Initial Effects of Stagecoach Reservoir on Discharge, Water-Quality Characteristics, and Suspended-Sediment Loads in the Yampa River, Northwestern Colorado

by Robert L. Tobin

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CONVERSION FACTORS AND OTHER RELATED INFORMATION

Multiply	By	To obtain
acre	0.4047	hectare
acre-foot (acre-ft)	1,233.6	cubic meter
acre-foot per year (acre-ft/yr)	1,233.6	cubic meter per year
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
foot (ft)	0.3048	meter
inch (in.)	25.4	millimeter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.59	square kilometer
ton	0.9074	metric ton (or megagram)

Temperature in degree Celsius (°C) may be converted to degree Fahrenheit (°F) by using the following equation:

$$°F = 9/5\ (°C) + 32.$$

The following terms and abbreviations are used in this report:

biochemical oxygen demand (BOD)
capacity inflow (CI)
colonies per 100 milliliters (col/100 mL)
dissolved oxygen (DO)
diversity index (DI)
microgram per liter (µg/L)
microsiemens per centimeter at 25 degrees Celsius (µS/cm)
milligram per liter (mg/L)
milligram per liter per day [(mg/L)/d]
nephelometric turbidity units (NTU)
ratio of fecal coliform to fecal streptococci (FC/FS)

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

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Abstract

The construction and filling of Stagecoach Reservoir on the Yampa River during 1988–91 were done to enhance water management and to use local water resources. To assess the initial effects of the reservoir on the hydrology of the upper Yampa River, physical, chemical, and biological data were collected at a site upstream (YR–1) during water years 1989–92 and a site downstream (YR–2) from the reservoir during water years 1985–92 and at two sites in the reservoir during 1990–92. Annual suspended-sediment loads were determined for the Yampa River for water years 1985–92, and sediment retention in Stagecoach Reservoir was estimated. The initial filling of the 33,275-acre-foot reservoir proceeded slower than expected because inflow from the Yampa River was about 50 to 73 percent of average during water years 1989–91.

Secchi-disk measurements in Stagecoach Reservoir ranged from 2.5 to 18 feet. Algal growth and sediment transport during stormy weather decreased water clarity, and possible algal grazing by zooplankton and sediment deposition improved water clarity. Water temperature in the reservoir ranged from 0 to 22 degrees Celsius, and thermal stratification was maintained during summer. Values of pH ranged from 7.2 in the hypolimnion to 8.9 in the epilimnion. Changes in pH were related to photosynthesis and respiration.

Concentrations of dissolved oxygen in the reservoir ranged from 0 milligram per liter in the hypolimnion to 13 milligrams per liter in the epilimnion. Average 5-day biochemical-oxygen-demand rates ranged from 0.33 to 0.46 milligram per liter per day. Oxygen production from photosynthesis was greatest in the epilimnion; oxygen depletion from respiration was characteristic in the hypolimnion. Near or above average inflow might decrease the incidence of anaerobic conditions.

Specific conductance in the reservoir ranged from 414 to 520 microsiemens per centimeter at 25 degrees Celsius, depending on the specific conductance of inflow from the Yampa River. The water was a very hard, calcium bicarbonate type. Nitrogen input to the reservoir was mostly as organic nitrogen that ranged in concentration from less than 0.18 to about 1.0 milligram per liter. Concentrations of dissolved phosphorus in the inflow of the Yampa River ranged from less than 0.01 to 0.06 milligram per liter. Decomposition of organic material and release of nutrients from sediments under reducing conditions were probable causes for dissolved-ammonia concentrations near the reservoir bottom to increase to maximum values of 0.9 to 1.6 milligrams per liter as nitrogen during thermal stratification in summer. Dissolved phosphorus also increased in the same conditions to a range of 0.32 to 0.35 milligram per liter. Except for concentrations of total recoverable manganese that ranged from 210 to 440 micrograms per liter near the reservoir bottom, most concentrations of 20 trace constituents were measured at or near analytical detection limits.

A total of 119 phytoplankton from 7 phyla was identified in Stagecoach Reservoir during 1990–92. Cyanophyta (blue-green algae) accounted for most of the cell counts. Cyanophyta blooms of *Aphanizomenon* and *Aphanocapsa* developed during 1990–92, and photosynthesis caused concentrations of dissolved oxygen to exceed 150-percent saturation in the epilimnion. Diversity index values for phytoplankton ranged from 0.05 to 3.06. Values of diversity index during the summer of 1992 indicated that the community diversity of algae could be greatest in spring and least in fall. All colony counts of fecal coliform bacteria in the reservoir during 1990–92 were less than criteria limits set by the State of Colorado.

During water years 1985–88 (preconstruction period), at a site on the Yampa River downstream from the proposed damsite, and water years 1989–92 (post-construction period), at a site upstream from the dam, annual loads of suspended sediment ranged from 2,480 to 22,650 tons. The average annual suspended-sediment load for these two sites was about 9,650 tons. The annual sediment displacement of reservoir capacity was about 7 acre-feet, or about 0.02 of the original reservoir capacity.

During initial filling of Stagecoach Reservoir, ranges of water temperature and specific conductance downstream from the reservoir were decreased, and values of turbidity, pH, dissolved oxygen, fecal coliform bacteria, and suspended-sediment concentrations decreased compared with inflow data. Ranges of dissolved ammonia and phosphorus were 5 to 20 times greater than the range from the base-line site on the Yampa River prior to dam construction and the upstream control site after dam construction. Most downstream values of dissolved oxygen and nutrients returned to near pre-impoundment ranges after the reservoir had filled.

INTRODUCTION

In recent years, changes in existing and projected demands on the available water supplies of northwestern Colorado caused local water managers to reevaluate water issues. Historically, surface-water supplies in northwestern Colorado generally exceeded water quantities needed locally for irrigation and domestic purposes; water allocation and storage seldom were an issue. However, potential needs changed as population in the lower Colorado River basins and Front Range communities of Colorado increased, and projected water quantities required for energy development fluctuated during 1970–90. Because reservoir storage can be an effective means to enhance water management and to protect and use local water resources, Stagecoach Reservoir was authorized and financed from local, State, and Federal sources to help meet water-resource needs.

The construction of Stagecoach Reservoir Dam was completed on the upper Yampa River about 14 mi south of Steamboat Springs (fig. 1) in late 1988. At a spillway capacity of 33,275 acre-ft, the surface area of Stagecoach Reservoir is 720 acres, and maximum depth near the dam is about 120 ft. In addition to the spillway overflow that occurs at the 7,200-ft elevation, water can be released through three multilevel gates at elevations of 7,182; 7,157; and 7,085 ft (fig. 2). The project was sponsored by the Upper Yampa Water Conservancy District, and the stored water is used for supplemental supplies, electric power generation, and recreation. Because runoff in the upper Yampa River Basin was small during 1989–91, Stagecoach Reservoir filled slowly. It was not until spring 1991 that the reservoir initially filled to a spillway capacity.

Because Stagecoach Reservoir was expected to substantially alter the discharge, water-quality characteristics, and suspended-sediment loads of the Yampa River, hydrologic monitoring upstream and downstream from the reservoir and within the reservoir was required by permitting agencies. In late 1984, the U.S. Geological Survey, in cooperation with the Upper Yampa Water Conservancy District, began a study to define base-line hydrologic characteristics of the Yampa River and to measure the effects of the proposed Stagecoach Reservoir on the Yampa River. Although water quality within a newly filled reservoir is likely to change as the reservoir ages, the data were necessary to determine initial water-quality conditions and to facilitate management of water releases from the reservoir.

The objectives of the study were to: (1) Identify ranges of discharge and water quality in the Yampa River prior to dam construction; (2) describe the initial physical, chemical, and biological characteristics within Stagecoach Reservoir; (3) compare these water-quality characteristics with water quality of the Yampa River upstream and downstream from the reservoir and determine effects of the impoundment; (4) describe the quantity and characteristics of suspended-sediment loads in the Yampa River near the reservoir prior and subsequent to filling of the reservoir; and (5) estimate sediment retention within the reservoir.

