properties	Reporting limit	Analytical laboratory and method
Los Piños River above Vallecito Reservoir near Bayfield, CO—Continued		
Fluoride, dissolved and total	0.2 mg/L	EPA Method 300
Iron, dissolved and total	5 µg/L	EPA Method 200.7 (ICP)
Lead, dissolved and total	1.5 µg/L	EPA Method 200.7 (ICP)
Manganese, dissolved and total	3 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Mercury, dissolved and total	0.2 µg/L	EPA Mehtod 245.1 (CVAA)
Nickel, dissolved and total	10 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Potassium, dissolved and total	2 mg/L	EPA Method 200.7 (ICP)
Silver, dissolved and total	0.8 µg/L	EPA Method 200.7 (ICP)
Silica, dissolved and total	1 mg/L	EPA Method I-2700-85
Sulfate, dissolved and total	1.0 mg/L	EPA Method 300
Total suspended solids	4 mg/L	EPA Method 160.2
Zinc, dissolved and total	4 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Dissolved organic carbon	0.33 mg/L	USGS National Water-Quality Laboratory
Ultraviolet absorbance at 254 nm	-	USGS National Water-Quality Laboratory
Nitrogen, ammonia dissolved	0.002 mg/L	USGS National Water-Quality Laboratory
Nitrogen, ammonia + organic nitrogen, total	0.10 mg/L	USGS National Water-Quality Laboratory
Nitrogen, ammonia + organic nitrogen, dissolved	0.10 mg/L	USGS National Water-Quality Laboratory
Nitrogen, nitrite + nitrate, dissolved	0.005 mg/L	USGS National Water-Quality Laboratory
Total phosphorus	0.008 mg/L	USGS National Water-Quality Laboratory
Phosphorus, dissolved	0.006 mg/L	USGS National Water-Quality Laboratory
Phosphorus, phosphate, ortho, dissolved	0.001 mg/L	USGS National Water-Quality Laboratory
Suspended sediment	0.5 mg/L	USGS Sediment Laboratory
Los Piños River above Vallecito Reservoir		
Aluminum, dissolved	50 µg/L	CDPHE—USEPA Method 200.7
Arsenic, dissolved	1 µg/L	CDPHE—USEPA Method 200.8
Cadmium, dissolved	0.3 µg/L	CDPHE—USEPA Method 200.8
Copper, dissolved	4 µg/L	CDPHE—USEPA Method 200.8
Hardness	-	CDPHE—USEPA Method 200.7
Iron, total recoverable	10 µg/L	CDPHE—USEPA Method 200.7
Iron, dissolved	10 µg/L	CDPHE—USEPA Method 200.7
Lead, dissolved	1 µg/L	CDPHE—USEPA Method 200.8
Manganese, dissolved	4 µg/L	CDPHE—USEPA Method 200.8
Mercury, dissolved	-	CDPHE—USEPA Method 245.1
Mercury, total	0.2 µg/L	CDPHE—USEPA Method 245.1
Selenium, dissolved	1 µg/L	CDPHE—USEPA Method 200.8
Silver, dissolved	0.2 µg/L	CDPHE—USEPA Method 200.8
Sulfate, total	-	CDPHE—USEPA Method 300
Zinc, dissolved	10 µg/L	CDPHE—USEPA Method 200.8
Dissolved solids	-	CDPHE—USEPA Method 160.1
Total suspended solids	10 mg/L	CDPHE—USEPA Method 160.2
Total Kjeldahl nitrogen	-	CDPHE—USEPA Method 351.2
Ammonia, total	0.05 mg/L	CDPHE—USEPA Method 350.1
Nitrate + nitrite, total	-	CDPHE—USEPA Method 353.2
Phosphorus, total	-	CDPHE—USEPA Method 365.1
Vallecito Reservoir south sampling site		
Alkalinity	5 mg/L	EPA Method 310.1
Aluminum, dissolved and total	45 µg/L	EPA Method 200.7 (ICP)
Arsenic, dissolved and total	1 µg/L	EPA Method 200.8 (ICP/MS) or 200.9 (AAGF)
Cadmium, dissolved and total	0.5 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Chloride, dissolved and total	0.5 mg/L	EPA Method 300
Copper dissolved and total	1 µg/L	EPA Method 200.8 (ICP/MS) or 200.9 (AAGF)

Table 7. Constituents and properties measured in the water-quality monitoring of Vallecito Reservoir, its inflows and outflow, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter at 25º Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; --, no data]

Constituents and properties	Reporting limit	Analytical laboratory
Vallecito Reservoir south sampling site—Continued		
Chromium, dissolved and total	0.8 µg/L	EPA Method 200.7 (ICP)
Fluoride, dissolved and total	0.2 mg/L	EPA Method 300
Iron, dissolved and total	5 µg/L	EPA Method 200.7 (ICP)
Lead, dissolved and total	1.5 µg/L	EPA Method 200.7 (ICP)
Manganese, dissolved and total	3 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Mercury, dissolved and total	0.2 µg/L	EPA Mehtod 245.1 (CVAA)
Nickel, dissolved and total	10 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Potassium, dissolved and total	2 mg/L	EPA Method 200.7 (ICP)
Silver, dissolved and total	0.8 µg/L	EPA Method 200.7 (ICP)
Silica, dissolved and total	1 mg/L	EPA Method I-2700-85
Sulfate, dissolved and total	1.0 mg/L	EPA Method 300
Total suspended solids	4 mg/L	EPA Method 160.2
Zinc, dissolved and total	4 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Dissolved organic carbon	0.33 mg/L	USGS National Water-Quality Laboratory
Ultraviolet absorbance at 254 nm	-	USGS National Water-Quality Laboratory
Nitrogen, ammonia dissolved	0.002 mg/L	USGS National Water-Quality Laboratory
Nitrogen, ammonia + organic nitrogen, total	0.10 mg/L	USGS National Water-Quality Laboratory
Nitrogen, ammonia + organic nitrogen, dissolved	0.10 mg/L	USGS National Water-Quality Laboratory
Nitrogen, nitrite + nitrate, dissolved	0.005 mg/L	USGS National Water-Quality Laboratory
Total phosphorus	0.008 mg/L	USGS National Water-Quality Laboratory
Phosphorus, dissolved	0.006 mg/L	USGS National Water-Quality Laboratory
Phosphorus, phosphate, ortho, dissolved	0.001 mg/L	USGS National Water-Quality Laboratory
Chlorophyll-*a*	0.001 mg/L	USGS National Water-Quality Laboratory
Los Piños River below Vallecito Reservoir near Bayfield, CO		
Alkalinity	5 mg/L	EPA Method 310.1
Aluminum, dissolved and total	45 µg/L	EPA Method 200.7 (ICP)
Arsenic, dissolved and total	1 µg/L	EPA Method 200.8 (ICP/MS) or 200.9 (AAGF)
Cadmium, dissolved and total	0.5 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Chloride, dissolved and total	0.5 mg/L	EPA Method 300
Copper dissolved and total	1 µg/L	EPA Method 200.8 (ICP/MS) or 200.9 (AAGF)
Chromium, dissolved and total	0.8 µg/L	EPA Method 200.7 (ICP)
Fluoride, dissolved and total	0.2 mg/L	EPA Method 300
Iron, dissolved and total	5 µg/L	EPA Method 200.7 (ICP)
Lead, dissolved and total	1.5 µg/L	EPA Method 200.7 (ICP)
Manganese, dissolved and total	3 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Mercury, dissolved and total	0.2 µg/L	EPA Mehtod 245.1 (CVAA)
Nickel, dissolved and total	10 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Potassium, dissolved and total	2 mg/L	EPA Method 200.7 (ICP)
Silver, dissolved and total	0.8 µg/L	EPA Method 200.7 (ICP)
Silica, dissolved and total	1 mg/L	EPA Method I-2700-85
Sulfate, dissolved and total	1.0 mg/L	EPA Method 300
Total suspended solids	4 mg/L	EPA Method 160.2
Zinc, dissolved and total	4 µg/L	EPA Method 200.7 (ICP) or 200.8 (ICP/MS)
Dissolved organic carbon	0.33 mg/L	USGS National Water-Quality Laboratory
Ultraviolet absorbance at 254 nm	-	USGS National Water-Quality Laboratory
Nitrogen, ammonia dissolved	0.002 mg/L	USGS National Water-Quality Laboratory
Nitrogen, ammonia + organic nitrogen, total	0.10 mg/L	USGS National Water-Quality Laboratory
Nitrogen, ammonia + organic nitrogen, dissolved	0.10 mg/L	USGS National Water-Quality Laboratory
Nitrogen, nitrite + nitrate, dissolved	0.005 mg/L	USGS National Water-Quality Laboratory
Total phosphorus	0.008 mg/L	USGS National Water-Quality Laboratory
Phosphorus, dissolved	0.006 mg/L	USGS National Water-Quality Laboratory
Phosphorus, phosphate, ortho, dissolved	0.001 mg/L	USGS National Water-Quality Laboratory

Table 8. Field blanks collected from stream and reservoir sampling sites, 1999–2002.

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Site name	Date	Time	pH, laboratory (standard units)	Specific conductance (µS/cm)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	-	1	0.003	<0.001	<0.03	-
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	5.62	1.17	<0.002	<0.001	<0.025	-
Vallecito Creek near Bayfield, CO	08/23/1999	1130	-	1.06	<0.002	<0.001	<0.025	-
Vallecito Reservoir South	05/19/2000	1115	-	-	-	-	-	<0.2
Vallecito Reservoir South	06/06/2000	1000	-	-	-	-	-	-
Vallecito Reservoir South	07/11/2000	0930	-	-	-	-	-	-
Vallecito Reservoir South	08/22/2000	0935	-	-	-	-	-	<0.2
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	-	-	-	-	-	<0.2
Vallecito Reservoir South	07/17/2001	0950	-	-	-	-	-	<0.2
Vallecito Reservoir South	08/16/2001	1005	-	-	-	-	-	<0.2
Vallecito Reservoir South	09/18/2001	1010	-	-	-	-	-	<0.2
Vallecito Reservoir South	10/17/2001	1005	-	-	-	-	-	<0.2
Vallecito Reservoir South	05/22/2002	0850	-	-	-	-	-	-

Site name	Date	Time	Potassium, total (mg/L)	Chloride, dissolved (mg/L)	Sulfate, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)	Silica, dissolved (mg/L)	Nitrogen ammonia, dissolved (mg/L as N)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	-	-	-	-	-	<0.02	<0.002
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-	<0.002
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-	<0.002
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-	<0.002
Vallecito Creek near Bayfield, CO	04/21/1999	1300	-	<0.01	<0.01	<0.01	<0.01	<0.02	<0.002
Vallecito Creek near Bayfield, CO	08/23/1999	1130	-	<0.01	<0.01	<0.01	<0.01	<0.02	<0.002
Vallecito Reservoir South	05/19/2000	1115	<0.2	-	-	-	-	-	0.008
Vallecito Reservoir South	06/06/2000	1000	<0.2	-	-	-	-	-	-
Vallecito Reservoir South	07/11/2000	0930	<0.2	-	-	-	-	-	-
Vallecito Reservoir South	08/22/2000	0935	-	-	-	-	-	-	-
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-	0.009
Vallecito Reservoir South	06/14/2001	0930	<0.2	-	-	-	-	-	0.003
Vallecito Reservoir South	07/17/2001	0950	<0.2	-	-	-	-	-	0.005
Vallecito Reservoir South	08/16/2001	1005	<0.2	-	-	-	-	-	-
Vallecito Reservoir South	09/18/2001	1010	0.22	-	-	-	-	-	0.002
Vallecito Reservoir South	10/17/2001	1005	<0.2	-	-	-	-	-	<0.015
Vallecito Reservoir South	05/22/2002	0850	-	-	-	-	-	-	<0.015

Table 8. Field blanks collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Site name	Date	Time	Nitrogen nitrite, dissolved (mg/L as N)	Nitrogen nitrate, dissolved (mg/L as N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L as N)	Nitrogen Amn + Org, dissolved (mg/L as N)	Nitrogen Amn + Org, total (mg/L as N)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	<0.001	-	<0.005	-	-
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	<0.001	-	<0.005	<0.2	<0.2
Vallecito Reservoir South	10/23/1996	1015	<0.001	-	<0.005	<0.2	<0.2
Vallecito Reservoir South	07/01/1997	1040	0.001	-	0.005	0.233	<0.2
Vallecito Creek near Bayfield, CO	04/21/1999	1300	<0.001	<0.01	0.004	-	-
Vallecito Creek near Bayfield, CO	08/23/1999	1130	<0.001	<0.01	<0.005	-	-
Vallecito Reservoir South	05/19/2000	1115	<0.001	-	<0.005	<0.1	<0.1
Vallecito Reservoir South	06/06/2000	1000	-	-	-	-	-
Vallecito Reservoir South	07/11/2000	0930	-	-	-	-	-
Vallecito Reservoir South	08/22/2000	0935	-	-	-	-	-
Vallecito Reservoir South	05/17/2001	1005	<0.001	-	<0.005	<0.1	0.041
Vallecito Reservoir South	06/14/2001	0930	<0.001	-	<0.005	<0.1	<0.08
Vallecito Reservoir South	07/17/2001	0950	0.001	-	0.006	<0.1	<0.08
Vallecito Reservoir South	08/16/2001	1005	-	-	-	-	-
Vallecito Reservoir South	09/18/2001	1010	0.001	-	0.014	0.081	0.126
Vallecito Reservoir South	10/17/2001	1005	<0.002	-	<0.013	<0.1	<0.1
Vallecito Reservoir South	05/22/2002	0850	<0.002	-	<0.013	<0.1	<0.1

Site name	Date	Time	Phosphorus, total (mg/L as P)	Phosphorus, dissolved (mg/L as P)	Phosphorus, ortho, dissolved (mg/L as P)	Organic carbon, dissolved (mg/L as C)	UV absorbance (254 nm)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	-	-	0.001	-	-
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	<0.001	0.003	<0.001	-	-
Vallecito Reservoir South	10/23/1996	1015	0.006	0.001	<0.001	-	-
Vallecito Reservoir South	07/01/1997	1040	0.001	0.001	0.002	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	-	-	0.001	<0.1	-
Vallecito Creek near Bayfield, CO	08/23/1999	1130	-	-	<0.001	<0.1	-
Vallecito Reservoir South	05/19/2000	1115	<0.008	<0.006	<0.001	-	-
Vallecito Reservoir South	06/06/2000	1000	-	-	-	-	-
Vallecito Reservoir South	07/11/2000	0930	-	-	-	-	-
Vallecito Reservoir South	08/22/2000	0935	-	-	-	-	-
Vallecito Reservoir South	05/17/2001	1005	<0.004	<0.006	<0.007	2.3	0.002
Vallecito Reservoir South	06/14/2001	0930	<0.004	<0.006	<0.007	1.7	0.002
Vallecito Reservoir South	07/17/2001	0950	<0.004	<0.006	<0.007	0.4	0.003
Vallecito Reservoir South	08/16/2001	1005	-	-	-	-	-
Vallecito Reservoir South	09/18/2001	1010	0.003	<0.006	<0.007	-	-
Vallecito Reservoir South	10/17/2001	1005	<0.004	<0.004	<0.007	-	-
Vallecito Reservoir South	05/22/2002	0850	0.003	<0.004	<0.007	0.3	-

Table 8. Field blanks collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Site name	Date	Time	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Antimony, dissolved (µg/L)	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Barium, dissolved (µg/L)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	2.2	-	<0.2	-	-	<0.2
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	<0.3	-	<0.2	-	-	<0.2
Vallecito Creek near Bayfield, CO	08/23/1999	1130	<0.3	-	<0.2	-	-	<0.2
Vallecito Reservoir South	05/19/2000	1115	<10	<10	-	<1	<1	-
Vallecito Reservoir South	06/06/2000	1000	-	<10	-	-	<1	-
Vallecito Reservoir South	07/11/2000	0930	-	<10	-	-	<1	-
Vallecito Reservoir South	08/22/2000	0935	<10	-	-	<1	-	-
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	<10	<10	-	<1	<1	-
Vallecito Reservoir South	07/17/2001	0950	<10	<10	-	<1	<1	-
Vallecito Reservoir South	08/16/2001	1005	<10	<10	-	<1	<1	-
Vallecito Reservoir South	09/18/2001	1010	<10	<10	-	<1	<1	-
Vallecito Reservoir South	10/17/2001	1005	<10	<10	-	<1	<1	-
Vallecito Reservoir South	05/22/2002	0850	<15	-	-	-	-	-

Site name	Date	Time	Beryllium, dissolved (µg/L)	Boron, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)	Chromium, dissolved (µg/L)	Chromium, total (µg/L)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	<0.2	3	<0.3	-	<0.2	-
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	<0.2	<2.0	<0.3	-	<0.2	-
Vallecito Creek near Bayfield, CO	08/23/1999	1130	<0.2	<2.0	<0.3	-	<0.2	-
Vallecito Reservoir South	05/19/2000	1115	-	-	<0.2	<0.2	<0.4	<0.4
Vallecito Reservoir South	06/06/2000	1000	-	-	-	<0.2	-	<0.4
Vallecito Reservoir South	07/11/2000	0930	-	-	-	<0.2	-	<0.4
Vallecito Reservoir South	08/22/2000	0935	-	-	<0.2	-	<0.4	-
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	-	-	<0.3	<0.3	<0.4	<0.4
Vallecito Reservoir South	07/17/2001	0950	-	-	<0.3	<0.3	<0.4	<0.4
Vallecito Reservoir South	08/16/2001	1005	-	-	<0.3	<0.3	<0.4	<0.4
Vallecito Reservoir South	09/18/2001	1010	-	-	<0.3	<0.3	<0.4	<0.4
Vallecito Reservoir South	10/17/2001	1005	-	-	<0.3	<0.3	<0.4	<0.4
Vallecito Reservoir South	05/22/2002	0850	-	-	-	-	-	-

Table 8. Field blanks collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Site name	Date	Time	Cobalt, dissolved (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	<0.2	<0.2	-	<3	-	<0.3
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	<0.2	<0.2	-	<3.0	-	<0.3
Vallecito Creek near Bayfield, CO	08/23/1999	1130	<0.2	<0.2	-	<3.0	-	<0.3
Vallecito Reservoir South	05/19/2000	1115	-	0.9	<0.6	<4	<4	<1.5
Vallecito Reservoir South	06/06/2000	1000	-	-	<2	-	<4	-
Vallecito Reservoir South	07/11/2000	0930	-	-	<2	-	<4	-
Vallecito Reservoir South	08/22/2000	0935	-	<2	-	<4	-	<1.5
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	-	1.0	1.0	<4	<4	<2
Vallecito Reservoir South	07/17/2001	0950	-	3.0	1.0	<4	<4	<2
Vallecito Reservoir South	08/16/2001	1005	-	1.2	0.7	<4	<4	<2
Vallecito Reservoir South	09/18/2001	1010	-	0.5	1.9	<4	<4	<2
Vallecito Reservoir South	10/17/2001	1005	-	0.7	0.5	<4	<4	<2
Vallecito Reservoir South	05/22/2002	0850	-	-	-	<10	-	-

Site name	Date	Time	Lead total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)	Mercury, total (µg/L)	Molybdenum, dissolved (µg/L as Mo)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	-	<0.1	-	-	-	<0.2
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	-	<0.1	-	-	-	<0.2
Vallecito Creek near Bayfield, CO	08/23/1999	1130	-	<0.1	-	-	-	<0.2
Vallecito Reservoir South	05/19/2000	1115	<1.5	0.3	<0.3	-	<0.02	-
Vallecito Reservoir South	06/06/2000	1000	<1.5	-	<0.3	-	<0.02	-
Vallecito Reservoir South	07/11/2000	0930	<1.5	-	<0.3	-	<0.02	-
Vallecito Reservoir South	08/22/2000	0935	-	<0.3	-	-	-	-
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	<2	<0.4	<0.4	<0.1	<0.1	-
Vallecito Reservoir South	07/17/2001	0950	<2	<0.4	<0.4	<0.2	<0.2	-
Vallecito Reservoir South	08/16/2001	1005	<2	<0.4	<0.4	<0.2	<0.2	-
Vallecito Reservoir South	09/18/2001	1010	<2	<0.4	<0.4	<0.2	<0.2	-
Vallecito Reservoir South	10/17/2001	1005	<2	<0.4	<0.4	<0.2	<0.2	-
Vallecito Reservoir South	05/22/2002	0850	-	<2	-	-	-	-

Table 8. Field blanks collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Site name	Date	Time	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Selenium, dissolved (µg/L)	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	<0.5	-	-	-	<0.2	-
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	<0.5	-	-	-	<0.2	-
Vallecito Creek near Bayfield, CO	08/23/1999	1130	<0.5	-	-	-	<0.2	-
Vallecito Reservoir South	05/19/2000	1115	<0.4	<0.4	<1	<1	<0.2	<0.2
Vallecito Reservoir South	06/06/2000	1000	-	<0.4	-	-	-	<0.8
Vallecito Reservoir South	07/11/2000	0930	-	2.6	-	-	-	<0.8
Vallecito Reservoir South	08/22/2000	0935	<0.4	-	-	-	<0.8	-
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	<0.4	<0.4	-	-	<0.8	<0.8
Vallecito Reservoir South	07/17/2001	0950	<0.4	<0.4	-	-	<0.8	<0.8
Vallecito Reservoir South	08/16/2001	1005	<0.4	<0.4	-	-	<0.8	<0.8
Vallecito Reservoir South	09/18/2001	1010	<0.4	0.4	-	-	<0.8	<0.8
Vallecito Reservoir South	10/17/2001	1005	<0.4	<0.4	-	-	<0.8	<0.8
Vallecito Reservoir South	05/22/2002	0850	-	-	-	-	-	-

Site name	Date	Time	Strontium, dissolved (µg/L)	Thallium, dissolved (µg/L)	Thallium, total (µg/L)	Uranium, dissolved (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)
Vallecito Creek near Bayfield, CO	09/06/1996	0930	<0.1	-	-	<0.2	<0.5	-
Los Piños River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1450	-	-	-	-	-	-
Vallecito Reservoir South	10/23/1996	1015	-	-	-	-	-	-
Vallecito Reservoir South	07/01/1997	1040	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	04/21/1999	1300	<0.1	<0.1	-	<0.2	<0.5	-
Vallecito Creek near Bayfield, CO	08/23/1999	1130	<0.1	<0.1	-	<0.2	<0.5	-
Vallecito Reservoir South	05/19/2000	1115	-	-	-	-	<2	3.1
Vallecito Reservoir South	06/06/2000	1000	-	-	-	-	-	<2
Vallecito Reservoir South	07/11/2000	0930	-	-	-	-	-	8.3
Vallecito Reservoir South	08/22/2000	0935	-	-	-	-	<2	-
Vallecito Reservoir South	05/17/2001	1005	-	-	-	-	-	-
Vallecito Reservoir South	06/14/2001	0930	-	-	-	-	<2	<2
Vallecito Reservoir South	07/17/2001	0950	-	-	-	-	<2	<2
Vallecito Reservoir South	08/16/2001	1005	-	-	-	-	<2	<2
Vallecito Reservoir South	09/18/2001	1010	-	-	-	-	<2	<2
Vallecito Reservoir South	10/17/2001	1005	-	-	-	-	<2	<2
Vallecito Reservoir South	05/22/2002	0850	-	-	-	-	<1	-

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	pH laboratory (standard units)	pH field (standard units)	Specific conductance laboratory (µS/cm)	Specific conductance field (µS/cm)	Calcium dissolved (mg/L)	Magnesium dissolved (mg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	7.88	7.65	71.3	70.0	9.04	1.85
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	7.65	7.72	70.9	70.0	-	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	7.32	7.47	56	53	6.99	1.55
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	7.47	-	53	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	-	-	-	-	-

Site name	Date	Time	Sample type	Sodium dissolved (mg/L)	Potassium dissolved (mg/L)	Potassium total (mg/L)	Bicarbonate dissolved (mg/L)	Alkalinity dissolved (mg/L as $CaCO_3$)	Chloride dissolved (mg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	0.70	0.46	-	32.9	27	0.26
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	-		32.9	27	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	0.48	0.31	-	20.7	17	0.33
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	0.7	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	0.7	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	-	0.7	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	-	0.7	-	-	-

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Sulfate, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Antimony, dissolved (µg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	4.90	0.20	3.61	45.0	-	<1.0
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	-	-	44.8	-	<1.0
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	5.72	0.15	2.73	45.7	-	<1.0
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	-	-	50	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	-	-	55	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	-	-	-	<45	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	-	-	-	<45	-

Site name	Date	Time	Sample type	Antimony, total (µg/L)	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	-	<1.0	-	13.3	<1.0	<1.0
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	<1.0	-	13.3	<1.0	<1.0
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	-	<1.0	-	9.96	<1.0	<1.0
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	<2	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	<2	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	-	<2	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	-	<2	-	-	-

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Cadmium, total (µg/L)	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Cobalt, dissolved (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	-	<1.0	-	<1.0	<1.0	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	<1.0	-	<1.0	<1.0	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	-	-	-	<1.0	<1.0	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	<0.1	-	<5	-	-	<1
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	<0.1	-	<5	-	-	<1
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	<0.1	-	<5	-	-	<1
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	<0.1	-	<5	-	-	<1

Site name	Date	Time	Sample type	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	11.4	-	<1.0	-	8.11	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	-	<1.0	-	8.24	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	12.6	-	<1.0	-	20.0	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	70	-	<1	-	7
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	70	-	<1	-	8
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	50	-	<1	-	20
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	50	-	<1	-	20

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Mercury, total (µg/L)	Molybdenum, dissolved (µg/L)	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Selenium, dissolved (µg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	-	<1.0	<1.0	-	<1.0
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	<1.0	1.04	-	<1.0
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	-	<1.0	1.48	-	
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	-	<5	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	-	<5	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	<0.1	-	-	<5	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	<0.1	-	-	<5	-

Site name	Date	Time	Sample type	Silver, dissolved (µg/L)	Silver, total (µg/L)	Uranium, dissolved (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	-	-	-	-	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	-	-	-	-	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	<1.0	-	<1.0	1.17	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	<1.0	-	<1.0	1.06	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	<1.0	-	<1.0	3.02	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	<0.1	-	-	<5
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	<0.1	-	-	<5
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	<0.1	-	-	<5
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	<0.1	-	-	<5

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Nitrogen ammonia, dissolved (mg/L as N)	Nitrogen nitrite, dissolved (mg/L as N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L as N)	Nitrogen Amn + Org, dissolved (mg/L as N)	Nitrogen Amn + Org, total (mg/L as N)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	<0.002	<0.001	0.018	<0.2	<0.2
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	<0.002	<0.001	0.016	<0.2	<0.2
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	0.014	<0.001	<0.005	<0.2	<0.2
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	0.012	<0.001	<0.005	<0.2	<0.2
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	<0.002	0.001	0.007	<0.2	<0.2
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	<0.002	0.001	0.008	<0.2	<0.2
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	0.008	0.001	0.037	0.278	<0.2
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	0.008	0.001	0.036	0.207	<0.2
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	0.002	<0.001	0.087	0.056	0.117
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	-	-	-	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	0.003	0.001	0.119	0.070	<0.1
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	0.002	0.001	0.119	0.093	<0.1
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	-	-	-	-

Site name	Date	Time	Sample type	Phosphorus, total (mg/L as P)	Phosphorus, dissolved (mg/L as P)	Phosphorus, ortho, dissolved (mg/L as P)	Organic carbon, dissolved (mg/L as C)
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1520	Environmental	0.008	0.005	<0.001	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	08/13/1996	1525	Replicate	0.004	0.005	<0.001	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1035	Environmental	0.005	0.002	<0.001	-
Vallecito Reservoir South @ 2 feet	10/23/1996	1100	Replicate	0.005	0.004	<0.001	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1330	Environmental	0.005	0.002	0.002	-
Vallecito Reservoir Center @ 2 feet	07/01/1997	1335	Replicate	0.004	0.003	0.001	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	910	Environmental	0.005	0.002	0.002	-
Los Pinos River below Vallecito Reservoir near Bayfield , CO	07/02/1997	915	Replicate	0.006	0.002	0.001	-
Vallecito Creek near Bayfield, CO	05/13/1999	10:45	Environmental	0.007	<0.004	<0.001	2.3
Vallecito Creek near Bayfield, CO	05/13/1999	10:46	Replicate	-	-	-	-
Vallecito Creek near Bayfield, CO	06/08/1999	10:45	Environmental	0.005	0.004	0.001	1.4
Vallecito Creek near Bayfield, CO	06/08/1999	10:46	Replicate	0.005	<0.004	<0.001	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:30	Environmental	-	-	-	-
Vallecito Reservoir North @ 31.5 feet	08/24/1999	9:35	Replicate	-	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:32	Environmental	-	-	-	-
Vallecito Reservoir South @ 53 feet	09/21/1999	9:37	Replicate	-	-	-	-

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	pH, laboratory (standard units)	pH, field (standard units)	Specific conductance, laboratory (µS/cm)	Specific conductance, field (µS/cm)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	-	-	-	-	-	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	7.89	7.42	64.8	61.0	7.69	1.71
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	8.14	-	66.2	61	7.85	1.75
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	-	-	-	-	-	-

Site name	Date	Time	Sample type	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Potassium, total (mg/L)	Bicarbonate, dissolved (mg/L as HCO_3)	Alkalinity, dissolved (mg/L as $CaCO_3$)	Chloride, dissolved (mg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	-	1.1	-	-	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	-	1.1	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	-	0.39	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	-	0.42	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	-	0.8	1.00	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	-	0.8	0.88	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-		-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-		-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	-	0.76	0.79	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	-	0.78	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	-	0.74	0.79	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	-	0.78	0.74	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	-	0.87	0.94	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	-	0.81	0.92	-	-	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	0.73	0.5	-	23	19	0.14
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	0.74	0.5	-	23	19	0.14
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	-	0.65	0.70	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	-	0.70	0.69	-	-	-