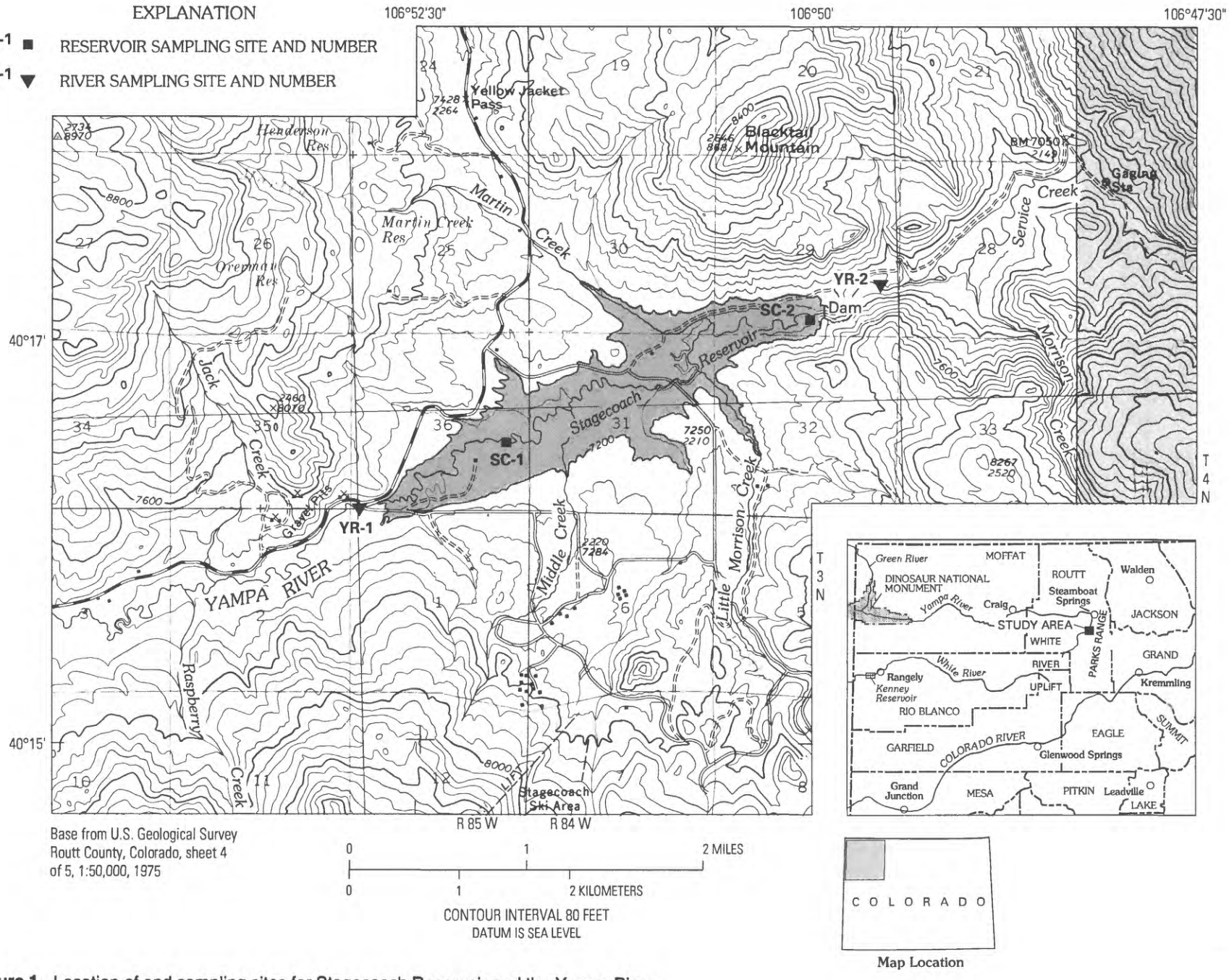


Figure 1. Location of and sampling sites for Stagecoach Reservoir and the Yampa River.

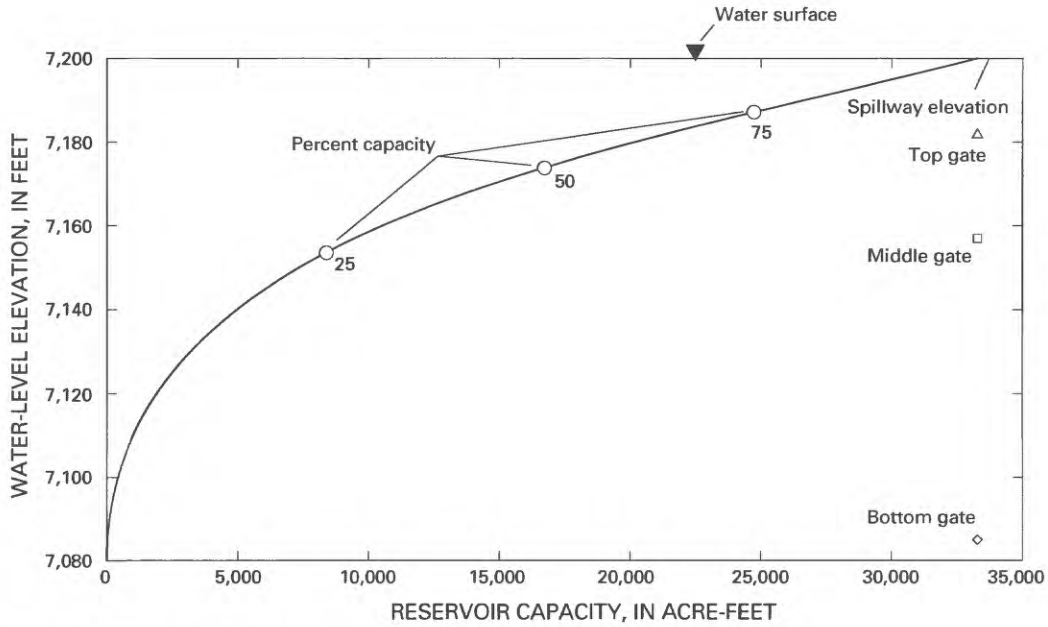


Figure 2. Water level and reservoir capacity for Stagecoach Reservoir.

Purpose and Scope

This report describes the physical, chemical, and biological characteristics of water impounded in Stagecoach Reservoir during the last full calendar year of filling (1990) and two subsequent years (1991–92) and compares these hydrologic characteristics with those for the Yampa River upstream (water years 1989–92) and downstream (water years 1985–92) from the reservoir. A water year is defined as the period from October 1 in the previous year through September 30 of the indicated year. The report also describes stream discharge and the quantity and characteristics of suspended-sediment loads in the Yampa River upstream and downstream from the reservoir and presents estimates of sediment retention in the reservoir during water years 1989–92. Site locations and general data-collection information are shown in figure 1 and are listed in table 1.

Approach

Comprehensive hydrologic monitoring of the Yampa River for discharge, water quality, and sediment began in late 1984 with the relocation and reactivation of the discontinued U.S. Geological Survey streamflow-gaging station 09237500. Station 09237500 (hereinafter referred to as site YR–2) was reestablished about 0.5 mi downstream from the original site and about 0.3 mi downstream from the proposed damsite (fig. 1). The gaging station was first established in 1939, and daily discharge was measured from water years 1940–44, 1957–72, and 1985–92.

Shortly before completion of the dam in late 1988, a second U.S. Geological Survey streamflow-gaging station, 09237450 (hereinafter referred to as site YR–1), was constructed on the Yampa River about 0.1 mi upstream from the proposed Stagecoach Reservoir (fig. 1). Hydrologic data collected at site YR–2 (base line) prior to dam completion in 1988 and data collected at site YR–1 (control) were used to measure the general hydrologic characteristics of the Yampa River unaffected by Stagecoach Reservoir. Hereinafter, data from these sites for these periods will be referred to as base-line and control data. Data from site YR–2 collected during water years 1989–92 were compared with the control data at site YR–1 and the base-line data at YR–2 to measure the effects of the reservoir on the Yampa River directly downstream from the dam.

Sampling in Stagecoach Reservoir was designed to evaluate water-quality characteristics during spring, summer, and fall. Two reservoir sites were established in the spring of 1990 for the collection of physical, chemical, and biological data. At that time, the water level in the reservoir was about 11 ft below the spillway crest, and reservoir capacity was about 25,000 acre-ft (75 percent) (fig. 2). U.S. Geological Survey reservoir sampling site 401628106515500 (hereinafter referred to as site SC–1) is at the west end of the reservoir about 0.2 mi from the inflow of the Yampa River (fig. 1).