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Sulfate, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Silica, dissolved (mg/L)	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)	Antimony, dissolved (µg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	-	-	-	62	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	-	-	-	63	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	-	-	-	<10	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	-	-	-	10.0	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	-	-	-	27.0	43.0	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	-	-	-	23.0	43.0	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	-	-	-	45.0	59.0	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	-	-	-	57.0	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	-	-	-	17.0	24.0	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	-	-	-	19.0	23.0	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	-	-	-	24.0	44.0	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	-	-	-	20.0	41.0	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	7.95	<0.1	3.19	30.2	-	<1.0
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	7.96	0.29	3.27	41.0	-	<1.0
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	-	-	-	57.0	91.0	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	-	-	-	55.0	84.0	-

Site name	Date	Time	Sample type	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Barium, dissolved (µg/L)	Barium, total (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	<1	-	-	-	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	<1	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	<1	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	<1	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	<1	<1	-	-	-	<0.2
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	<1	<1	-	-	-	<0.2
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	<1	<1	-	-	-	<0.2
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	<1	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	<1	<1	-	-	-	<0.2
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	<1	<1	-	-	-	<0.2
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	<1	<1	-	-	-	<0.2
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	<1	<1	-	-	-	<0.2
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	<2.0	-	12.5	-	<1.0	<1.0
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	<2.0	-	12.5	-	<1.0	<1.0
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	<1	<1	-	-	-	<0.3
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	<1	1.3	-	-	-	<0.3

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Cadmium, total (µg/L)	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Cobalt, dissolved (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	<0.1	-	<5	-	-	<1
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	<0.1	-	<5	-	-	<1
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	<0.2	-	<0.4	-	-	2.2
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	<0.2	-	<0.4	-	-	4.4
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	<0.2	<0.4	<0.4	-	0.8	1.1
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	<0.2	<0.4	<0.4	-	1.5	0.8
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	<0.2	<0.4	0.6	-	<2	2.7
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	<0.2	-	<0.4	-	-	<2
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	<0.2	<0.4	<0.4	-	<2	<2
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	<0.2	<0.4	<0.4	-	<2	<2
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	<0.2	<0.4	<0.4	-	0.7	1.6
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	<0.2	<0.4	<0.4	-	0.6	1.1
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	-	<0.8	-	<1.0	<1.0	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	-	<0.8	-	<1.0	<1.0	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	<0.3	<0.4	<0.4	-	1.2	1.8
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	<0.3	<0.4	<0.4	-	1.1	1.6

Site name	Date	Time	Sample type	Iron, dissolved (µg/L)	Iron, total (µg/L)	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	40	-	<1	-	18	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	40	-	<1	-	18	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	28	-	<1.5	-	6.8	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	34	-	<1.5	-	7.8	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	6.0	43.0	<1.5	<1.5	1.0	8.1	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	6.0	35.0	<1.5	<1.5	1.2	7.0	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	9.0	39.0	<1.5	<1.5	1.3	5.9	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	40.0	-	<1.5	-	5.7	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	9.0	33.9	<1.5	<1.5	24.3	43.8	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	8.6	32.6	<1.5	<1.5	24.8	47.3	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	7.3	36.1	<1.5	<1.5	1.0	14.6	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	5.8	38.2	<1.5	<1.5	0.8	14.5	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	<10.0	-	<1.0	-	6.88	-	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	<10.0	-	<1.0	-	6.88	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	14.4	42.8	<2	<2	1.5	4.1	<0.1
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	13.3	43.6	<2	<2	1.6	4.1	<0.1

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Mercury, total (µg/L)	Molybdenum, dissolved (µg/L)	Nickel, dissolved (µg/L)	Nickel, total (µg/L)	Selenium, dissolved (µg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	<0.1	-	-	<5	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	<0.1	-	-	<5	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	<0.05	-	-	<0.4	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	<0.05	-	-	0.4	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	<0.02	-	0.8	0.9	<1
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	<0.02	-	1.0	0.7	<1
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental		-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate		-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	0.12	-	0.9	1.8	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	<0.02	-	-	0.9	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	<0.02	-	0.9	0.9	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	<0.02	-	0.9	0.9	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	<0.04	-	0.6	0.9	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	<0.04	-	0.9	0.9	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	-	1.03	<1.0	-	<2.4
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	-	1.03	<1.0	-	<2.4
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	<0.1	-	0.9	0.7	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	<0.1	-	0.7	0.8	-

Site name	Date	Time	Sample type	Selenium, total (µg/L)	Silver, dissolved (µg/L)	Silver, total (µg/L)	Uranium, dissolved (µg/L)	Zinc, dissolved (µg/L)	Zinc, total (µg/L)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	-	<0.1	-	-	15
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	-	<0.1	-	-	<5
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	-	<0.8	-	-	13.8
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	-	<0.8	-	-	17.2
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	<1	<0.2	<0.2	-	2.0	10.0
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	<1	<0.2	<0.2	-	2.1	5.4
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	-	<0.8	<0.8	-	<2	2.5
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	-	<0.8	-	-	7.8
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	-	<0.8	<0.8	-	<2	<2
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	-	<0.8	<0.8	-	<2	<2
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	-	<0.8	<0.8	-	4.3	3.4
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	-	<0.8	<0.8	-	2.8	3.7
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	-	<1.0	-	<1.0	<1.0	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	-	<1.0	-	<1.0	1.24	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	-	<0.8	<0.8	-	<2	<2
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	-	<0.8	<0.8	-	<2	<2

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Nitrogen ammonia, dissolved (mg/L as N)	Nitrogen nitrite, dissolved (mg/L as N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L as N)	Nitrogen Amn + Org, dissolved (mg/L as N)	Nitrogen Amn + Org, total (mg/L as N)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	0.009	<0.001	<0.005	0.079	0.1
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	0.004	<0.001	<0.005	0.086	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	-	-	-	-	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	<0.002	<0.001	0.141	<0.1	<0.1
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	<0.002	<0.001	0.132	0.072	<0.1
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	0.006	0.001	0.009	0.118	1.06
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	0.01	0.002	0.009	0.1	0.178
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	<0.002	<0.001	0.021	0.1	0.11
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	0.003	<0.001	0.025	0.084	0.117

Site name	Date	Time	Sample type	Phosphorus, total (mg/L as P)	Phosphorus, dissolved (mg/L as P)	Phosphorus, ortho, dissolved (mg/L as P)	Organic carbon, dissolved (mg/L as C)	UV absorbance (254 nm)
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:45	Environmental	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	10/19/1999	9:46	Replicate	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:10	Environmental	-	-	-	-	-
Vallecito Reservoir Center @ 2 feet	11/30/1999	11:15	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/19/2000	11:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 85 feet	05/19/2000	11:00	Environmental	0.006	<0.006	<0.001	1.8	0.037
Vallecito Reservoir South @ 85 feet	05/19/2000	11:20	Replicate	-	<0.006	<0.001	1.7	0.037
Vallecito Reservoir South @ 2 feet	06/06/2000	10:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	06/06/2000	10:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 25 feet	07/11/2000	10:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:30	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/22/2000	9:35	Replicate	-	-	-	-	-
Vallecito Creek near Bayfield, CO	08/22/2000	16:00	Environmental	<0.008	<0.006	<0.001	0.6	0.011
Vallecito Creek near Bayfield, CO	08/22/2000	16:05	Replicate	<0.008	<0.006	0.001	0.7	0.012
Vallecito Reservoir South @ 2 feet	05/17/2001	10:00	Environmental	0.008	<0.006	<0.007	2.5	0.065
Vallecito Reservoir South @ 2 feet	05/17/2001	10:10	Replicate	0.012	<0.006	<0.007	2.1	0.065
Vallecito Reservoir South @ 2 feet	06/14/2001	9:15	Environmental	0.009	0.004	<0.007	2.2	0.073
Vallecito Reservoir South @ 2 feet	06/14/2001	9:20	Replicate	0.005	<0.006	<0.007	2.2	0.073

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	pH, laboratory (standard units)	pH, field (standard units)	Specific conductance, laboratory (µS/cm)	Specific conductance, field (µS/cm)	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	7.42	-	95	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	7.42	-	95	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	-	-	130	-	18.8	2.84
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	-	-	132.8	-	18.6	2.81

Site name	Date	Time	Sample type	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Potassium, total (mg/L)	Bicarbonate, dissolved (mg/L as HCO_3)	Alkalinity, dissolved (mg/L as $CaCO_3$)	Chloride, dissolved (mg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	-	0.63	0.64	-	-	-
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	-	0.63	0.66	-	-	-
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	-	0.70	0.77	-	-	-
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	-	0.67	0.73	-	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	-	0.67	0.98	-	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	-	0.65	0.85	-	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	-	0.71	0.75	-	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	-	0.73	0.73	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	-	48.1	39.4	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	-	48.1	39.4	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	1.56	1.11	-	-	58.3	0.65
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	1.53	1.02	-	-	57.2	0.91

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Sulfate, dissolved (mg/L)	Silica, dissolved (mg/L)	Aluminum, dissolved (µg/L)	Aluminum, total (µg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	-	-	42.0	49.0
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	-	-	41.0	48.0
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	-	-	11.0	31.0
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	-	-	16	36
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	-	-	26	38
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	-	-	30	40
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	-	-	11	21
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	-	-	27	30
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	15.8	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	16.6	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	12.7	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	<15	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	6.35	2.29	6.68	26.1
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	6.37	2.23	6.91	25.5

Site name	Date	Time	Sample type	Arsenic, dissolved (µg/L)	Arsenic, total (µg/L)	Cadmium, dissolved (µg/L)	Cadmium, total (µg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	<1	<1	<0.3	<0.3
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	<1	<1	<0.3	<0.3
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	<1	<1	<0.3	<0.3
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	<1	<1	<0.3	<0.3
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	<1	<1	<0.3	0.7
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	<1	<1	<0.3	<0.3
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	<1	<1	<0.3	<0.3
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	<1	<1	<0.3	<0.3
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	0.732	3.52	<0.04	<0.04
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	0.692	<2	<0.04	<0.04

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Chromium, dissolved (µg/L)	Chromium, total (µg/L)	Copper, dissolved (µg/L)	Copper, total (µg/L)	Iron, dissolved (µg/L)	Iron, total (µg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	<0.4	<0.4	1.2	1.7	11.7	31.5
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	<0.4	<0.4	1.3	1.1	12.5	32.6
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	<0.4	<0.4	<0.6	<0.6	14.7	43.3
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	<0.4	<0.4	0.6	1.6	13.0	43.4
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	<0.4	<0.4	4.1	1.3	5.1	26.8
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	<0.4	<0.4	0.9	1.6	4.0	27.7
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	<0.4	<0.4	0.5	2.7	6.5	37.3
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	<0.4	<0.4	1.0	2.7	6.4	38.2
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	-	-	8.83	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	-	-	9.92	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	-	-	<10	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	-	-	<10	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	-	-	0.447	0.549	7.00	52.2
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	-	-	0.461	0.488	8.30	51.5

Site name	Date	Time	Sample type	Lead, dissolved (µg/L)	Lead, total (µg/L)	Manganese, dissolved (µg/L)	Manganese, total (µg/L)	Mercury, dissolved (µg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	<2	<2	7.0	12.0	<0.2
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	<2	<2	7.6	12.8	<0.2
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	<2	<2	4.7	29.1	<0.2
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	<2	<2	4.2	30.2	<0.2
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	<2	<2	0.9	9.1	<0.2
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	<2	<2	0.5	7.5	<0.2
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	<2	<2	0.5	20.8	<0.2
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	<2	<2	<0.4	21.3	<0.2
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	3.75	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	3.92	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	12.7	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	11.5	-	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	<0.08	<1	9.57	63.9	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	<0.08	<1	11.0	61.3	-

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Mercury total (µg/L)	Nickel dissolved (µg/L)	Nickel total (µg/L)	Silver dissolved (µg/L)	Silver total (µg/L)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	<0.2	1.2	1.2	<0.8	<0.8
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	<0.2	1.3	1.1	<0.8	<0.8
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	<0.2	0.8	1.1	<0.8	<0.8
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	<0.2	0.9	1.1	<0.8	<0.8
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	<0.2	0.7	0.7	<0.8	<0.8
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	<0.2	0.7	0.6	<0.8	<0.8
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	<0.2	0.8	0.8	<0.8	<0.8
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	0.22	0.6	1.2	<0.8	<0.8
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	-	-	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	-	-	-	-	-
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	-	-	-	-	-

Site name	Date	Time	Sample type	Zinc dissolved (µg/L)	Zinc total (µg/L)	Nitrogen ammonia dissolved (mg/L as N)	Nitrogen nitrite dissolved (mg/L as N)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	<2	<2	0.019	0.003
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	<2	<2	0.018	0.003
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	<2	2.5	0.002	<0.001
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	<2	2.9	0.003	<0.001
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	<2	4.5	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	<2	<2	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	<2	<2	<0.015	<0.002
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	<2	<2	<0.015	<0.002
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	-	-	<0.015	<0.002
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	-	-	<0.015	<0.002
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	<1	-	<0.015	<0.002
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	3.48	-	<0.015	<0.002
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	<1	-	<0.015	<0.002
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	<1	-	<0.015	<0.002
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	1.82	<1	<0.015	<0.002
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	3.94	<1	<0.015	<0.002

Table 9. Field replicates collected from stream and reservoir sampling sites, 1999–2002.—Continued

[µS/cm, microsiemens per centimeter; mg/L, milligrams per liter; µg/L, micrograms per liter; nm, nanometers; <, less than; -, no data]

Site name	Date	Time	Sample type	Nitrogen $NO_2 + NO_3$ dissolved (mg/L as N)	Nitrogen Amn + Org dissolved (mg/L as N)	Nitrogen Amn + Org total (mg/L as N)	Phosphorus total (mg/L as P)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	0.032	0.089	0.102	0.004
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	0.032	0.135	0.11	<0.004
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	0.064	0.088	0.107	0.004
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	0.067	0.116	0.111	0.004
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	-	-	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	-	-	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	<0.013	<0.1	0.085	0.008
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	<0.013	0.074	0.095	0.004
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	0.019	<0.1	<0.1	<0.004
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	0.020	<0.1	<0.1	<0.004
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	<0.013	0.074	0.066	0.006
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	<0.013	0.069	0.062	0.005
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	<0.013	<0.1	0.136	0.01
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	<0.013	0.065	0.115	0.009
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	<0.013	0.123	0.164	0.018
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	<0.013	0.102	0.153	0.017

Site name	Date	Time	Sample type	Phosphorus dissolved (mg/L as P)	Phosphorus ortho dissolved (mg/L as P)	Organic carbon dissolved (mg/L as C)	UV absorbance (254 nm)
Vallecito Reservoir South @ 40 feet	07/17/2001	9:40	Environmental	<0.006	<0.007	3.4	0.060
Vallecito Reservoir South @ 40 feet	07/17/2001	9:45	Replicate	<0.006	<0.007	2.5	0.061
Vallecito Reservoir South @ 65 feet	08/16/2001	10:15	Environmental	<0.006	<0.007	2.1	0.052
Vallecito Reservoir South @ 65 feet	08/16/2001	10:20	Replicate	0.005	<0.007	2.0	0.051
Vallecito Reservoir South @ 2 feet	09/18/2001	10:30	Environmental	-	-	-	-
Vallecito Reservoir South @ 2 feet	09/18/2001	10:35	Replicate	-	-	-	-
Vallecito Reservoir South @ 35 feet	10/17/2001	10:10	Environmental	0.004	<0.007	1.4	0.037
Vallecito Reservoir South @ 35 feet	10/17/2001	10:15	Replicate	0.003	<0.007	1.5	-
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:15	Environmental	<0.004	<0.007	0.8	0.020
Los Pinos River above Vallecito Reservoir near Bayfield, CO	10/17/2001	10:16	Replicate	<0.004	<0.007	0.8	0.018
Vallecito Reservoir South @ 2 feet	05/22/2002	9:00	Environmental	0.002	<0.007	1.5	0.028
Vallecito Reservoir South @ 2 feet	05/22/2002	9:10	Replicate	<0.004	<0.007	1.5	0.030
Vallecito Reservoir South @ 2 feet	07/31/2002	9:00	Environmental	0.005	<0.007	1.4	0.036
Vallecito Reservoir South @ 2 feet	07/31/2002	9:05	Replicate	0.004	0.014	1.6	0.037
Vallecito Reservoir South @ 2 feet	08/29/2002	9:00	Environmental	0.008	<0.007	1.7	0.042
Vallecito Reservoir South @ 2 feet	08/29/2002	9:05	Replicate	0.008	0.004	1.6	0.042

Analysis of Field Blanks

Under ideal conditions any contamination present in field blanks would be so small that concentrations would be less than the detection limit. In practice, although concentrations measured in many field blanks are less than the detection limit, some blanks contain concentrations greater than the detection limit. Therefore, as stated in Mueller and Titus (2005), "The objective in analyzing data from blanks is to determine the amount of contamination that is not likely to be exceeded in a large percentage of the water samples represented by the blanks." This objective can be achieved by calculating an upper confidence limit (UCL) for a high percentile of contamination in the population of water samples represented by the blanks. This UCL is the maximum contamination expected in the specified percentage of water samples. For example, the 95-percent UCL for the 90th percentile of concentrations in blanks is the maximum contamination expected in 90 percent of all water samples. In other words, there is 95 percent confidence that this amount of contamination would be exceeded in no more than 10 percent of all samples (including environmental samples) that were collected, processed, and analyzed in the same manner as the blanks. This calculation was completed for the field blanks shown in table 8 using the formula given in Mueller and Titus (2005), and the results of calculation are given in table 10.

A review of the metal field blank data in table 8 for Vallecito Reservoir shows that all the blanks analyzed for dissolved and total aluminum, arsenic, cadmium, chromium, iron,

Table 10. Upper confidence limits for contamination by nutrients and metals in specified percentiles of all samples based on data for field blanks.

[Vallecito Reservoir field blanks—UCL for the 60th percentile (5 blanks), 70th percentile (7 blanks), and 75th percentile (8 and 9 blanks) of concentration in blanks. mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Analyte	Number of blanks	Most common detection limit	5 blanks Upper 92-percent confidence limit	7 blanks Upper 92-percent confidence limit	8 blanks Upper 90-percent confidence limit	9 blanks Upper 92-percent confidence limit
Ammonia, dissolved, mg/L	9	0.015	-	-	-	<0.015
Nitrate + nitrite, dissolved, mg/L	9	0.013	-	-	-	0.014
Ammonia + organic nitrogen, dissolved, mg/L	9	0.1	-	-	-	0.233
Ammonia + organic nitrogen, total, mg/L	9	0.1	-	-	-	<0.2
Phosphorus, total, mg/L	9	0.004	-	-	-	<0.008
Phosphorus, dissolved, mg/L	9	0.006	-	-	-	<0.006
Orthophosphate, dissolved, mg/L	9	0.007	-	-	-	<0.007
Aluminum, dissolved, µg/L	8	10	-	-	<15	-
Aluminum, total, µg/L	8	10	-	-	<10	-
Arsenic, dissolved, µg/L	7	1	-	<1	-	-
Arsenic, total, µg/L	8	1	-	-	<1	-
Cadmium, dissolved, µg/L	7	0.3	-	<0.3	-	-
Cadmium, total, µg/L	8	0.3	-	-	<0.3	-
Chromium, dissolved, µg/L	7	0.4	-	<0.4	-	-
Chromium, total, µg/L	8	0.4	-	-	<0.4	-
Copper, dissolved, µg/L	7	2	-	3.0	-	-
Copper, total, µg/L	8	2	-	-	<2	-
Iron, dissolved, µg/L	8	4	-	-	<4	-
Iron, total, µg/L	8	4	-	-	<4	-
Lead, dissolved, µg/L	7	2	-	<2	-	-
Lead, total, µg/L	8	2	-	-	<2	-
Manganese, dissolved, µg/L	8	0.4	-	-	<2	-
Manganese, total, µg/L	8	0.4	-	-	<0.4	-
Mercury, dissolved, µg/L	5	0.2	<0.2	-	-	-
Mercury, total, µg/L	8	0.2	-	-	<0.2	-
Nickel, dissolved, µg/L	7	0.4	-	<0.4	-	-
Nickel, total, µg/L	8	0.4	-	-	2.6	-
Potassium, dissolved, µg/L	7	0.2	-	<0.2	-	-
Potassium, total, µg/L	8	0.2	-	0.22	-	-
Silver, dissolved, µg/L	7	0.8	-	<0.8	-	-
Silver, total, µg/L	8	0.8	-	-	<0.8	-
Zinc, dissolved, µg/L	8	2	-	-	<2	-
Zinc, total, µg/L	8	2	-	-	8.3	-

Table 10. Upper confidence limits for contamination by nutrients and metals in specified percentiles of all samples based on data for field blanks.—Continued

[Vallecito Creek and Los Piños River field blanks—UCL for the 50th percentile of concentration in blanks. mg/L, milligrams per liter; µg/L, micrograms per liter; <, less than; -, no data]

Analyte	Number of blanks	Most common detection limit	3 blanks Upper 88-percent confidence limit	4 blanks Upper 94-percent confidence limit
Ammonia, dissolved, mg/L	4	0.002	-	<0.002
Nitrate + nitrite, dissolved, mg/L	4	0.005	-	<0.005
Orthophosphate, dissolved, mg/L	4	0.001	-	<0.001
Aluminum, dissolved, µg/L	3	0.3	2.2	-
Antimony, dissolved, µg/L	3	0.2	<0.2	-
Barium, dissolved, µg/L	3	0.2	<0.2	-
Beryllium, dissolved, µg/L	3	0.2	<0.2	-
Boron, dissolved, µg/L	3	2.0	3.0	-
Cadmium, dissolved, µg/L	3	0.3	<0.3	-
Chromium, dissolved, µg/L	3	0.2	<0.2	-
Cobalt, dissolved, µg/L	3	0.2	<0.2	-
Copper, dissolved, µg/L	3	0.2	<0.2	-
Iron, dissolved, µg/L	3	3.0	<3.0	-
Lead, dissolved, µg/L	3	0.3	<0.3	-
Manganese, dissolved, µg/L	3	0.1	<0.1	-
Molybdenum, dissolved, µg/L	3	0.2	<0.2	-
Nickel, dissolved, µg/L	3	0.5	<0.5	-
Silver, dissolved, µg/L	3	0.2	<0.2	-
Zinc, dissolved, µg/L	3	0.5	<0.5	-

lead, manganese, mercury, and silver and dissolved nickel and zinc were reported as less than the reporting limit. A review of the data in table 10 indicates that there is 88–94 percent confidence (depending on the number of field blanks) that potential contamination is no greater than the detection limit for each of these constituents in at least 60–75 percent of all samples. For example, for dissolved and total iron in Vallecito Reservoir there is 90 percent confidence that contamination is no greater than 4 µg/L in at least 75 percent of all samples. For dissolved cadmium in Vallecito Reservoir there is 92 percent confidence that contamination is no greater than 0.3 µg/L in at least 70 percent of all samples. Two out of eight blanks for total nickel had measurable amounts of nickel (0.4 µg/L and 2.6 µg/L) and two out of eight blanks for total zinc had measurable amounts of zinc (3.1 µg/L and 8.3 µg/L). The information provided in table 10 for total zinc indicates that there is 90 percent confidence that contamination is no greater than 8.3 µg/L in at least 75 percent of all samples. For total nickel there is 90 percent confidence that contamination is no greater than 2.6 µg/L in at least 75 percent of all samples.

A review of the nutrient field blank data in table 10 for Vallecito Reservoir indicates that there is 92 percent confidence that contamination is no greater than the detection limit for dissolved ammonia, total ammonia plus organic nitrogen, total phosphorus, dissolved phosphorus, and dissolved orthophosphate in at least 75 percent of all samples. There is 90 percent confidence that contamination is no greater than 0.014 mg/L for dissolved nitrite plus nitrate and no greater than 0.233 mg/L for dissolved ammonia plus organic nitrogen in at least 75 percent of all samples.

All field blanks collected at Vallecito Creek near Bayfield, Colo., and Los Piños River above Vallecito Reservoir near Bayfield, Colo., and analyzed for metals and nutrients had concentrations that were less than the reporting limit except for one aluminum field blank and one boron field blank. Therefore, except for aluminum and boron, for constituents analyzed in three field blanks, there is 88 percent confidence that contamination is no greater than the detection limit in at least 50 percent of all samples. For constituents analyzed in four field blanks there is 94 percent confidence that contamination is no greater than the detection limit in at least 50 percent of all samples.

The results of the analysis of the field blank samples given in table 10 can then be compared to environmental concentrations to determine the likelihood that contamination has affected the interpretation of the environmental data in samples collected from Vallecito Reservoir. For all constituents measured in Vallecito Reservoir, with the exception of total nickel and zinc, there is a high degree of confidence that contamination is not greater than the detection limit or is only slightly greater than the detection limit. However, because the environmental concentrations are close to the detection limit for all constituents and the range of samples that could be affected by contamination varies from 25 to 40 percent, some effects from contamination cannot be ruled out. For example, with respect to orthophosphate, there is 92 percent confidence

that contamination is less than the detection limit in at least 75 percent of samples; however, the potential contamination in the remaining 25 percent is not known. Although there is no evidence that contamination accounts for any of the measured orthophosphate, environmental concentrations are low in comparison to the detection limit, and some effects from contamination cannot be ruled out. The environmental concentrations of total iron and total manganese, however, are usually at least 10 times greater than the detection limit. It is unlikely that contamination as great as 4 mg/L in 25 percent of all samples (total iron) and as great as 0.4 mg/L in 25 percent of all samples (total manganese) will affect the interpretation of the total iron and manganese concentrations in the environmental samples. The amount of potential contamination for total nickel and total zinc shown in table 10 exceeds the concentration of these constituents in most of the environmental samples so that contamination probably has compromised the interpretation of the environmental data for these two constituents.

The same analysis of the data presented in table 10 applies to the environmental data collected from Vallecito Creek near Bayfield, Colo., and Los Piños River above Vallecito Reservoir near Bayfield, Colo. There is a high degree of confidence that contamination is not greater than the detection limit or is only slightly greater than the detection limit but because the environmental concentrations are close to the detection limit for all constituents and the range of samples that could be affected by contamination is 50 percent, some effects from contamination cannot be ruled out. For example, with respect to orthophosphate, we can state with 94 percent confidence that contamination is less than the detection limit in at least 50 percent of samples; however, the potential contamination in the remaining 50 percent is not known. Although there is no evidence that contamination accounts for any of the measured orthophosphate, environmental concentrations are low in comparison to the detection limit, and some effects from contamination cannot be ruled out. The concentration of dissolved manganese in Vallecito Creek near Bayfield, Colo., and Los Piños River above Vallecito Reservoir near Bayfield, Colo., is usually at least 10 times greater than the detection limit. It is unlikely that contamination as great as 0.1 mg/L in 50 percent of all samples will affect the interpretation of the dissolved manganese concentrations in the environmental samples.

Analysis of Field Replicates

The field replicate data were analyzed to assess the amount of variability present in the environmental data by the method given in Mueller and Titus (2005). This method involved calculating a standard deviation for each field replicate pair and examining graphs of the standard deviation of each replicate pair as a function of the average concentration of each field replicate pair to determine if the standard deviation is constant over the range of concentrations measured. Typically, the higher the constituent concentration, the greater the standard deviation, however, the relation between standard deviation of each replicate pair was constant over the range in concentration measured for each constituent. This consistency most likely is a result of relatively little variation in the environmental concentrations for all constituents (that is concentrations were generally quite low and similar to each other). Therefore, the average standard deviation of the replicate pairs for each constituent was substituted into the following equation to calculate a 95 percent confidence interval about a single sample:

$$C_{interval} = C_{sample} \pm Z_{0.95}SD$$

where

$C_{interval}$ is the confidence interval about a single measurement = $100(1-\alpha)$;

C_{sample} is the concentration of a single sample;

SD is the average standard deviation of the replicate pairs;

and

$Z_{0.95}$ is the statistic for the 95-percentage point of the standard normal curve = 1.96

When one of the replicate pairs was reported as less than the reporting limit but the other had measurable amounts of a constituent reported, the sample with a value of less than the reporting limit was assigned a value of one-half the reporting limit to perform the calculation.

The 95-percent confidence interval data about a single sample are presented in table 11 and can be interpreted in the following manner. There is 95 percent confidence that the true value of any individual measurement for any constituent listed in table 11 will lie within the range given in table 11. To determine the minimum significant difference that can be detected between any two individual measurements the following formula was used:

$$\Delta C \text{ (difference in concentration between two samples)} \geq 1.96 * \sqrt{2} * SD$$

If the difference in concentration between any two samples is equal to or greater than the values listed in table 11, there is a 95 percent probability that the difference is significant. This calculation has shown that, for the nutrient constituents, the minimum concentration difference that can be considered significant among the sampling sites (reservoir and the three stream sites) and over time at any given sampling site is small, ranging from 1 µg/L to 32 µg/L, except for total ammonia + organic nitrogen in the reservoir (minimum difference of 0.186 mg/L) and DOC in the reservoir (minimum difference of 0.4 mg/L). For the total and dissolved metal constituents there were only sufficient data to perform this calculation for the Vallecito Reservoir South sampling site. At this site, the minimum concentration difference that can be considered significant over time is small as well, ranging from 0.3 to 7.9 µg/L, depending on the metal and whether it is expressed as a total or dissolved analysis. The minimum concentration difference that can be considered significant for the CDPHE sampling sites is also small.

Table 11. Ninety-five percent confidence intervals about a single sample.