Table 1. Site information and general data-collection information, Stagecoach Reservoir and the Yampa River

[--, data not collected; C, continuous; M, monthly; Q, quarterly; A, annually; SA, semiannually]

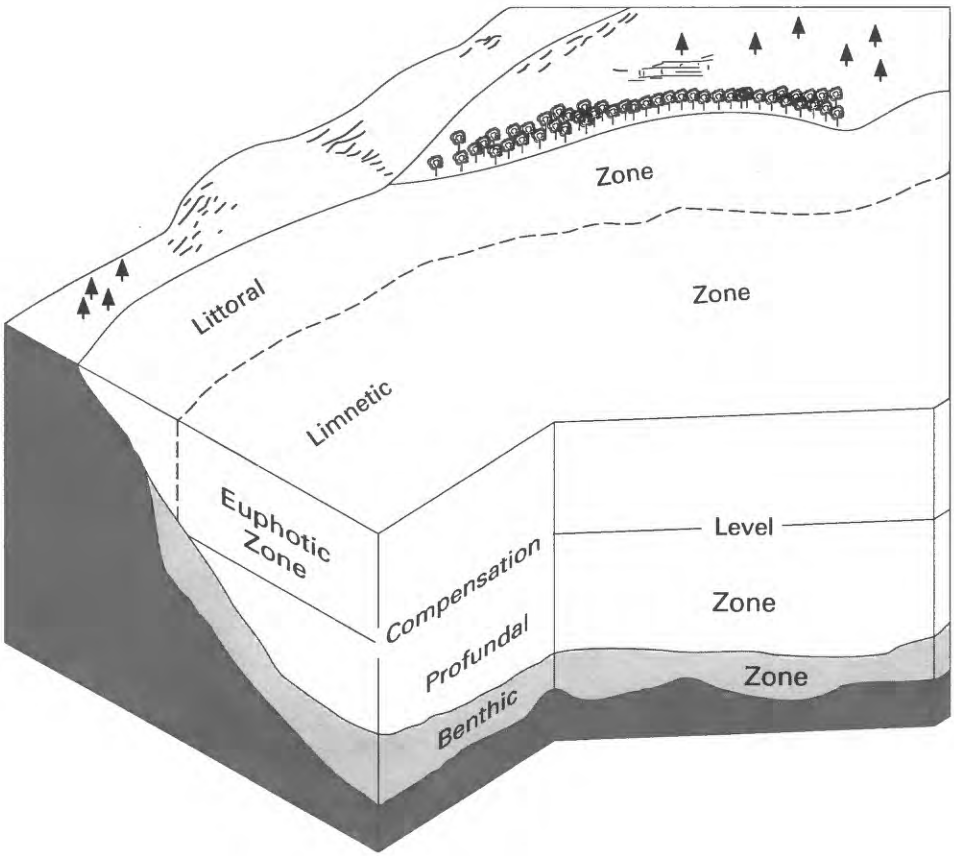
Properties and constituents	Approximate sampling frequency			
	[1]Site SC–1	[2]Site SC–2	[3]Site YR–1	[4]Site YR–2
Discharge	--	--	C	C
Profile and onsite measurements				
Temperature, pH, dissolved oxygen (DO)	M	M	M	M
Specific conductance (SC)	M	M	M	M
Secchi disk	M	M	--	--
Cations				
Calcium (Ca), magnesium (Mg), potassium (K), sodium (Na)	Q	Q	Q	Q
Anions				
Alkalinity ($CaCO_3$), chloride (Cl)	Q	Q	Q	Q
Fluoride (F), sulfate (SO_4)	Q	Q	Q	Q
Nutrients				
Nitrite plus nitrate (NO_2+NO_3), ammonia (NH_3)	M	M	M	M
Organic nitrogen (Org N), phosphorus (P)	M	M	M	M
Organic carbon (Org C)	M	M	--	--
Trace constituents				
Aluminum (Al), antimony (Sb), arsenic (As), barium (Ba)	A	A	SA	SA
Beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co)	A	A	SA	SA
Copper (Cu), iron (Fe), lead (Pb), lithium (Li)	A	A	SA	SA
Manganese (Mn), mercury (Hg), molybdenum (Mo)	A	A	SA	SA
Nickel (Ni), selenium (Se), silver (Ag), strontium (Sr), zinc (Zn)	A	A	SA	SA
Biological and physical				
Phytoplankton, bacteria	M	M	M	M
Biochemical oxygen demand (BOD), turbidity	M	M	M	M
Suspended solids	M	M	M	M
Suspended sediment	--	--	M	M

[1]Stagecoach Reservoir near inlet (U.S. Geological Survey station number 401628106515500), April 1990–November 1992.
[2]Stagecoach Reservoir at dam (U.S. Geological Survey station number 401707106495800), April 1990–November 1992.
[3]Yampa River above Stagecoach Reservoir (U.S. Geological Survey station number 09237450), October 1988–September 1992.
[4]Yampa River below Stagecoach Reservoir (U.S. Geological Survey station number 09237500), October 1984–September 1992.

Data from this site were from a mixing zone of fluvial and lacustrine water. U.S. Geological Survey reservoir sampling site 401707106495800 (hereinafter referred to as site SC–2) is at the dam about 50 ft upstream from the spillway (fig. 1). Water-quality data at site SC–2 represent characteristics of lacustrine water that generally had a maximum residence time within the reservoir.

Light penetration in the reservoir was measured as the average depth of several observations at which a standard Secchi disk could no longer be seen. This value approximates the depth that receives 5 percent of the surface light intensity (Yoshimura, 1938). Light-scattering properties of water in the reservoir and the Yampa River were assessed from turbidity measurements expressed in nephelometric turbidity units (NTU). Major zones in a lake or reservoir based on a combination of light penetration, biology, and morphology are shown in figure 3. The base of the euphotic zone generally is estimated by multiplying the Secchi-disk depth by a factor of 2.5 to 5.0 (Verduin, 1956).

Profile measurements of selected water-quality properties and sample collections for physical, chemical, and biological analyses were made in the reservoir using a submersible pump that continuously delivered water from any depth to a multiprobe manifold at the water surface. The manifold housed probes that measured water temperature, pH, dissolved oxygen (DO), and specific conductance. Water samples could be withdrawn at any depth for laboratory analysis. Except at the manifold discharge point, water movement within the entire system remained isolated from atmospheric effects.



EXPLANATION

Littoral zone	—	Shallow water area that has sufficient light to support attached vegetation
Limnetic zone	—	Open water area where base is defined by the 1-percent light intensity level
Euphotic zone	—	The combined littoral and limnetic zones
Compensation level	—	Level at which oxygen production equals oxygen uptake
Profundal zone	—	Zone of deep water where the light intensity is less than 1 percent of the surface light. Little or no photosynthesis occurs in this zone
Benthic zone	—	Lake bottom

Figure 3. Major zones in a lake (modified from Britton and others, 1975, p. 3).

Oxygen consumption because of indigenous processes that occur within the reservoir and in the Yampa River was estimated from 5- and 20-day biochemical-oxygen-demand (BOD) analyses. Incubations for the BOD analyses were processed from iced samples within 6 to 24 hours of sample collection.

Assessments of general water chemistry are based on laboratory data for periodic samples of major constituents, nutrients, and trace constituents. Samples were taken from near-surface and near-bottom depths at sites SC–1 and SC–2 in the reservoir and from depth- and width-integrated composites at sites YR–1 and YR–2 in the Yampa River.

Point samples for phytoplankton (algae) identification, biovolume, and chlorophyll *a* analyses were collected from depths of maximum DO saturation (usually 2 ft). Because oxygen is a by-product of photosynthesis, data from these depths generally should represent zones of maximum phytoplankton activity. A second set of samples that consisted of composites of water from the euphotic zone at sites SC–1 and SC–2 also were analyzed. These analyses were done to describe the general phytoplankton population in the reservoir. All phytoplankton and chlorophyll samples were analyzed by a private laboratory.

The presence of the sanitary-indicator bacteria, fecal coliform and fecal streptococci, also were determined from near-surface and near-bottom depths at both sites in Stagecoach Reservoir and at sites YR–1 and YR–2 in the Yampa River. Incubations for bacteria analyses were processed from iced samples within 6 to 24 hours of sample collection. All samples for chemical and biological laboratory analyses were collected, preserved, and analyzed in accordance with standard procedures of the U.S. Geological Survey (Brown and others, 1970; Goerlitz and Brown, 1972; Fishman and Friedman, 1989; Britton and Greeson, 1989).

Estimates of annual suspended-sediment load transported by the Yampa River are based on streamflow data and suspended-sediment concentrations for water years 1985–92. Samples of suspended sediment were collected using depth-integrated techniques from equal stream-width increments. Sediment-collection techniques and laboratory analyses used in this study are summarized in Guy (1969) and Guy and Norman (1970).

Except for phytoplankton and chlorophyll data, all hydrologic data used in this report were obtained from the U.S. Geological Survey WATSTORE (Hutchison, 1975) computer data base. Data summaries, statistics, and analyses are based on a review of the compiled data base.

River-Basin Characteristics

The upper Yampa River Basin upstream from Stagecoach Reservoir in northwestern Colorado (fig. 1) includes parts of eastern Rio Blanco and Garfield Counties and most of the southeastern parts of Routt County. The drainage area of the Yampa River at Stagecoach Dam is about 277 mi^2. The Yampa River generally flows from south to north upstream from Steamboat Springs. West of Steamboat Springs, the Yampa River flows west to join the Green River in Dinosaur National Monument near the Colorado-Utah border. Annual precipitation in the upper Yampa River Basin ranges from about 16 in. near the southern parts of the basin to about 40 in. in the higher elevations of the basin. Most precipitation occurs as winter snow and summer thunderstorms.

The upper Yampa River Basin was formed by the White River uplift to the west and the Parks Range to the east. Surface rocks in the western parts of the basin consist mostly of sediments of Cretaceous age (Tweto, 1979). Basalts of Tertiary age intermittently cap these sediments near the western border of the basin. Sediments of Tertiary age are the most common rocks in the eastern part of the basin. Ranching, agriculture, mining, and recreation are the primary land uses in the basin.

Acknowledgments

The author thanks John Yurich and Phil Eggleston of the Upper Yampa Water Conservancy District for assistance in collecting samples. The author also thanks John Fetcher of the Upper Yampa Water Conservancy District and the resident staff of the Colorado Division of Parks and Outdoor Recreation for supplying equipment during the study.

INITIAL EFFECTS OF STAGECOACH RESERVOIR

The short- and long-term effects of a reservoir on a river are many. Environmental changes, recreation, water supply and management, and hydrology all are major areas of concern. This section addresses the initial effects of Stagecoach Reservoir on the Yampa River.

Discharge

Discharge in the Yampa River principally is from snowmelt during spring and early summer. Occasional intense thunderstorms can temporarily increase flow and sediment loads in the Yampa River during summer. Streamflow for the period of record (U.S. Geological Survey, 1987–93) indicates that maximum or near maximum discharges measured at streamflow-gaging stations in the Yampa River occurred during snowmelt runoff in 1984 prior to the construction of Stagecoach Reservoir. A hydrograph showing daily mean discharge for water years 1940–44, 1957–72, and 1985–92 for site YR–2 is shown in figure 4. A maximum instantaneous discharge for site YR–2 of 1,400 ft^3/s was recorded in April 1962. A minimum daily discharge at site YR–2 of 8.9 ft^3/s was recorded in May 1963. Prior to reservoir construction (base-line data), mean annual discharge at site YR–2 for the period of record ending in water year 1988 was 89.4 ft^3/s or 64,770 acre-ft. Daily mean discharge and annual mean discharge at site YR–1 (control data, water years 1989–92) and at site YR–2 for the study period (water years 1985–92) are shown in figure 5.

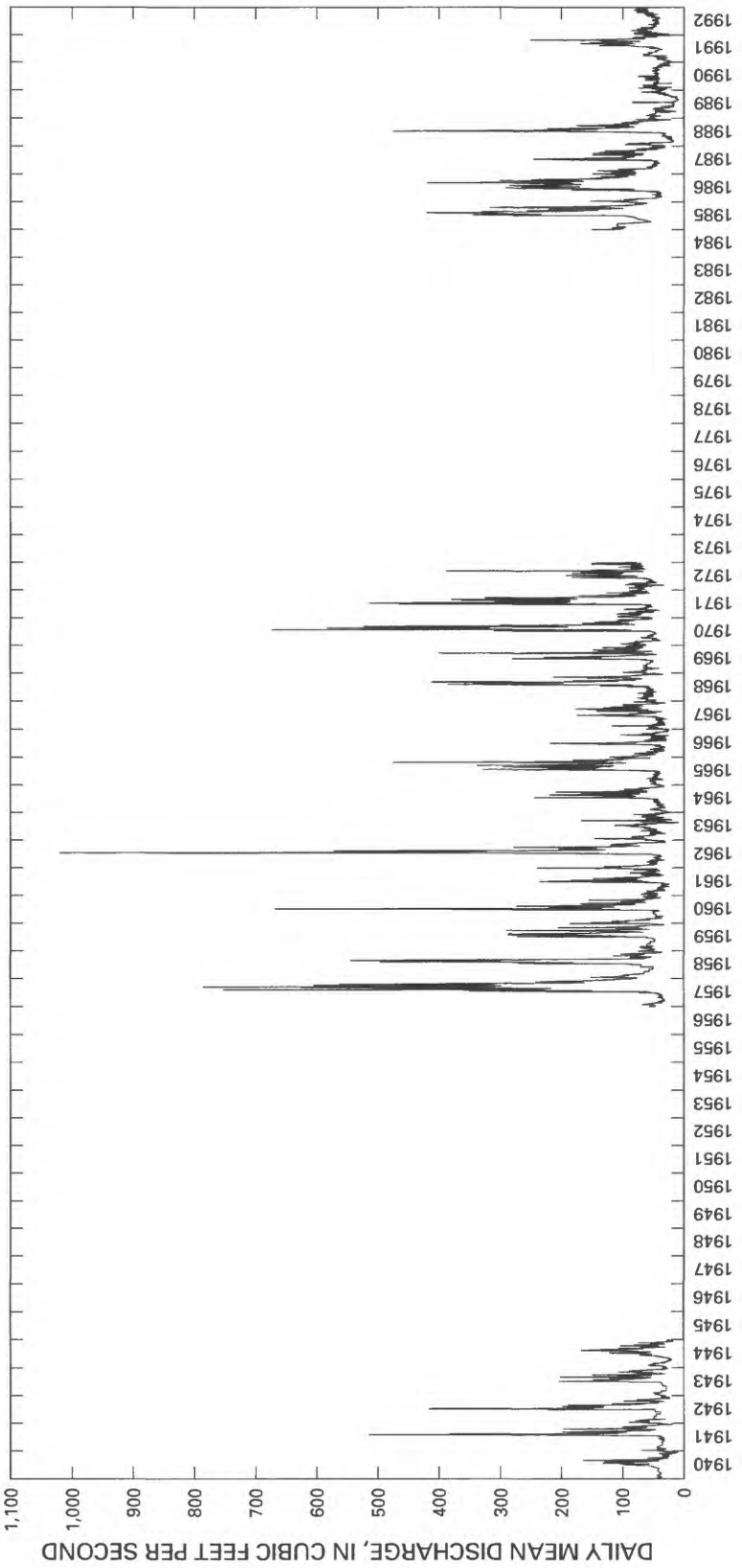


Figure 4. Daily mean discharge at site YR–2, water years 1940–44, 1957–72, and 1985–92.