[+/–, plus or minus; µg/L, micrograms per liter; mg/L, milligrams per liter]

Parameter and reporting unit	95% Confidence interval about a single sample (+/–)	Minimum significant difference between samples
Vallecito Reservoir		
Aluminum, dissolved, µg/L	5.6	7.9
Aluminum, total, µg/L	4.1	5.8
Copper, dissolved, µg/L	0.8	1.1
Copper, total, µg/L	0.7	1.0
Iron, dissolved, µg/L	1.1	1.6
Iron, total, µg/L	2.3	3.2
Manganese, dissolved, µg/L	0.7	1.0
Manganese, total, µg/L	1.3	1.9
Nickel, dissolved, µg/L	0.2	0.3
Nickel, total, µg/L	0.2	0.3
Zinc, dissolved, µg/L	0.8	1.2
Zinc, total, µg/L	3.0	4.2
Ammonia, dissolved, mg/L	0.002	0.003
Nitrate + nitrite, dissolved, mg/L	0.001	0.001
Ammonia + organic nitrogen, dissolved, mg/L	0.023	0.032
Ammonia + organic nitrogen, total, mg/L	0.131	0.186
Phosphorus, total, mg/L	0.002	0.004
Phosphorus, dissolved, mg/L	0.001	0.001
Orthophosphorus, dissolved, mg/L	0.002	0.002
Organic carbon, dissolved, mg/L	0.3	0.4
Stream sampling sites		
Ammonia, dissolved, mg/L	0.001	0.001
Nitrate + nitrite, dissolved, mg/L	0.004	0.005
Ammonia + organic nitrogen, dissolved, mg/L	0.032	0.045
Phosphorus, total, mg/L	0.001	0.002
Phosphorus, dissolved, mg/L	0.001	0.001
Orthophosphorus, dissolved, mg/L	0.001	0.001
CDPHE stream sampling sites		
Iron, total, µg/L	3	4
Iron, dissolved, µg/L	1	2
Sulfate, dissolved, mg/L	0.2	0.3
Nitrate + Nitrite, dissolved, mg/L	0.003	0.005
Phosphorus, total, mg/L	0.021	0.029

Analysis of pH and Specific Conductance Standard Reference Samples by the Hydrolab

Quality control for the Hydrolab involved measuring the pH of a low ionic-strength solution provided by the USGS Standard Reference Sample Program (Farrar, 1999) and the specific conductance of a potassium chloride solution provide by the USGS water-quality service unit in Ocala, Fla., after calibration. The low ionic-strength solution is a snowmelt sample (P-31) with a most probable pH value of 7.44. The specific-conductance value of the potassium chloride solution varied from 48, 50, or 52 microsiemens per centimeter at 25 degrees Celsius depending on availability from the USGS water-quality service unit in Ocala, Fla. The accuracy of the water temperature probe was not checked during this study. In the future a quality-control procedure to use for the water temperature probe would be to compare the water temperature measured with the Hydrolab to the water temperature measured with a National Institute of Standards rated thermometer capable of measuring to 0.1 degree Celsius.

The quality of the Hydrolab pH data was evaluated by determining if bias was present in the values measured by the Hydrolab of a Low Ionic Strength Solution. There does appear to be a low bias in the pH measurements made by the Hydrolab as the majority of the pH measurements are below 7.44 (fig. 2 and table 12). The following hypotheses were evaluated with a t-test to determine if bias is present in the Hydrolab measurements:

Null Hypothesis (H_O)—The mean of the differences between the Hydrolab measurements of the Low Ionic Strength Standard and the accepted pH value of the Low Ionic Strength Standard is equal to zero.

Alternative Hypothesis (H_A)—The mean of the differences between the Hydrolab measurements of the Low Ionic Strength Standard and the accepted pH value of the Low Ionic Strength Standard is not equal to zero.

The p-value for the t-test is 0.0013, indicating that the null hypothesis is rejected for any $\alpha > 0.0013$. Alpha (α) is the level of significance of a hypothesis test and represents the maximum probability of rejecting the null hypothesis when it is true. Therefore, by rejecting the null hypothesis at $\alpha = 0.01$ we have 99-percent confidence (the null hypothesis will be rejected when it is true only one time in a hundred) that bias is present in the pH measurements by the Hydrolab and that the Hydrolab measurements underestimate pH by 0.47 pH units at a pH of 7.44. Technically this conclusion of low bias applies only to a pH of 7.44, and the same calculation would need to be done on other standard reference solutions that bracket the pH measured in Vallecito Reservoir to calculate the bias at all pH values. However, since most of the measured pH values are around a pH of 7.44 (table 4), it is probably safe to conclude that the Hydrolab pH measurements presented in this report are

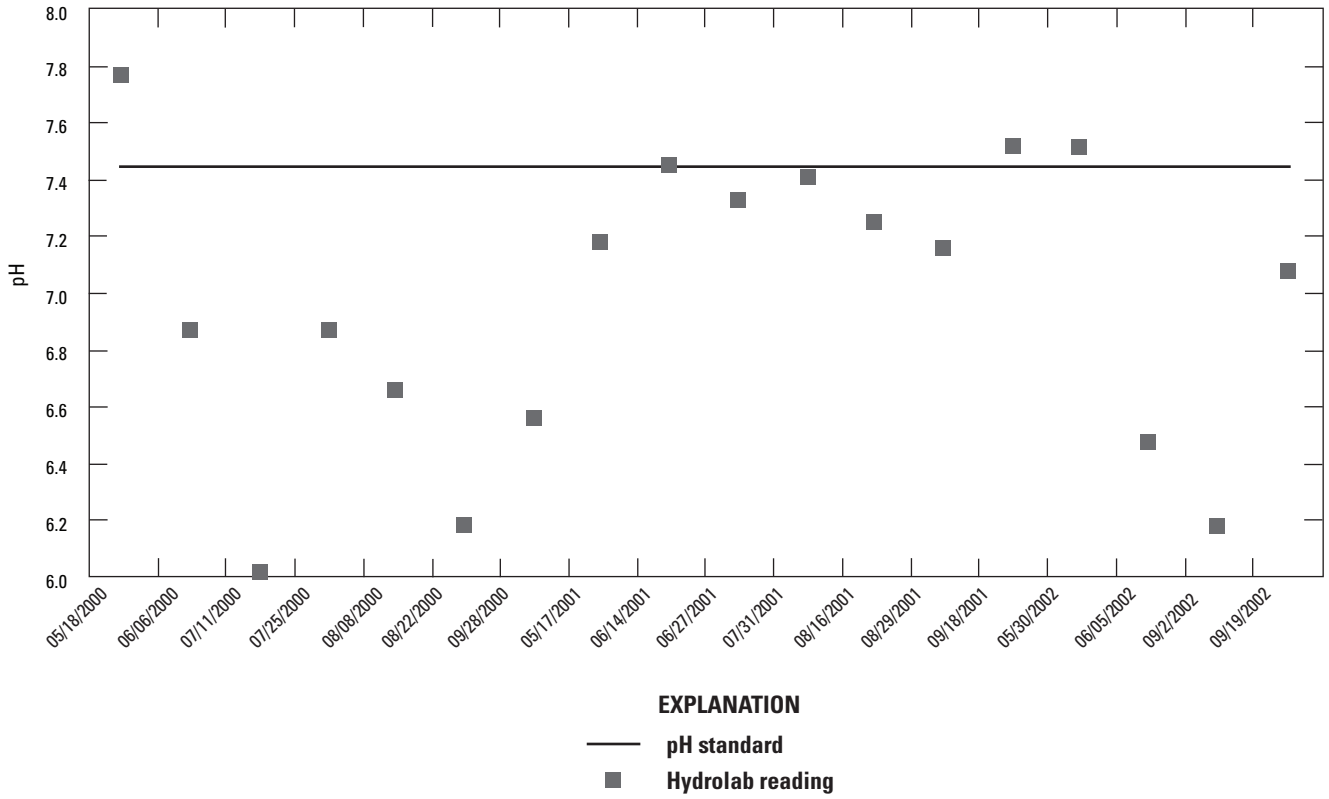

Figure 2. Comparison of Hydrolab measurements of the low ionic strength standard to the accepted true value of the standard.

biased low by about 0.47 pH unit. However, pH values as high as 9.4 and as low as 6.2 were measured. At these pH values, the calculated bias of 0.47 unit is most likely not accurate, and measurements of a standard reference sample with these pH values would be needed to estimate the bias present (if it exists).

The quality of the Hydrolab specific-conductance data was evaluated by determining if bias was present in the values measured by the Hydrolab of a specific-conductance standard (fig. 3 and table 11). Since the differences in the Hydrolab measurements of the specific-conductance standard and the accepted true value of the specific-conductance standard were not normally distributed, a Wilcoxon Signed Ranks test was used to evaluate the following hypotheses to determine if bias is present in the Hydrolab measurements:

Null Hypothesis (H_O)—The mean of the differences between the Hydrolab measurements of the specific-conductance standard and the accepted value of the specific-conductance standard is equal to zero.

Alternative Hypothesis (H_A)—The mean of the differences between the Hydrolab measurements of the specific-conductance standard and the accepted value of the of the specific-conductance standard is not equal to zero.

The p-value for this test is 0.1357, indicating that the null hypothesis can be accepted at $\alpha = 0.05$, and we can conclude that there is no bias present in the measurement of specific conductance by the Hydrolab.

Table 12. Differences in the measurement of the pH and specific-conductance (SC) standards by the Hydrolab.

Date	pH standard	Hydrolab reading	Difference	Percentage of error
05/18/2000	7.44	7.77	–0.33	–4.4
06/06/2000	7.44	6.87	0.57	7.7
07/11/2000	7.44	6.02	1.42	19.1
07/25/2000	7.44	6.87	0.57	7.7
08/08/2000	7.44	6.65	0.79	10.6
08/22/2000	7.44	6.18	1.26	16.9
09/28/2000	7.44	6.56	0.88	11.8
05/17/2001	7.44	7.17	0.27	3.6
06/14/2001	7.44	7.44	0.00	0.0
06/27/2001	7.44	7.32	0.12	1.6
07/31/2001	7.44	7.40	0.04	0.5
08/16/2001	7.44	7.25	0.19	2.6
08/29/2001	7.44	7.15	0.29	3.9
09/18/2001	7.44	7.51	–0.07	–0.9
05/30/2002	7.44	7.51	–0.07	–0.9
06/05/2002	7.44	6.47	0.97	13.0
09/02/2002	7.44	6.17	1.27	17.1
09/19/2002	7.44	7.07	0.37	5.0
			Mean	6.4
			Median	4.4

Table 12. Differences in the measurement of the pH and specific-conductance (SC) standards by the Hydrolab.—Continued

Date	SC standard	Hydrolab reading	Difference	Percentage of error
05/18/2000	50	47	–3	6.0
06/06/2000	50	47	–3	6.0
06/20/2000	50	57	7	–14.0
07/11/2000	50	51	1	–2.0
07/25/2000	48	48	0	0.0
08/08/2000	48	48	0	0.0
08/22/2002	48	48	0	0.0
09/28/2000	50	50	0	0.0
05/17/2001	50	49	–1	2.0
06/14/2001	50	48	–2	4.0
06/27/2001	50	49	–1	2.0
07/31/2001	50	50	0	0.0
08/16/2001	50	49	–1	2.0
08/29/2001	50	50	0	0.0
09/18/2001	50	48	–2	4.0
10/01/2001	50	47	–3	6.0
05/30/2002	52	48	–4	7.7
06/05/2002	50	49	–1	2.0
09/02/2002	48	50	2	–4.2
09/19/2002	50	50	0	0.0
			Mean	1.1
			Median	1.0

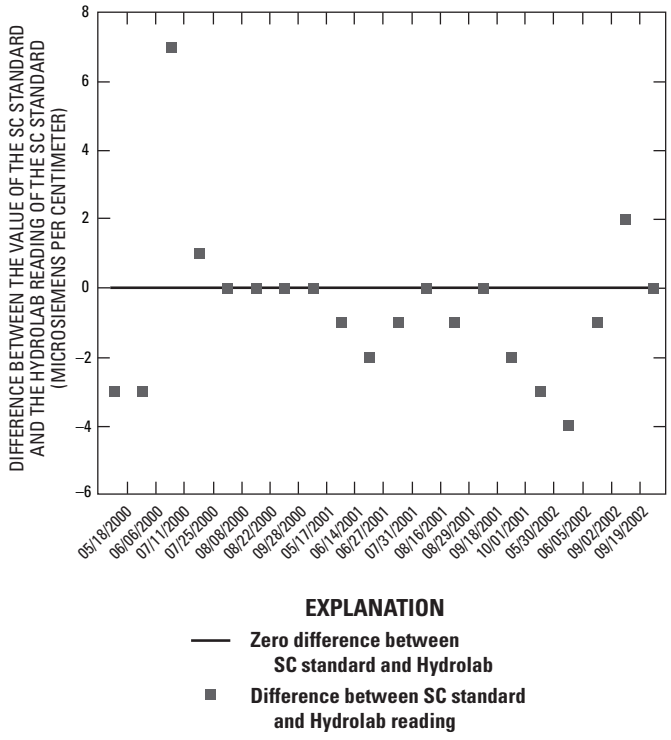

Figure 3. Difference between the value of the specific-conductance standard and the Hydrolab reading of the specific conductance standard.

Summary

The USGS, in cooperation with volunteers from the Pine River Watershed Stakeholders Group and the U.S. Environmental Protection Agency (USEPA), U.S. Bureau of Reclamation (BOR), Colorado Department of Public Health and Environment (CDPHE), Pine River Irrigation District, Southern Ute Tribe, San Juan Basin Health Department, and San Juan Resource Conservation and Development, collected water-quality samples from Vallecito Reservoir, its two major inflows, and its outflow between August 1999 and November 2002 at about monthly intervals from April through November. This report documents the (1) sampling sites and times of sample collection, (2) sample-collection methods, (3) laboratory analytical methods, and (4) responsibilities of each agency/group involved in the project. The report also provides the environmental and quality-control data collected during the project and provides an interpretation of the quality-control data (field blanks and field duplicates) to assess the quality of the environmental data.

The study was initiated due to concern the Pine River Watershed Stakeholders Group expressed about the potential effects population growth and development within the Vallecito Reservoir watershed might have on the water quality of Vallecito Reservoir, its two major inflows (Vallecito Creek and Los Piños River), and Los Piños River downstream from the reservoir. To address this issue, the stakeholders envisioned a long-term water-quality monitoring project of the study area and initiated water-quality sampling in August 1999. The overall objectives of the water-quality monitoring are to (1) characterize the current water quality of the study area and (2) periodically monitor the water quality of the study area over time to document trends in water quality and the causes for the trends if they occur.

The water-quality samples were analyzed for total and dissolved metals (aluminum, arsenic, cadmium, copper, chromium, iron, lead, manganese, mercury, nickel, silver, and zinc), dissolved major ions (calcium, magnesium, sodium, potassium, chloride, bicarbonate, and sulfate), dissolved silica, dissolved organic carbon, ultraviolet absorbance at 254 and 280 nanometers, nutrients (total organic nitrogen, dissolved organic nitrogen, dissolved ammonia, dissolved nitrate, total phosphorus, dissolved phosphorus, and orthophosphorus), chlorophyll-*a* (reservoir only), and suspended sediment (inflows to the reservoir only). Measurements of field properties (pH, specific conductance, water temperature, and dissolved oxygen) also were made at each sampling site each time a water-quality sample was collected.