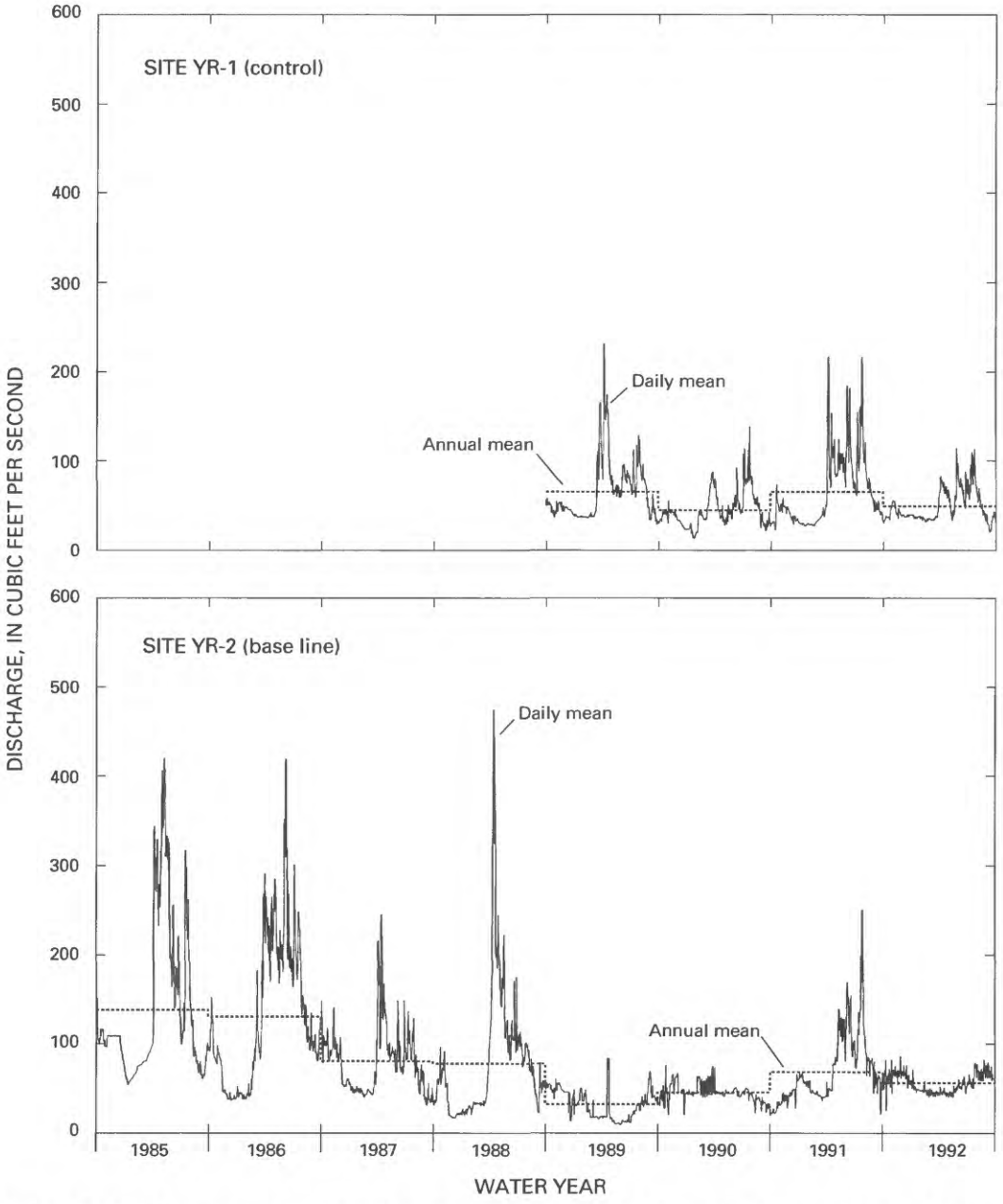


Figure 5. Daily mean and annual mean discharge at sites YR–1 (water years 1989–92) and YR–2 (water years 1985–92).

Data for sites YR–1 and YR–2 (table 2) indicate that inflow to Stagecoach Reservoir from the Yampa River (site YR–1) during water years 1989–91 was about 50 to 73 percent of the long-term average for site YR–2. Early reservoir storage decreased the discharge at site YR–2 to about 35 percent of average in water year 1989 when about 24,140 acre-ft was stored in Stagecoach Reservoir. Because annual discharges at sites YR–1 and YR–2 were about equal during water years 1990–91 (table 2), unmeasured tributary inflow to Stagecoach Reservoir (fig. 1) from late 1988 to mid-1991 probably provided the additional 9,135 plus acre-ft of water needed to initially fill the reservoir and balance water losses from evaporation and ground-water migration.

Daily mean discharge at site YR–2 is compared with the daily mean discharge deficit between sites YR–1 and YR–2 for water years 1989–92 in figure 6. The negative deficit values of discharge (reservoir storage) indicate that mainstream storage in the reservoir occurred mostly during spring and summer. Except for periods in spring and summer of 1989, stream discharge at site YR–2 during water years 1989–92 generally was at or in excess of the minimum discharge stipulated in permit regulations.

The capacity-inflow (CI) ratios and theoretical hydraulic residence times for the reservoir at various river discharges are listed in table 3. CI decreases as the quantity of water that moves through a given water body in a specified period (flushing) increases. Residence-time calculations assume complete mixing and no thermal stratification within the reservoir. During periods of thermal stratification, however, temperature of inflowing water will affect the allocation of the incoming river water within the reservoir. Thus, the way in which water is released from selected depths at the dam can result in residence times within different thermal zones that are considerably different from the values listed in table 3.

Table 2. Discharge data for sites YR–1 (water years 1989–92) and YR–2 (water years 1940–44, 1957–72, and 1985–92)

[ft^3/s, cubic feet per second; acre-ft, acre-feet; acre-ft/mi^2, acre-feet per square mile; --, no data; NC, data not calculated; data calculations on unrounded data; all data rounded to standard significant figures]

Water year	Site YR–1					Site YR–2				
	Daily discharge (ft^3/s)			Annual		Daily discharge (ft^3/s)			Annual	
	Maximum	Minimum	Average	Discharge (acre-ft)	Yield (acre-ft/mi^2)	Maximum	Minimum	Average	Discharge (acre-ft)	Yield (acre-ft/mi^2)
1940–44, 1957–72	--	--	--	--	--	1,400	8.9	86	62,380	224
1985	--	--	--	--	--	447	54	139	100,300	361
1986	--	--	--	--	--	461	36	131	94,740	341
1987	--	--	--	--	--	323	31	80	57,970	209
1988	--	--	--	--	--	669	17	77	56,160	202
1989	274	29	65	47,350	184	129	9.4	32	23,210	83
1990	206	14	45	32,400	126	102	20	45	32,650	117
1991	277	23	65	47,260	184	257	19	68	49,420	178
1992	134	21	49	35,910	140	174	25	56	40,670	146
1940–88										
Maximum	--	--	--	--	--	1,400	54	NC	NC	NC
Minimum	--	--	--	--	--	323	8.9	NC	NC	NC
Average	--	--	--	--	--	NC	NC	89	64,770	233
1989–92										
Maximum	277	29	65	47,350	184	257	25	68	49,420	178
Minimum	134	14	45	32,400	126	102	9.4	32	23,210	83
Average	223	22	56	40,730	158	166	18	50	36,490	131

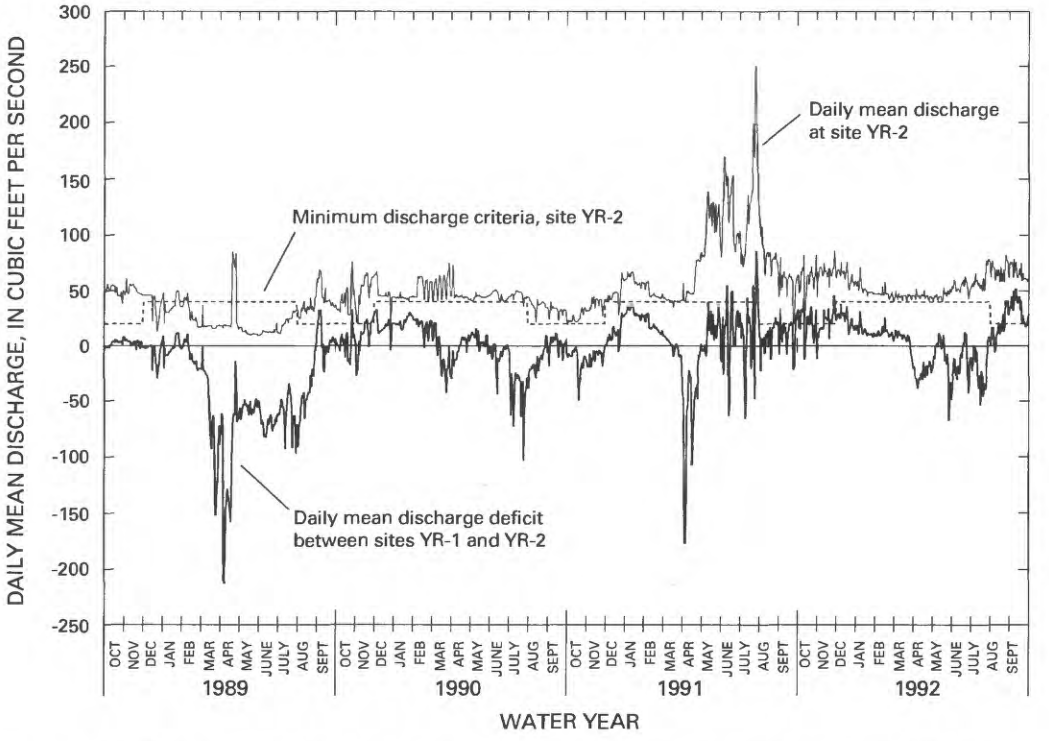


Figure 6. Deficit in daily mean discharge between sites YR–1 and YR–2, water years 1989–92.

Water-Quality Characteristics

Water quality in lakes and reservoirs can be substantially different when compared with the water quality of inflowing streams. Although many physical, chemical, and biological variables are involved, changes in water quality are most noticeable when sunlight and solar heating in summer cause nonuniform biological growth and water-temperature distributions to develop within the impounded waters. Sunlight and temperature not only affect biological and chemical activities, but also, because the density of water is a function of temperature (water is densest at about 4°C), temperature is the primary cause of most lake stratification. Depending on reservoir morphology, hydraulic residence time, release patterns at the dam, and wind mixing, various patterns of thermal stratification can develop. Thermal stratification in summer commonly is characterized by: (1) An upper zone of uniformly warm water (epilimnion), (2) an intermediate zone of transition where temperature decreases rapidly with depth (metalimnion), and (3) a lower zone of uniformly cold water (hypolimnion). The seasonal thermal profiles and circulation patterns of a temperate-zone lake are shown in figure 7. Hutchinson (1957) termed lakes that circulate twice a year in this manner as dimictic. Stagecoach Reservoir is an example of a dimictic lake.

During periods when thermal stratification is stable, the different metabolic activities of aquatic animals, phytoplankton, plants, and bacteria can alter and recycle concentrations of dissolved gases, nutrients, and other chemical constituents. As these activities progress, the metalimnion acts as a barrier (because of density differences) between the epilimnion and the hypolimnion, decreasing the exchange of heat and dissolved substances and, also, acts as a biological barrier that affects the movement and dispersal of many aquatic organisms. If time and biological activities are sufficient, water zones that have different chemical characteristics can develop. The environments of these physical, biological, and chemical zones are discussed in Hutchinson (1957) and Odum (1971).

Onsite measurements of light penetration and profiles of water temperature, pH, dissolved oxygen, and specific conductance were made with depth at sites SC–1 and SC–2. Data for the profiles are presented for selected depths in tables 8 and 9 in the "Supplemental Data" section at the back of the report. Also included in the "Supplemental Data" section are data for selected physical and biological measurements (tables 10 and 11), major constituents (tables 12 and 13), nutrients (tables 14 and 15), and trace constituents (tables 16 and 17) for near-surface and near-bottom depths at sites SC–1 and SC–2.

Table 3. Capacity-inflow ratios[1] and theoretical hydraulic residence times[2] for Stagecoach Reservoir

Inflow-outflow discharge (cubic feet per second)	Annual discharge[3] (acre-feet)	Capacity-inflow ratio	Approximate residence time (days)
20	14,490	2.30	839
40	28,980	1.15	419
60	43,470	.77	280
80	57,960	.57	210
90	65,205	.51	186
100	72,450	.46	168
200	144,900	.23	84
300	217,350	.15	56
400	289,800	.11	42
500	362,250	.09	34
600	434,700	.08	28
700	507,150	.07	24
800	579,600	.06	21
900	652,050	.05	19
1,000	724,500	.05	17
1,200	869,400	.04	14
1,400	1,014,300	.03	12

[1]Capacity-inflow ratio is equal to the reservoir capacity (33,275 acre-feet) divided by annual discharge.

[2]Approximate residence time is the time required for a unit volume of inflow water from the Yampa River to move through the reservoir to a point of discharge at the dam. The time in days is equal to the reservoir capacity divided by the annual discharge (capacity-inflow ratio) times the average number of days in a year. Data calculations were on unrounded data.

[3]Based on 365.25 days per year.

Light Penetration and Turbidity

Nearly all biological activities in a lake depend directly or indirectly on sunlight. Photosynthesis by phytoplankton and other plants is related to the amount of available sunlight. The depth to which light penetrates a lake is dependent on latitude and season, surface area and physical condition, turbidity, phytoplankton characteristics, and transmission and absorption characteristics of the water and its dissolved material.

Turbidity is a qualitative measure of the light-reducing or light-scattering capabilities of the suspended and colloidal matter in water. Turbidity will decrease light penetration at depth and cause water temperature in the hypolimnion to remain cool during summer. Excessive turbidity can decrease photosynthesis and primary production; disrupt fish feeding patterns and physiological functions; inhibit benthic dwelling organisms; and, at large values, be directly lethal (McKee and Wolf, 1971).

Secchi-disk measurements in Stagecoach Reservoir (tables 10 and 11) ranged from 4.0 to 18.0 ft near the inlet (site SC–1) and from 2.5 to 18.0 ft at the dam (site SC–2). Data (fig. 8) indicate that dissimilar light penetration conditions existed between sites SC–1 and SC–2 during 1990 when the reservoir was filling. During 1991 and 1992, differences in light penetration between the two sites generally were small. Light penetration increased slightly from site SC–1 to site SC–2 during the late summer of 1992.

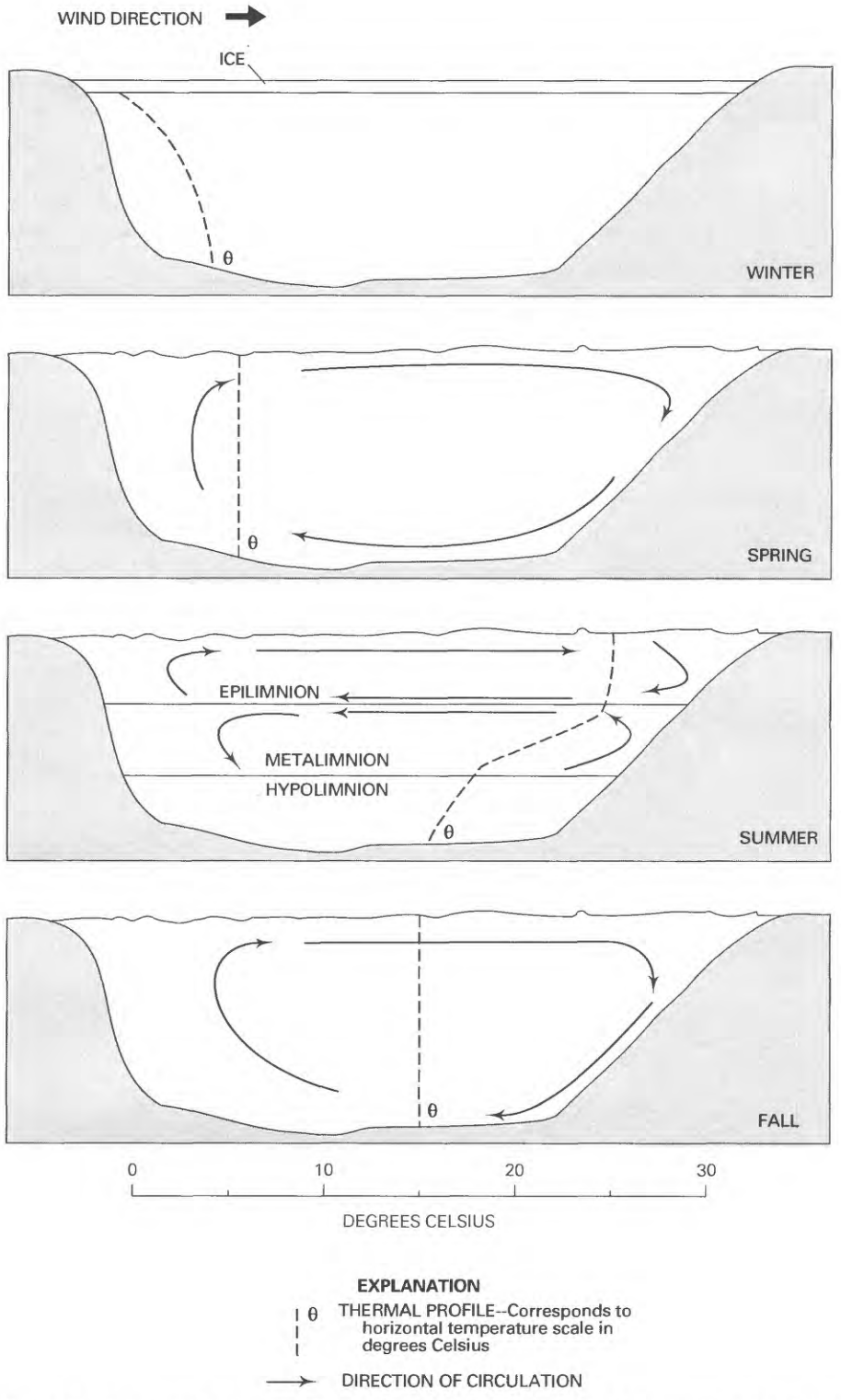


Figure 7. Seasonal thermal profiles and circulation patterns in a temperate-zone lake (modified from Britton and others, 1975, p. 4).

Turbidity measured from the 2-ft depths (tables 10 and 11) ranged from 0.6 to 3.0 NTU near the inlet (site SC–1) and from 0.5 to 9.0 NTU at the dam (site SC–2). Correlation of turbidity and Secchi-disk measurements and a mathematical expression for estimating turbidity from Secchi-disk measurements are shown in figure 9.