An assessment of the field-blank data collected from Vallecito Reservoir showed that all constituents were either below or slightly above the detection limit in all field blanks. The only exceptions were one total nickel and one total zinc field blank in which the measured concentration of these two

constituents were well above the detection limit. Thus, it was concluded with 88–94 percent confidence (depending on the number of field blanks) that potential contamination is no greater than the detection limit for each of these constituents in at least 60–75 percent of all samples. However, since the concentration of all constituents in the environmental samples is close to the detection limit and the range of samples that could be affected by contamination is 25–40 percent, some effects from contamination cannot be ruled out. The environmental concentrations of total iron and total manganese, however, are usually at least 10 times greater than the detection limit. It is unlikely that contamination as great as 4 mg/L in 25 percent of all samples (total iron) and as great as 0.4 mg/L in 25 percent of all samples (total manganese) will affect the interpretation of the total iron and manganese concentrations in the environmental samples. The amount of potential contamination for total nickel and total zinc exceeds the concentration of these constituents in most of the environmental samples so that contamination probably has compromised the interpretation of the environmental data for these two constituents.

An assessment of the field blank data collected from Vallecito Creek and Los Piños River showed that all constituents were below the detection limit in all field blanks except for one aluminum field blank and one boron field blank. Therefore, except for aluminum and boron, for constituents analyzed in three field blanks, there is 88 percent confidence that contamination is no greater than the detection limit in at least 50 percent of all samples. For constituents analyzed in four field blanks, there is 94 percent confidence that contamination is no greater than the detection limit in at least 50 percent of all samples. However, since the concentration of all constituents in the environmental samples is close to the detection limit and the amount of samples that could be affected by contamination is 50 percent, some effects from contamination cannot be ruled out. The environmental concentration of dissolved manganese in Vallecito Creek near Bayfield, Colo., and Los Piños River above Vallecito Reservoir near Bayfield, Colo., is usually at least 10 times greater than the detection limit. It is unlikely that contamination as great as 0.1 mg/L in 50 percent of all samples will affect the interpretation of the dissolved manganese concentrations in the environmental samples.

The analysis of the field blank data has shown that, except for total nickel and total zinc in samples collected from the Vallecito Reservoir South sampling site, there is no cause for concern about contamination; but these data are limited, so there is some uncertainty (particularly for the stream samples). Therefore, the environmental data collected from all sampling sites (Vallecito Reservoir and the three stream sites) can be considered comparable.

Variability present in the environmental data was estimated by calculating a 95 percent confidence interval about a single sample for each constituent and the minimum difference between any two samples that can be considered significant. The calculation of the minimum difference between any two samples that can be considered significant indicates that, for both the nutrient and metal constituents, the differences in concentration among the sampling sites and over time at a given sampling site (that can be detected) is small. For example, for the nutrient constituents the minimum concentration difference that can be considered significant ranges from 1 µg/L to 32 µg/L, except for total ammonia + organic nitrogen in the reservoir (minimum difference of 0.186 mg/L) and DOC in the reservoir (minimum difference of 0.4 mg/L). For the total and dissolved metal constituents there were only sufficient data to perform this calculation for the Vallecito Reservoir South sampling site. At this site, the minimum concentration difference that can be considered significant is small as well and ranges from 0.3 to 7.9 µg/L, depending on the metal and whether it is expressed as a total or dissolved analysis.

The CDPHE did not collect field blanks from Vallecito Creek near mouth and Los Piños River above Vallecito Reservoir but did collect a few field replicates from these sampling sites. The minimum concentration difference that can be considered significant for the CDPHE sampling sites is small (4 µg/L for total Fe, 2 µg/L for dissolved Fe, 5 µg/L as N for NO_3 + NO_2, 29 µg/L as P for total phosphorus, and less than 1 mg/L for sulfate) but it was not possible to determine if contamination has any effect on the interpretation of the environmental data collected from these sites.

An analysis of the quality-control data for the Hydrolab showed that, on average, the Hydrolab underestimated pH by 0.47 pH units, and there was no bias in the measurement of specific conductance. The documentation of sampling dates, locations, field methods, and laboratory methods described in this report and the analysis of the field blank and field duplicate data allow the water-quality data collected during 1999–2002 to serve as a baseline data set against which future changes in water quality can be assessed.

Acknowledgments

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Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End						
05/19/00	10:36	0	87	7.9	10.7	9.3
05/19/00	10:37	5	84	7.9	10.6	9.7
05/19/00	10:39	10	84	7.9	10.4	9.4
05/19/00	10:40	15	84	7.8	10.2	9.1
05/19/00	10:41	20	84	7.8	10.1	9.2
05/19/00	10:43	30	83	7.8	10	9.1
05/19/00	10:44	40	84	7.7	9.6	8.6
05/19/00	10:45	50	84	7.7	9.2	8.6
05/19/00	10:46	60	86	7.5	8.5	8.8
05/19/00	10:47	70	87	7.5	8	8.6
05/19/00	10:49	80	88	7.4	7.8	8.9
05/19/00	10:50	85	88	7.4	7.7	9.4
06/06/00	10:00	2	84	8.3	16	8.25
06/06/00	9:32	5	78	8.3	15.8	8.3
06/06/00	9:34	10	77	8.3	15.7	8.2
06/06/00	9:36	15	77	8.3	15.6	8.3
06/06/00	9:38	20	77	8.3	15.5	8.2
06/06/00	10:15	25	76	7.5	11.3	7.9
06/06/00	9:40	30	75	7.4	10.4	7.8
06/06/00	9:41	35	75	7.4	9.9	7.7
06/06/00	9:42	40	74	7.3	9.7	7.6
06/06/00	9:43	50	78	7.2	9.2	7.5
06/06/00	9:45	60	78	7.2	9	7.3
06/06/00	9:46	70	78	7.2	8.9	7.2
06/06/00	9:47	80	79	7.2	8.9	7.2
06/06/00	9:48	90	79	7.2	8.8	7.2
06/06/00	10:30	100	81	7.1	8.6	7
06/20/00	10:00	0	87	8.2	17.2	8.5
06/20/00	10:01	5	87	8.4	17.2	8.6
06/20/00	10:02	10	87	8.4	17	8.7
06/20/00	10:03	15	87	8.4	16.9	8.8
06/20/00	10:04	20	85	8.2	15.8	8.8
06/20/00	10:05	25	84	8.1	15.4	8.8
06/20/00	10:06	30	82	7.6	13.9	8.7
06/20/00	10:07	35	84	7.2	11.2	8.1
06/20/00	10:08	40	85	7.1	10.8	7.5
06/20/00	10:09	45	85	7	10.6	7.5
06/20/00	10:10	50	86	6.9	10.2	7.2
06/20/00	10:11	60	87	6.9	9.9	7
06/20/00	10:12	70	87	6.9	9.8	7
07/11/00	9:30	0	86	7.8	19.7	7
07/11/00	9:31	5	84	7.8	19.5	7.1
07/11/00	9:32	10	83	7.7	19.4	7.1
07/11/00	9:33	15	83	7.7	19.4	7.2
07/11/00	9:34	20	82	7.5	18.9	7.2
07/11/00	10:00	25	82	7.3	18.5	7.2
07/11/00	9:36	30	80	7	16.5	6.9
07/11/00	9:37	35	79	6.7	14.7	6.4
07/11/00	9:38	45	79	6.4	11.6	5.5
07/11/00	9:39	55	79	6.3	10.7	5.4
07/11/00	9:40	65	80	6.3	10.2	5.2
07/11/00	9:41	75	80	6.3	9.9	5.1
07/11/00	10:30	78	81	6.3	9.8	4.9

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End—Continued						
07/25/00	9:58	2	80	8	20	7.3
07/25/00	10:00	5	80	8	19.9	7.4
07/25/00	10:01	10	80	7.9	19.8	7.5
07/25/00	10:02	15	80	7.8	19.8	7.4
07/25/00	10:03	20	80	7.7	19.8	7.4
07/25/00	10:04	25	80	7.9	19.7	7.3
07/25/00	10:05	30	78	7.4	18.4	6.8
07/25/00	10:06	32	78	7.2	17.3	6.3
07/25/00	10:07	35	77	7.1	16.8	6.2
07/25/00	10:08	45	75	6.9	14.2	5.3
07/25/00	10:09	55	75	6.8	12.2	5
07/25/00	10:10	65	76	6.7	10.8	4.7
07/25/00	10:12	75	77	6.7	10	4.1
07/25/00	10:15	80	78	6.8	9.8	3.8
08/08/00	9:30	2	80	7.8	20.1	7.8
08/08/00	9:32	5	81	7.8	20	7.9
08/08/00	9:33	10	81	7.8	19.8	7.8
08/08/00	9:34	15	81	7.8	19.7	8
08/08/00	9:35	20	82	7.8	19.6	7.9
08/08/00	9:37	25	82	7.7	19.6	7.8
08/08/00	9:38	30	82	7.5	19.4	7.5
08/08/00	9:40	35	82	7.2	19	7
08/08/00	9:41	40	82	6.8	18	5.8
08/08/00	9:42	45	80	6.6	16.4	4.8
08/08/00	9:43	55	77	6.4	12.9	3.7
08/08/00	9:44	65	77	6.4	10.6	3.6
08/08/00	9:45	71	78	6.7	10.1	2.7
08/22/00	9:30	2	84	6.9	19.5	7.2
08/22/00	9:32	5	84	7.1	19.5	7.2
08/22/00	9:33	10	84	7.2	19.5	7.3
08/22/00	9:34	15	84	7.2	19.5	7.3
08/22/00	9:35	20	84	7.2	19.5	7.4
08/22/00	9:36	25	85	7.2	19.5	7.4
08/22/00	9:37	30	84	7.2	19.4	7.3
08/22/00	9:39	35	84	7.2	19.4	7.3
08/22/00	9:41	40	86	6.8	19.2	8.4
08/22/00	10:00	43	86	6.6	18.5	5.1
08/22/00	9:46	45	84	6.5	18	4.6
08/22/00	9:47	50	80	6.3	14	2.9
08/22/00	9:48	55	78	6.3	12	2.6
08/22/00	9:49	60	77	6.2	11	2.4
08/22/00	10:15	70	82	6.2	9.7	0.7
09/02/00	10:00	0	91	7.2	17.6	6.9
09/02/00	10:01	5.5	91	7.3	17.4	6.8
09/02/00	10:02	10	91	7.3	17.4	6.8
09/02/00	10:03	15	91	7.2	17.3	6.8
09/02/00	10:04	20	91	7.2	17.3	6.6
09/02/00	10:05	25	92	7.2	17.2	6.6
09/02/00	10:06	30	91	7.1	17.1	6.5
09/02/00	10:07	35	91	7.1	17	6.5
09/02/00	10:08	40	91	7	16.8	6.2
09/02/00	10:09	45	90	6.8	16.4	5.4
09/02/00	10:10	50	86	6.4	13.4	2.2

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End—Continued						
09/02/00	10:11	55	85	6.3	10.8	0.9
09/02/00	10:12	60	87	6.4	10.1	0.3
09/28/00	10:00	0.1	97	7.1	14.8	6.3
09/28/00	10:01	5	97	7.1	14.8	6.3
09/28/00	10:02	10	97	7.1	14.8	6.3
09/28/00	10:03	15	97	7.1	14.8	6.2
09/28/00	10:04	20	97	7.1	14.8	6.2
09/28/00	10:05	25	97	7	14.8	6.2
09/28/00	10:06	30	96	7	14.8	6
09/28/00	10:07	35	97	6.8	14.5	5.5
09/28/00	10:08	40	97	6.8	14.2	5.4
09/28/00	10:09	45	94	6.4	13.5	3.6
09/28/00	10:10	50	91	6.2	11.6	0.9
05/17/01	10:01	2	83	8.3	12.7	8.6
05/17/01	10:00	10	81	8.2	12.0	8.7
05/17/01	9:59	20	80	7.9	10.0	8.5
05/17/01	9:58	30	79	7.7	8.2	8.5
05/17/01	9:57	40	84	7.6	7.2	8.5
05/17/01	9:56	50	84	7.5	6.9	8.4
05/17/01	9:55	60	87	7.4	6.6	8.1
05/17/01	9:48	70.4	89	7.4	6.2	7.8
05/30/01	9:55	2.1	72	8.1	12.6	8
05/30/01	9:54	7	71	8.1	12.4	8.1
05/30/01	9:52	11.8	72	8.1	12.3	8.1
05/30/01	9:50	17	72	8	12.1	8
05/30/01	9:49	22	72	7.7	10.8	7.9
05/30/01	9:47	27.6	72	7.6	9.6	7.9
05/30/01	9:45	32.7	67	7.5	8.8	8
05/30/01	9:42	42	69	7.5	8.3	7.9
05/30/01	9:40	46.8	72	7.4	8.1	7.8
05/30/01	9:38	52.2	74	7.4	7.7	7.8
05/30/01	9:36	57.1	75	7.4	7.7	7.8
05/30/01	9:35	62.1	76	7.3	7.6	7.3
05/30/01	9:33	66.7	76	7.3	7.5	7.7
05/30/01	9:32	72.5	76	7.3	7.4	7.8
05/30/01	9:31	78	80	7.3	7.3	7.9
05/30/01	9:25	83.9	81	7.3	7.1	8.4
06/01/01	9:46	10	65	7.9	13.1	8.1
06/01/01	9:47	15	64	7.9	12.8	8.1
06/01/01	9:48	20	64	7.8	12.6	8.1
06/01/01	9:49	25	64	7.8	12.4	8.1
06/01/01	9:50	30	64	7.8	12.1	8.1
06/01/01	9:55	35	63	7.7	11.3	8.1
06/01/01	9:56	40	63	7.7	11.1	8
06/01/01	9:58	50	65	7.6	9.7	7.9
06/01/01	9:59	55	66	7.5	9.7	7.8
06/01/01	10:00	60	66	7.5	9.5	7.7
06/01/01	10:01	65	68	7.5	9.2	7.7
06/01/01	10:02	70	68	7.5	9	7.5
06/01/01	10:03	75	68	7.5	9	7.5
06/01/01	10:04	80	68	7.5	8.8	7.5
06/01/01	10:06	90	70	7.4	8.6	7.3
06/14/01	9:15	2	64	7.8	13.4	7.8

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End—Continued						
06/14/01	9:45	0.9	64	7.9	13.4	7.8
06/14/01	9:46	10	65	7.9	13.1	8.1
06/14/01	9:47	15	64	7.9	12.8	8.1
06/14/01	9:48	20	64	7.8	12.6	8.1
06/14/01	9:49	25	64	7.8	12.4	8.1
06/14/01	9:50	30	64	7.8	12.1	8.1
06/14/01	9:55	35	63	7.7	11.3	8.1
06/14/01	9:56	40	63	7.7	11.1	8.0
06/14/01	9:57	45	64	7.6	10.3	8.0
06/14/01	9:58	50	65	7.6	9.7	7.9
06/14/01	9:59	55	66	7.5	9.7	7.8
06/14/01	10:00	60	66	7.5	9.5	7.7
06/14/01	10:01	65	68	7.5	9.2	7.7
06/14/01	10:02	70	68	7.5	9.0	7.5
06/14/01	10:03	75	68	7.5	9.0	7.5
06/14/01	10:04	80	68	7.5	8.8	7.5
06/14/01	10:05	85	70	7.5	8.6	7.3
06/14/01	10:06	90	70	7.4	8.6	7.3
06/27/01	9:56	0.6	64	8.3	17.8	7.4
06/27/01	9:55	5.1	65	8.3	17.5	7.5
06/27/01	9:54	10	64	8.3	17.3	7.5
06/27/01	9:53	15	64	8.3	17.2	7.6
06/27/01	9:52	20.1	63	8	15.9	7.6
06/27/01	9:51	25	61	7.5	13.7	7.2
06/27/01	9:50	30.2	60	7.4	12.3	7.1
06/27/01	9:49	35.2	60	7.3	35.2	7
06/27/01	9:48	40.2	61	7.3	11	7
06/27/01	9:47	45.3	62	7.3	10.5	7
06/27/01	9:46	50	62	7.2	10.3	7
06/27/01	9:45	54.9	63	7.2	10.2	7
06/27/01	9:44	59.9	64	8.2	9.9	6.9
06/27/01	9:43	65.1	63	7.2	9.8	6.8
06/27/01	9:42	70.2	64	7.2	9.8	6.8
06/27/01	9:41	75.1	64	7.2	9.7	6.9
06/27/01	9:40	80	64	7.2	9.6	6.9
06/27/01	9:39	84.9	64	7.2	9.5	6.7
06/27/01	9:38	90.2	64	7.2	9.4	6.7
06/27/01	9:36	95.3	64	7.1	9.4	6.6
06/27/01	9:35	99.9	65	7.1	9.4	6.6
07/17/01	9:30	2	67	8.2	19.3	7.0
07/17/01	9:38	5	67	8.2	19.3	7.0
07/17/01	9:37	10	67	8.2	19.2	6.9
07/17/01	9:36	15	67	8.1	19.2	6.9
07/17/01	9:35	19.9	67	8.1	19.1	6.9
07/17/01	9:34	25	65	7.6	16.9	7.1
07/17/01	9:33	29.9	62	7.3	14.5	6.7
07/17/01	9:32	35	62	7.1	13.1	6.1
07/17/01	9:31	40	62	7.1	12.5	5.8
07/17/01	9:30	45	63	7.1	11.6	5.7
07/17/01	9:29	50	64	7.0	11.1	5.8
07/17/01	9:28	55	64	7.0	10.8	5.6
07/17/01	9:27	60	64	7.0	10.8	5.6
07/17/01	9:26	65.1	65	7.0	10.7	5.7
07/17/01	9:25	70.1	65	7.0	10.7	5.7

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End—Continued						
07/17/01	9:24	75	65	7.0	10.5	5.8
07/17/01	9:23	80	66	7.0	10.3	5.7
07/17/01	9:22	85	66	7.0	10.1	5.7
07/17/01	9:21	90	67	-	9.9	5.4
07/17/01	9:20	90.5	66	7.1	10.0	6.2
07/31/01	9:25	5.1	68	8.5	20.0	7
07/31/01	9:26	10	68	8.5	19.9	7.2
07/31/01	9:27	14.9	68	8.4	19.9	7.2
07/31/01	9:28	20.1	69	8.4	19.8	7.3
07/31/01	9:29	25	69	8	18.6	7.5
07/31/01	9:30	29.9	67	7.7	17.3	7.4
07/31/01	9:31	34.9	64	7.4	15.1	7
07/31/01	9:32	40.4	64	7.2	14.0	6.2
07/31/01	9:33	45.3	63	7.1	13.2	5.9
07/31/01	9:34	49.6	64	7	12.8	5.6
07/31/01	9:35	54.9	64	7	11.7	5.6
07/31/01	9:36	59.7	64	7	11.2	5.5
07/31/01	9:37	65.3	64	7	11.0	5.5
07/31/01	9:38	70.1	64	7	10.7	5.3
07/31/01	9:39	75.3	66	6.9	10.5	4.8
07/31/01	9:40	80.1	65	6.9	10.3	4.8
07/31/01	9:41	85.1	66	6.9	10.1	4.2
08/16/01	9:22	5	68	8.4	19.4	6.9
08/16/01	9:23	10	68	8.5	19.3	6.9
08/16/01	9:24	15	68	8.5	19.3	6.9
08/16/01	9:25	20	68	8.6	19.3	6.9
08/16/01	9:26	25	68	8.6	19.2	6.9
08/16/01	9:27	30	67	7.5	17.4	6.5
08/16/01	9:28	35	67	7.1	16.5	6.2
08/16/01	9:30	40	65	7.3	15.9	5.6
08/16/01	9:31	45	65	7.2	15.5	5.5
08/16/01	9:32	49.9	65	7.2	15	5.2
08/16/01	9:33	55	64	7.1	14.2	4.7
08/16/01	9:34	60	64	7.0	12.9	4.5
08/16/01	9:35	65	64	7.0	12.1	4.4
08/16/01	9:36	70	64	6.9	11.6	4.3
08/16/01	9:37	75	64	6.9	11.2	4.1
08/16/01	9:38	80	64	6.9	10.8	4.1
08/16/01	9:39	85	66	6.8	10.3	8.4
08/16/01	9:48	88	66	6.8	10.1	2.8
08/17/01	9:38	5	67	8.2	19.3	7
08/17/01	9:37	10	67	8.2	19.2	7
08/17/01	9:36	15	67	8.1	19.2	7
08/17/01	9:35	19.9	67	8.1	19.1	6.9
08/17/01	9:34	25	65	7.6	16.9	7.1
08/17/01	9:33	29.9	62	7.3	14.5	6.7
08/17/01	9:32	35	62	7.1	13.1	6.1
08/17/01	9:30	45	63	7.1	11.6	5.7
08/17/01	9:29	50	64	7.0	11.1	5.8
08/17/01	9:28	55	64	7.0	10.8	5.6
08/17/01	9:27	60	64	7.0	10.8	5.5
08/17/01	9:26	65.1	65	7.0	10.7	5.7
08/17/01	9:25	70.1	65	7.0	10.7	5.7

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End—Continued						
08/17/01	9:24	75	65	7.0	10.5	5.8
08/17/01	9:23	80	66	7.0	10.3	5.7
08/17/01	9:22	85	66	7.0	10.1	5.7
08/29/01	9:22	8	70	8.1	18.4	6.7
08/29/01	9:23	10	70	8.2	18.4	6.7
08/29/01	9:24	15	70	8.2	18.3	7.1
08/29/01	9:25	20	70	8.2	18.3	7.1
08/29/01	9:26	25	70	8.2	18.3	6.9
08/29/01	9:27	30	69	8.2	18.3	6.9
08/29/01	9:28	35	68	7.6	16.6	6.4
08/29/01	9:29	40	68	7.4	16.1	6.1
08/29/01	9:30	45	67	7.2	15.5	5.7
08/29/01	9:31	50	66	7.1	15.1	5.3
08/29/01	9:32	55	66	7.1	14.9	5
08/29/01	9:33	60	66	7	14.4	4.5
08/29/01	9:34	65	66	6.9	13.6	4.2
08/29/01	9:35	70	65	6.9	12.7	3.9
08/29/01	9:36	75	65	6.8	11.2	3.3
08/29/01	9:37	80	66	6.7	10.7	2.8
10/17/01	10:00	2	68	8	12.2	7.2
10/17/01	9:31	5	71	7.9	12.2	7.1
10/17/01	9:32	10	68	7.8	12.2	7
10/17/01	9:33	15	67	7.8	12.2	7
10/17/01	9:34	20	68	7.8	12.2	7
10/17/01	9:35	25	68	7.8	12.2	6.9
10/17/01	9:36	30	68	7.8	12.2	6.9
10/17/01	10:10	35	68	7.8	12.2	6.9
10/17/01	9:38	40	68	7.8	12.2	7.4
10/17/01	9:39	45	68	7.8	12.2	9.4
10/17/01	9:40	50	68	7.7	12.2	7.7
10/17/01	9:41	55	68	7.7	12.1	6.8
10/17/01	9:42	60	68	7.6	12.1	6.5
10/17/01	9:43	65	70	7.5	11.9	5.9
05/22/02	9:00	2	87	7.9	12.4	7.2
05/22/02	9:55	5	87	7.8	12.4	7.2
05/22/02	9:54	10	88	7.8	12.3	7.2
05/22/02	9:53	15	88	7.7	12.2	7.1
05/22/02	9:52	20	88	7.7	12.0	7.1
05/22/02	9:51	25	88	7.7	11.9	7.1
05/22/02	9:50	30	88	7.7	11.8	7.0
05/22/02	9:49	35	89	7.6	11.8	7.0
05/22/02	9:48	40	88	7.6	11.5	6.9
05/22/02	9:47	45	89	7.5	11.3	6.9
05/22/02	9:46	50	89	7.4	10.7	6.9
05/22/02	9:45	55	89	7.3	10.6	6.8
05/22/02	9:44	60	89	7.3	10.4	6.7
05/22/02	9:20	65	89	7.3	10.2	6.6
05/22/02	9:43	67.5	89	7.2	10.0	6.7
06/05/02	9:20	1	92	7.2	15.3	6.7
06/05/02	9:21	5	92	7.2	15.1	6.7
06/05/02	9:22	10	92	7.2	15.0	6.6
06/05/02	9:23	15	92	7.2	15.0	6.6
06/05/02	9:24	20	92	7.2	15.0	6.6

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at South End—Continued						
06/05/02	9:25	25	92	7.2	14.9	6.5
06/05/02	9:26	30	91	6.9	12.9	6.6
06/05/02	9:27	35	92	6.8	12.5	6.5
06/05/02	9:28	40	92	6.7	12.4	6.4
06/05/02	9:29	45	92	6.6	12.2	6.2
06/05/02	9:30	50	92	6.5	11.8	6.0
06/05/02	9:31	55	92	6.3	11.5	5.8
06/05/02	9:32	60	92	6.3	11.4	5.6
08/29/02	10:30	5	122	8.8	17.6	6.2
08/29/02	10:31	10	123	8.9	17.6	6.1
08/29/02	10:32	15	122	9	17.6	6
08/29/02	10:33	20	122	9.2	17.5	6.1
08/29/02	10:34	25	122	9.3	17.5	6.1
08/29/02	10:35	30	122	9.4	17.4	5.5
09/19/02	9:30	0.1	136	7.3	15.2	6.1
09/19/02	9:31	5	134	7.3	15.1	6
09/19/02	9:32	10	135	7.4	15.1	6
09/19/02	9:33	15	134	7.4	15.1	5.7
09/19/02	9:34	20	134	7.4	15	5.7
09/19/02	9:35	25	134	7.4	15.1	5.7
09/19/02	9:36	30	134	7.4	15.1	5.7
09/19/02	9:37	35	124	7.2	14.8	5
09/19/02	9:03	40	123	7.1	14.4	4.5
09/19/02	9:39	43	122	7	14.3	3.9
Vallecito Reservoir at Center						
05/19/00	10:09	2	89	7.8	11.2	9
05/19/00	10:10	5	84	7.9	10.9	9.2
05/19/00	10:11	10	82	7.9	10.8	8.8
05/19/00	10:13	15	82	7.8	10.6	8.8
05/19/00	10:15	20	82	7.8	10.4	8.8
05/19/00	10:16	30	84	7.7	9.6	8.6
05/19/00	10:18	40	85	7.6	8.6	8.5
05/19/00	10:19	50	83	7.5	8.1	8.5
05/19/00	10:20	55	83	7.5	8	8.5
06/06/00	10:30	0	76	8.5	16.5	8.6
06/06/00	10:32	5	75	8.2	16.2	8.7
06/06/00	10:33	10	75	8.4	15.9	8.6
06/06/00	10:34	15	75	8.3	15.3	8.4
06/06/00	10:35	20	77	8	13.2	8.3
06/06/00	10:36	50	76	7.6	11.5	8.2
06/06/00	10:37	30	70	7.5	10.6	8.2
06/06/00	10:38	40	76	7.3	9.4	7.8
06/06/00	10:40	50	75	7.2	9.4	7.6
06/20/00	10:30	0	88	8.3	17.2	8.3
06/20/00	10:31	5	87	8.3	17.6	8.3
06/20/00	10:32	10	87	8.4	17.6	8.5
06/20/00	10:33	15	87	8.4	17.5	8.5
06/20/00	10:34	20	87	8.4	17.4	8.5
06/20/00	10:35	25	82	7.6	14.3	8.3
06/20/00	10:36	30	82	7.3	13.1	8.3
06/20/00	10:37	35	82	7.2	12.1	7.6
06/20/00	10:38	40	84	7	11	7.4
06/20/00	10:39	50	86	6.9	10.2	6.9

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at Center—Continued						
07/11/00	10:20	0	83	7.8	20.7	7.1
07/11/00	10:21	5	82	7.8	20.1	7.1
07/11/00	10:22	10	82	7.8	19.8	7.1
07/11/00	10:23	15	82	7.6	19.5	7.2
07/11/00	10:24	20	81	7.4	18.6	7.2
07/11/00	10:25	25	79	6.8	16.9	7
07/11/00	10:26	30	79	6.7	16.2	6.9
07/11/00	10:27	35	77	6.6	14.4	6.5
07/11/00	10:28	45	78	6.5	11.8	5.7
07/11/00	10:29	55	79	6.4	10.9	5.4
07/11/00	10:30	60	79	6.3	10.4	5.2
07/25/00	10:31	2	80	8	19.9	7.4
07/25/00	10:32	5	80	8	19.8	7.4
07/25/00	10:33	10	80	7.9	7.9	7.4
07/25/00	10:34	15	80	7.8	19.7	7.3
07/25/00	10:35	20	80	7.7	19.6	7.2
07/25/00	10:36	25	80	7.6	19.6	7.2
07/25/00	10:37	30	78	6.9	17.2	6.3
07/25/00	10:40	32	79	6.8	17	6
07/25/00	10:41	40	76	6.5	15	5.4
07/25/00	10:44	50	76	6.4	13.2	5
08/08/00	14:15	2	82	7.8	20.4	7.9
08/08/00	14:17	5	82	7.8	20.3	7.7
08/08/00	14:18	10	82	7.8	19.7	7.7
08/08/00	14:19	15	82	7.8	19.7	7.7
08/08/00	14:20	20	82	7.7	19.6	7.7
08/08/00	14:21	25	82	7.5	19.4	7.4
08/08/00	14:22	30	82	7.3	19	7.1
08/08/00	14:23	35	82	7.1	18.7	6.5
08/08/00	14:25	40	83	6.9	18.2	6
08/08/00	14:26	42	83	6.9	17.9	5.7
08/22/00	10:20	2	86	7.4	19.6	7.3
08/22/00	10:21	5	86	7.4	19.6	7.3
08/22/00	10:22	10	85	7.3	19.5	7.2
08/22/00	10:23	15	86	7.3	19.5	7.3
08/22/00	10:24	20	85	7.3	19.5	7.2
08/22/00	10:25	25	85	7.3	19.4	7.2
08/22/00	10:26	30	85	7.2	19.4	7
08/22/00	10:27	35	87	7	19.1	6.6
08/22/00	10:28	38	87	6.8	6.8	5.4
09/02/00	10:30	1.4	92	7.3	17.7	7.3
09/02/00	10:31	5	92	7.3	17.5	7.1
09/02/00	10:32	10	91	7.4	17.4	7
09/02/00	10:33	15	91	7.4	17.4	7.1
09/02/00	10:34	20	92	7.3	17.3	7
09/02/00	10:35	25	92	7.3	17.3	7
09/02/00	10:36	30	92	7.2	17.1	6.7
09/02/00	10:37	32	92	7.1	17	6.4
09/28/00	10:30	0.1	97	7.2	14.6	7
09/28/00	10:31	5	97	7.2	14.6	7
09/28/00	10:32	10	98	7.2	14.6	7.1
09/28/00	10:33	15	98	7.2	14.6	7
09/28/00	10:34	21	98	7.1	14.2	7