General observations of the epilimnion and Secchi-disk measurements during sampling periods indicated that changes in light penetration with time were related mostly to plankton characteristics in the epilimnion and to weather conditions. Extensive growths of algal macrocolonies and scums in summer and eroded shore and fluvial suspended sediments transported during stormy weather tended to decrease water clarity. Possible algal grazing by zooplankton and sediment deposition probably contributed to improved water clarity.

The effects of Stagecoach Reservoir on turbidity in the Yampa River were measured from data collected periodically during water years 1989–92 (U.S. Geological Survey, 1987–93). Turbidity for 24 samples collected from the Yampa River at site YR–1 ranged from 2.7 to 62 NTU. During the same 4 years, turbidity for 24 samples from the Yampa River downstream from the reservoir (site YR–2) ranged from 0.6 to 7.1 NTU, and turbidity in 7 samples collected during water year 1992 was less than 3.0 NTU. Comparison of data from the Yampa River and the reservoir indicate that Stagecoach Reservoir greatly decreased turbidity in the Yampa River.

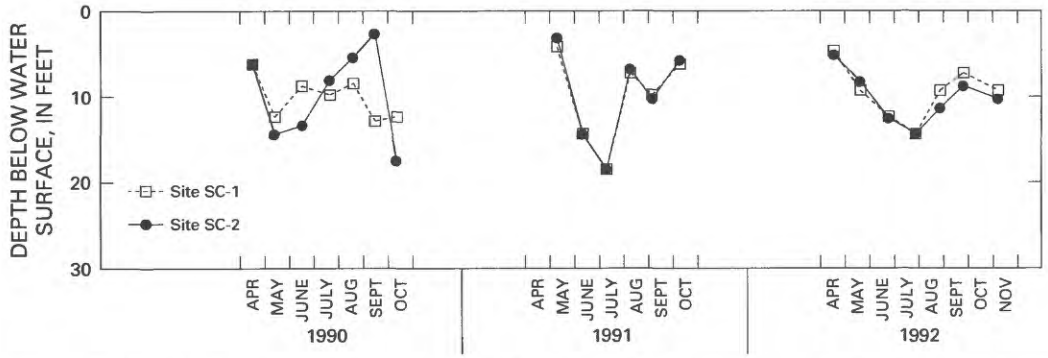


Figure 8. Secchi-disk measurements at sites SC–1 and SC–2 in Stagecoach Reservoir, 1990–92.

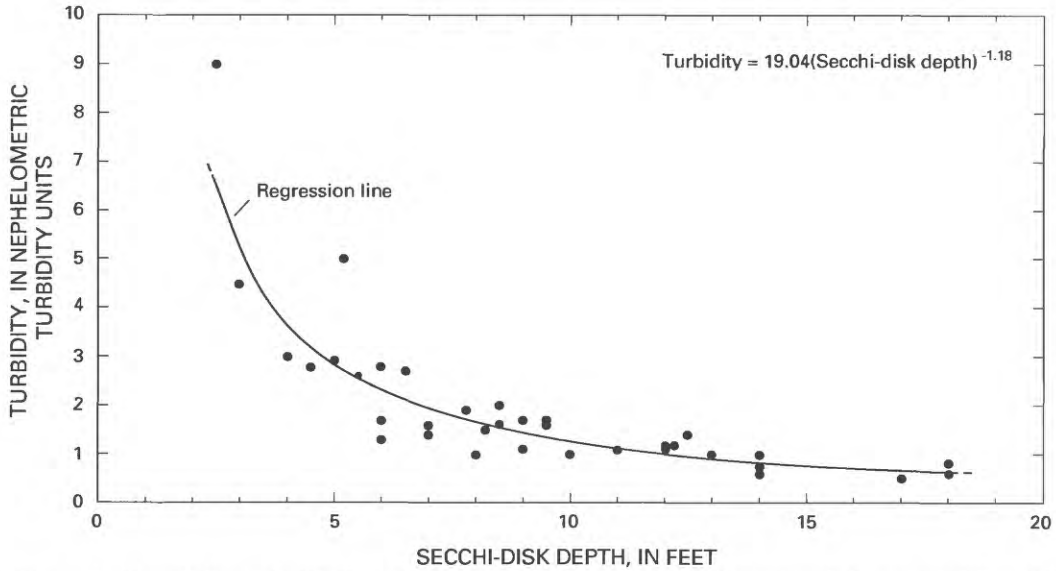


Figure 9. Correlation of turbidity to Secchi-disk measurements in Stagecoach Reservoir (sites SC–1 and SC–2), 1990–92.

Water Temperature

Water temperature from profile measurements made in Stagecoach Reservoir (tables 8 and 9) ranged from 3.5°C at near-bottom depths in spring to 22.0°C in the epilimnion during summer. In winter, water temperature under ice cover ranged from 0°C in near-surface water to about 4 to 5°C near the reservoir bottom (Phil Eggleston, Upper Yampa Water Conservancy District, written commun., 1991–92). Profile measurements of water temperature for selected depths at sites SC–1 and SC–2 in spring and August 1990–92 are shown in figure 10.

The reservoir was warmest in 1990 and during July and August. During summer, water temperature at depth generally decreased about 0.6 to 9.2°C at site SC–1 and about 6.8 to 13.8°C at site SC–2. Because water density increases with decreasing water temperature, the coolest water in the reservoir accumulated near the reservoir bottom and remained unmixed with warmer surface water. Thus, thermal stability developed in the reservoir following spring circulation in March or April. Although the reservoir remained thermally stratified through summer until the late fall circulation in October or November, wind action probably caused lateral mixing to occur within the epilimnion. In addition, streamflow infusion of the hypolimnion probably occurred when the water temperature of inflowing water was similar to the hypolimnion temperature.

The effect of the reservoir on temperature in the Yampa River at site YR–2 is shown from periodic measurements of water temperature plotted in figure 11. Prior to dam completion, annual stream temperatures at site YR–2 ranged from 0 to about 17 to 20°C; during water years 1989–92, temperatures at site YR–1 ranged from 0 to about 22 to 23°C. Data (fig. 11) indicate that subsequent to dam construction, the annual temperature range at site YR–2 decreased; maximum temperatures generally were cooler and minimum temperatures were warmer than temperatures at site YR–1. Although the range of temperature within Stagecoach Reservoir is similar to temperature ranges in the unaffected part of the Yampa River, the post-construction temperatures at site YR–2 mostly would be controlled by the management of the release gates and temperature distribution within the reservoir.

pH

Hydrogen ion activity (pH) is a measure of the acid-base characteristics of water. Water that is free of dissolved matter has a pH of 7.0, but natural waters that contain dissolved constituents normally have a range of pH from 5.0 to 9.0 and most frequently from 6.5 to 8.5. The constituents carbon dioxide (CO_2), bicarbonate (HCO_3), and carbonate (CO_3) that account for most alkalinity in natural waters generally buffer pH in natural waters (Hem, 1985).

Waters that have considerable biological production and low ionic concentrations can develop diel shifts in pH (Allen, 1972). Values of pH can increase to greater than 9.0 as phytoplankton use dissolved CO_2 and HCO_3 during photosynthesis. Conversely, diel and seasonal decreases in pH values to less than 7.0 can occur when CO_2 from decomposition and respiration accumulate in poorly mixed water. If exposure time is sufficient, these environmental changes can be harmful or lethal to some aquatic life (National Academy of Sciences, 1972).

Measured values of pH in Stagecoach Reservoir (tables 8 and 9) generally decreased with depth in summer and ranged from 7.2 in the hypolimnion, where decomposition was prevalent, to 8.9 in the epilimnion, where photosynthesis was great, at site SC–2. Profile measurements of pH for selected depths at sites SC–1 and SC–2 in spring and August 1990–92 are shown in figure 12.

Periodic measurements of pH in the Yampa River prior to, during, and after reservoir filling are shown in figure 13. Control and base-line data indicate that pH in the Yampa River ranged from about 7.7 to 8.9, but generally the range of pH was about 8.1 to 8.7. Values of pH were greatest in summer when photosynthetic activities would be maximum.

During reservoir filling, values and range of pH at site YR–2 decreased several tenths of a pH unit when compared with base-line values. After filling, the values and range of pH at site YR–2 increased, but were less than the values at site YR–1. Because pH in Stagecoach Reservoir generally decreases with depth, post-construction pH values in the Yampa River immediately downstream from the dam mostly will depend on the depth of release and the pH range in Stagecoach Reservoir.