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at Center—Continued						
02/01/01	12:04	2.7	65	7.9	13.8	7.8
02/01/01	12:05	10	65	7.9	13.6	7.8
02/01/01	12:06	15	65	7.9	13.4	7.8
02/01/01	12:07	20	65	7.8	13.1	7.8
02/01/01	12:08	25	64	7.8	12.8	7.8
02/01/01	12:09	30	64	7.7	10.6	7.9
02/01/01	12:10	35	64	7.6	10.5	7.8
02/01/01	12:11	40	64	7.6	10.5	7.7
02/01/01	12:12	45	64	7.6	10.4	7.7
02/01/01	12:13	50	66	7.5	9.7	7.6
02/01/01	12:14	55	66	7.5	9.6	7.4
02/01/01	12:15	65	67	7.5	9.2	7.4
02/01/01	12:16	65	67	7.5	9.2	7.4
05/30/01	9:55	68	75	7.4	7.6	8.3
05/30/01	9:57	61.7	75	7.4	7.6	8
05/30/01	9:59	66.9	74	7.4	7.7	7.8
05/30/01	10:00	52	73	7.4	7.8	7.8
05/30/01	10:01	46.7	72	7.4	8	7.8
05/30/01	10:02	41.5	73	7.4	8	7.8
05/30/01	10:03	36.7	72	7.5	8.2	7.7
05/30/01	10:04	31.9	70	7.5	8.4	7.7
05/30/01	10:05	27.1	69	7.5	8.7	7.8
05/30/01	10:06	22.5	70	7.7	10.8	7.7
05/30/01	10:07	17.3	68	7.8	11.2	7.8
05/30/01	10:08	12.3	69	7.9	11.7	7.8
05/30/01	10:09	7	71	8.1	12.4	8.1
05/30/01	10:10	2.1	71	8.1	12.8	8
06/27/01	10:14	70	64	7.2	10	7.5
06/27/01	10:15	65.2	64	7.2	10	7.2
06/27/01	10:16	60.1	64	7.2	10.1	7.1
06/27/01	10:17	55	63	7.2	10.1	7
06/27/01	10:18	50.2	63	7.2	10.2	6.9
06/27/01	10:19	45	63	7.2	10.3	7
06/27/01	10:20	40.1	62	7.2	10.7	7
06/27/01	10:21	34.9	62	7.3	11	7
06/27/01	10:22	30.1	58	7.3	11.9	7
06/27/01	10:23	25.2	60	7.4	12.8	7
06/27/01	10:24	20.1	62	7.8	15	7.3
06/27/01	10:25	15	65	8.2	16.8	7.4
06/27/01	10:26	9.9	64	8.2	16.9	7.5
06/27/01	10:27	5.1	64	8.2	17.2	7.4
06/27/01	10:31	0.1	64	8.3	17.9	7.5
07/17/01	10:30	64	66	7.2	10.7	5.9
07/17/01	10:31	55	64	7.1	11.3	5.8
07/17/01	10:32	50	64	7.1	11.6	5.9
07/17/01	10:33	45	64	7	12	5.8
07/17/01	10:34	40	63	7	12.4	5.9
07/17/01	10:35	35	62	7.1	13.5	6.2
07/17/01	10:36	30	63	7.3	14.8	6.7
07/17/01	10:37	25	63	7.4	15.9	7
07/17/01	10:38	20	65	7.7	17.2	7.1
07/17/01	10:39	15	67	8	19.3	6.9
07/17/01	10:40	10	68	8.1	19.5	6.9

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at Center—Continued						
07/17/01	10:41	5	68	8.1	19.6	6.9
07/17/01	10:42	2	68	8.1	19.6	6.9
07/31/01	9:57	5	68	8.4	20.6	6.7
07/31/01	10:00	20.3	68	8.4	20.3	6.7
07/31/01	10:02	14.9	68	8.4	20.2	6.7
07/31/01	10:03	20.4	68	8.2	19.2	6.8
07/31/01	10:05	25.1	68	7.8	17.6	6.8
07/31/01	10:07	30.1	66	7.6	16.9	6.6
07/31/01	10:08	35	64	7.4	15.2	6.2
07/31/01	10:09	39.9	64	7.2	13.9	5.6
07/31/01	10:10	44.8	64	7.1	13.1	5.2
07/31/01	10:11	50	64	7.1	12.3	5
07/31/01	10:12	55.1	64	7.1	12	4.9
07/31/01	10:13	59.9	64	7	11.9	4.8
07/31/01	10:14	65	64	7	11.3	4.8
08/16/01	10:10	5	68	8.3	19.2	6.8
08/16/01	10:11	10	68	8.4	19.1	6.8
08/16/01	10:12	15	67	8.2	18.7	6.8
08/16/01	10:13	20	67	7.7	17.8	6.6
08/16/01	10:14	25	66	7.5	17.2	6.4
08/16/01	10:15	30	66	7.4	16.7	6.2
08/16/01	10:16	35	66	7.3	16.3	5.8
08/16/01	10:17	40	66	7.2	15.9	5.6
08/16/01	10:18	45	64	7.2	14.9	5.4
08/16/01	10:19	50	65	7.1	14.5	4.9
08/16/01	10:20	55	65	7	14	4.5
08/16/01	10:21	60	66	7	13.1	4.1
08/29/01	9:55	5	69	8	18.3	7
08/29/01	9:56	20	69	8	18.3	7.1
08/29/01	9:57	15	69	8.1	18.3	7.2
08/29/01	9:58	20	70	8.1	18.3	7.2
08/29/01	9:59	25	70	8.1	14.2	7
08/29/01	10:00	30	69	8.1	18.2	6.9
08/29/01	10:01	35	68	7.6	16.6	6.4
08/29/01	10:02	40	68	7.3	16.2	6
08/29/01	10:03	45	68	7.2	15.9	5.8
08/29/01	10:04	50	68	7.2	15.5	5.5
08/29/01	10:05	55	67	7.1	14.8	5.1
08/29/01	10:06	60	67	7	14.3	4.6
10/17/01	10:12	2	69	8	12.2	7.8
10/17/01	10:13	5	69	8	12.2	7.4
10/17/01	10:14	10	69	8	12.2	7.3
10/17/01	10:15	15	68	7.9	12.1	7.2
10/17/01	10:16	20	69	7.9	12.1	7.2
10/17/01	10:17	25	69	7.9	12.1	7.2
10/17/01	10:18	30	69	7.9	12.1	7.1
10/17/01	10:19	35	68	7.9	12.1	7.2
05/22/02	11:00	38	90	7.5	10.8	6.9
05/22/02	11:01	35	90	7.5	11	6.8
05/22/02	11:02	30	89	7.6	11.7	6.9
05/22/02	11:03	25	89	7.7	12.1	6.9
05/22/02	11:04	25	89	7.7	12.1	6.9
05/22/02	11:05	15	88	7.8	12.8	7

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at Center—Continued						
05/22/02	11:06	10	88	7.8	12.9	7
05/22/02	11:07	5	88	7.9	12.9	7
05/22/02	11:08	1	88	7.9	12.9	7
06/05/02	9:45	1	92	7.2	15.6	6.5
06/05/02	9:46	5	91	7.3	15.3	6.5
06/05/02	9:47	10	92	7.3	15.2	6.5
06/05/02	9:48	15	92	7.3	15.2	6.4
06/05/02	9:49	20	92	7.3	15.1	6.4
06/05/02	9:50	25	92	7.1	13.9	6.4
06/05/02	9:51	30	92	6.9	12.8	6.2
Vallecito Reservoir at North End						
05/19/00	9:34	2	84	7.9	11.9	8.6
05/19/00	9:40	5	82	8	11.4	8.7
05/19/00	9:43	15	83	7.9	11	8.6
05/19/00	9:45	15	83	7.9	11	8.6
05/19/00	9:46	20	81	7.7	10.2	8.3
05/19/00	9:47	25	81	7.6	9.4	8.2
05/19/00	9:49	30	83	7.5	8.8	8.2
05/19/00	9:51	35	82	7.5	8.3	8.1
05/19/00	9:53	40	82	7.5	8.2	8.1
06/06/00	11:00	0	74	8.3	17.2	8.6
06/06/00	11:02	5	74	8.4	16.7	8.9
06/06/00	11:03	10	76	8.2	15.5	8.9
06/06/00	11:04	15	75	8.2	14.7	9.2
06/06/00	11:05	20	73	7.7	12.6	9.2
06/06/00	11:06	25	70	7.6	11.9	9.2
06/06/00	11:07	30	67	7.5	10.9	9.1
06/06/00	11:08	35	68	7.3	10.2	8.8
06/06/00	11:09	40	73	7.2	9.7	8.7
06/06/00	11:10	45	75	7.2	9.4	8.5
06/20/00	10:50	0	87	8.4	18.1	8.5
06/20/00	10:51	5	87	8.4	18.1	8.5
06/20/00	10:52	10	87	8.4	18	8.5
06/20/00	10:53	15	87	8.4	17.7	8.5
06/20/00	10:54	20	87	8.4	17.6	8.4
06/20/00	10:55	25	90	7.7	14.8	8.2
07/11/00	10:45	0	82	7.8	20.6	7.3
07/11/00	10:46	5	82	7.8	20.5	7.3
07/11/00	10:47	10	82	7.7	20.1	7.2
07/11/00	10:48	15	82	7.5	19.7	7.3
07/11/00	10:49	25	80	6.8	17.2	7.3
07/11/00	10:50	25	80	6.8	17.2	7.3
07/11/00	10:51	30	78	6.8	15.9	7
07/11/00	10:52	32	79	6.7	15.4	6.7
07/25/00	10:55	2	82	8	20.5	7.3
07/25/00	10:56	5	81	7.9	20	7.4
07/25/00	10:57	10	80	7.8	19.9	7.3
07/25/00	10:58	15	80	7.7	19.8	7.2
07/25/00	10:59	18	80	7.4	19.4	7
08/08/00	14:35	2	83	7.9	20.7	7.8
08/08/00	14:36	5	84	7.8	20.7	7.7
08/08/00	14:37	10	84	7.8	20.4	7.7
08/08/00	14:38	13	83	7.6	19.8	7.6
08/22/00	10:40	2	86	7.4	19.8	7.5

Appendix Table. Field property data measured in Vallecito Reservoir, 2000–2002.—Continued

[ft, feet; µS/cm, microsiemens per centimeter; ºC, degrees Celsius; mg/L, milligrams per liter]

Date	Time	Reservoir sample depth, ft	Field specific conductance, µS/cm @ 25°C	Field pH, standard units	Temperature, °C	Dissolved oxygen (DO), mg/L
Vallecito Reservoir at North End—Continued						
08/22/00	10:41	5	86	7.5	19.6	7.5
08/22/00	10:42	8	89	7.3	19.1	7.4
09/02/00	10:45	1.2	94	7.4	18	7.3
09/02/00	10:46	5.4	94	7.2	17.1	7.4
09/28/00	10:45	0.1	101	7.2	14	6.8
09/28/00	10:46	5	106	6.9	11.9	7
05/31/01	10:19	23.6	58	7.7	7.9	8.5
05/31/01	10:20	18.8	62	7.6	9.1	8.2
05/31/01	10:21	13.6	61	7.6	10	8.1
05/31/01	10:22	8.8	66	7.8	11.4	8
05/31/01	10:23	3.7	69	8	12.4	7.9
05/31/01	10:24	1.6	69	8.1	12.8	7.9
06/14/01	11:40	2	64	8	14.8	7.7
06/14/01	11:41	10	64	7.9	14.2	7.8
06/14/01	11:42	15	64	7.9	13.7	7.7
06/14/01	11:43	20	69	7.8	12.8	7.7
06/14/01	11:44	25	62	7.7	11.4	7.8
06/14/01	11:45	30	61	7.6	9.7	7.7
06/14/01	11:46	35	62	7.5	9.7	7.7
06/27/01	10:45	37	61	7.4	11.4	7.6
06/27/01	10:46	30.3	60	7.4	12.7	7.5
06/27/01	10:47	25.1	61	7.6	14.6	7.5
06/27/01	10:48	20.3	63	7.8	15.4	7.7
06/27/01	10:49	15.1	63	8	15.9	7.8
06/27/01	10:51	10.2	64	8.2	17	7.6
06/27/01	10:52	4.9	65	8.2	17.7	7.5
06/27/01	10:55	0.1	65	8.2	17.9	7.4
07/17/01	11:00	33	65	7.5	15.1	7
07/17/01	11:01	25	63	7.5	15.8	7.1
07/17/01	11:02	20	65	7.7	17.1	7.3
07/17/01	11:03	15	68	8.2	19.7	7.1
07/17/01	11:04	10	68	8.2	19.8	7.1
07/17/01	11:05	5	68	8.2	19.8	7
07/17/01	11:06	2	67	8.2	19.9	7.1
07/31/01	10:29	5	69	8.4	21.2	6.6
07/31/01	10:30	9.8	68	8.4	21	6.6
07/31/01	10:31	14.9	69	8.4	20.5	6.7
07/31/01	10:32	20	68	7.9	18.4	6.9
07/31/01	10:33	24.8	67	7.5	16.6	6.3
07/31/01	10:34	28.8	69	7.2	15.2	5.1
08/16/01	10:30	5	68	8.4	19.5	6.8
08/16/01	10:31	10	68	8.4	19.2	6.8
08/16/01	10:32	15	68	8.3	18.8	6.9
08/16/01	10:33	20	68	8	18.2	6.9
08/16/01	10:34	25	68	7.8	17.8	6.8
08/29/01	10:10	5	70	8	18.3	7
08/29/01	10:11	10	70	8.1	18.2	7
08/29/01	10:12	15	70	8.1	18.1	7
08/29/01	10:13	20	70	8	18	6.9
08/29/01	10:14	25	70	8	17.9	6.8
10/17/01	10:30	2	69	8.1	12.2	7.6
10/17/01	10:31	5	69	8	12.1	7.3
10/17/01	10:32	10	69	8	12.1	7.3
10/17/01	10:33	15	69	7.9	11.7	7.2