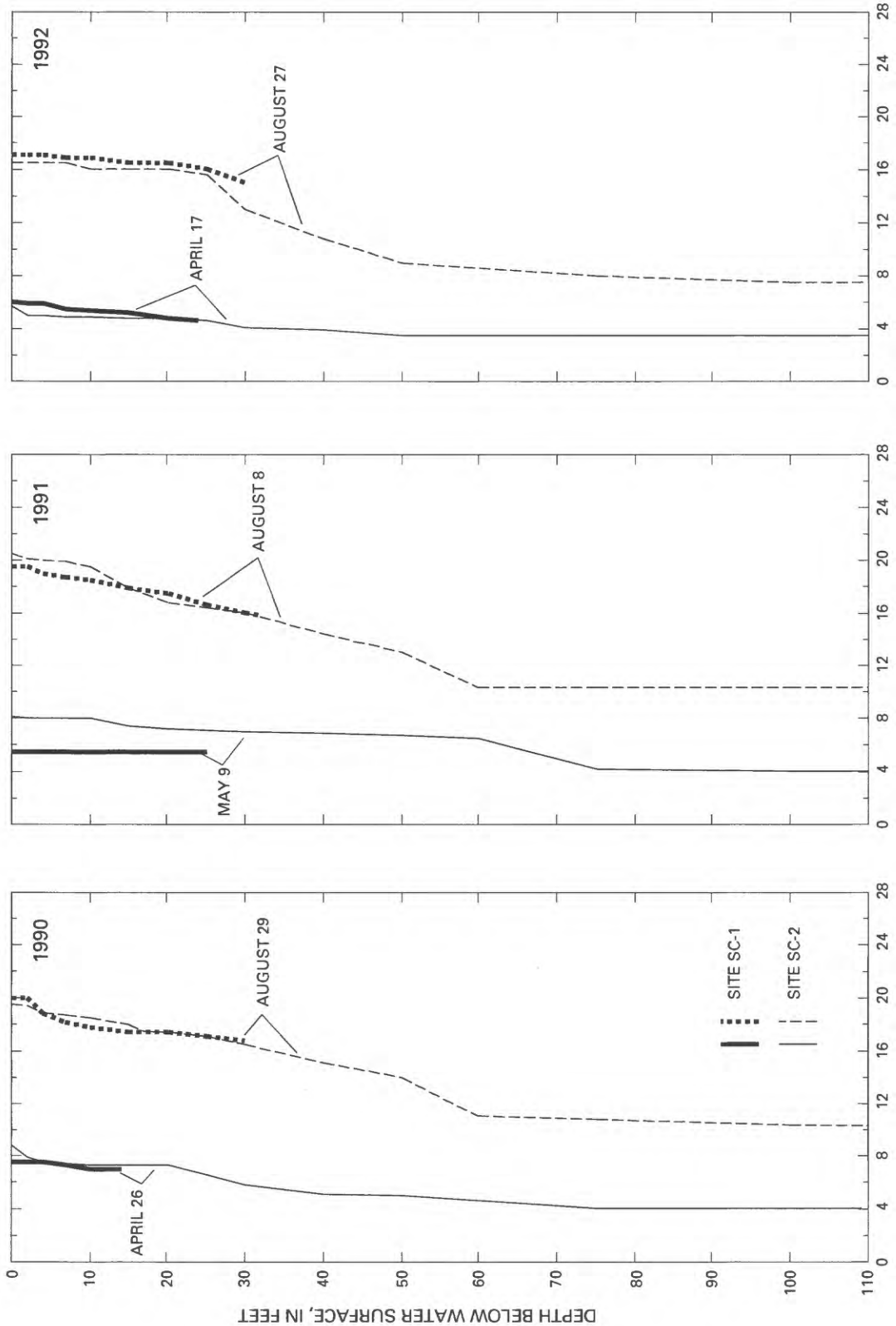


Figure 10. Profile measurements of water temperature in spring and August at sites SC–1 and SC–2 in Stagecoach Reservoir, 1990–92.

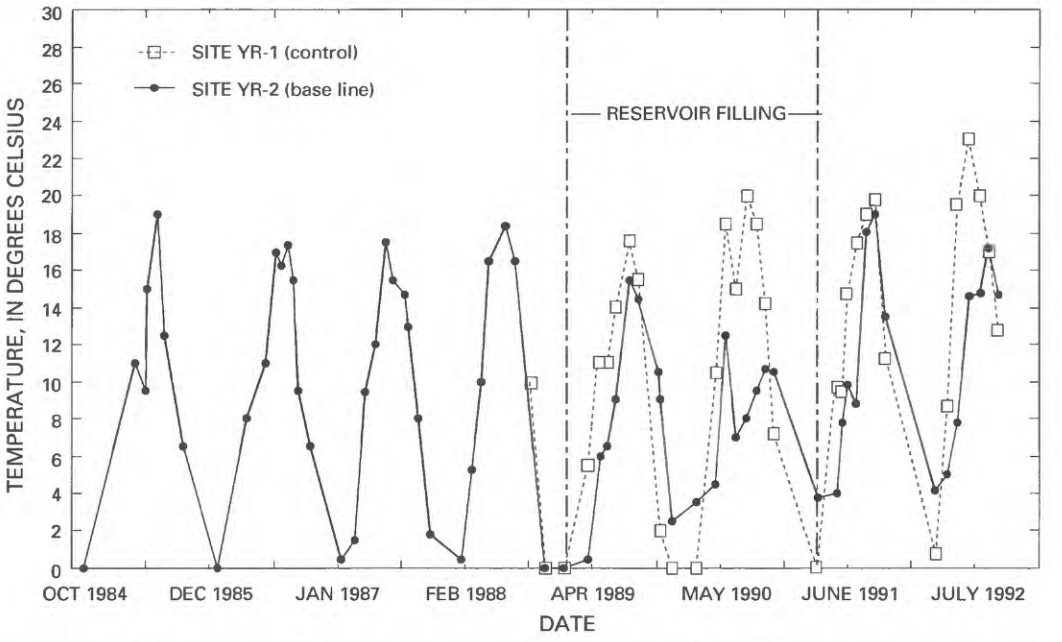


Figure 11. Periodic measurements of water temperature in the Yampa River at sites YR–1 (water years 1989–92) and YR–2 (water years 1985–92).

Dissolved Oxygen and Biochemical Oxygen Demand

Oxygen dissolves in water to a concentration controlled by the atmospheric partial pressure of the gas and the temperature and salinity of the water. Concentrations of DO at 100-percent saturation will increase as water temperature decreases or atmospheric pressure increases, or both.

Except for photosynthesis, almost all oxygen transfer to the water occurs at the air-water interface. Because oxygen diffuses very slowly in calm water (Hutchinson, 1957), winds, water turbulence, and currents are major factors in the aeration of a water body.

Seasonal and diel variations of DO in a water body are indirect measures of the internal metabolism and oxygen demand of the system. In lakes, the epilimnion typically is a zone where photosynthesis (largely by phytoplankton production) occurs. This zone often is marked by nutrient uptake and daytime oxygen production. When ample nutrients and lighting conditions exist, zones of oxygen supersaturation can develop.

Conversely, the hypolimnion can accumulate biomass produced in overlying waters and debris transported by inflowing streams. As organisms die and settle downward, they are decomposed by bacteria and fungi. During decomposition, reduced forms of nutrients are returned to the water and oxygen is consumed. If large amounts of organic matter are present in a thermally stratified lake, the concentrations of DO in the deeper levels can be decreased to zero (anaerobic). Anaerobic decomposition in the hypolimnion of lakes often results in the production of hydrogen sulfide and ammonia.

The quantity of oxygen consumed by indigenous processes in an isolated water sample that is confined in the dark at 20°C for 5 days is termed the 5-day biochemical oxygen demand (BOD). BOD is a measurement of the biological and chemical oxygen demand that exists in the sample and includes respiration, decomposition, and chemical oxidation. Allowing for variables, such as temperature differences between the sampled water body and the incubator, BOD sometimes is used to estimate the oxidation processes in a river or lake.

Concentrations of DO in Stagecoach Reservoir (tables 8 and 9) generally decreased with depth and ranged from 0 mg/L in the hypolimnion at sites SC–1 and SC–2 to 13.0 mg/L in the epilimnion at site SC–2. Large photosynthetic activity, indicated indirectly by pH values greater than 8.3 and DO saturation greater than 120 percent, was common in the epilimnion in summer. Photosynthesis apparently was greatest at site SC–2 in August 1990 when pH was measured at 8.9 and DO saturation was 180 percent. Anaerobic conditions from decomposition and respiration generally characterized the hypolimnion in summer. General decreases in pH and DO occurred following late fall mixing. Profile measurements of DO for selected depths at sites SC–1 and SC–2 in spring and August 1990–92 are shown in figure 14.

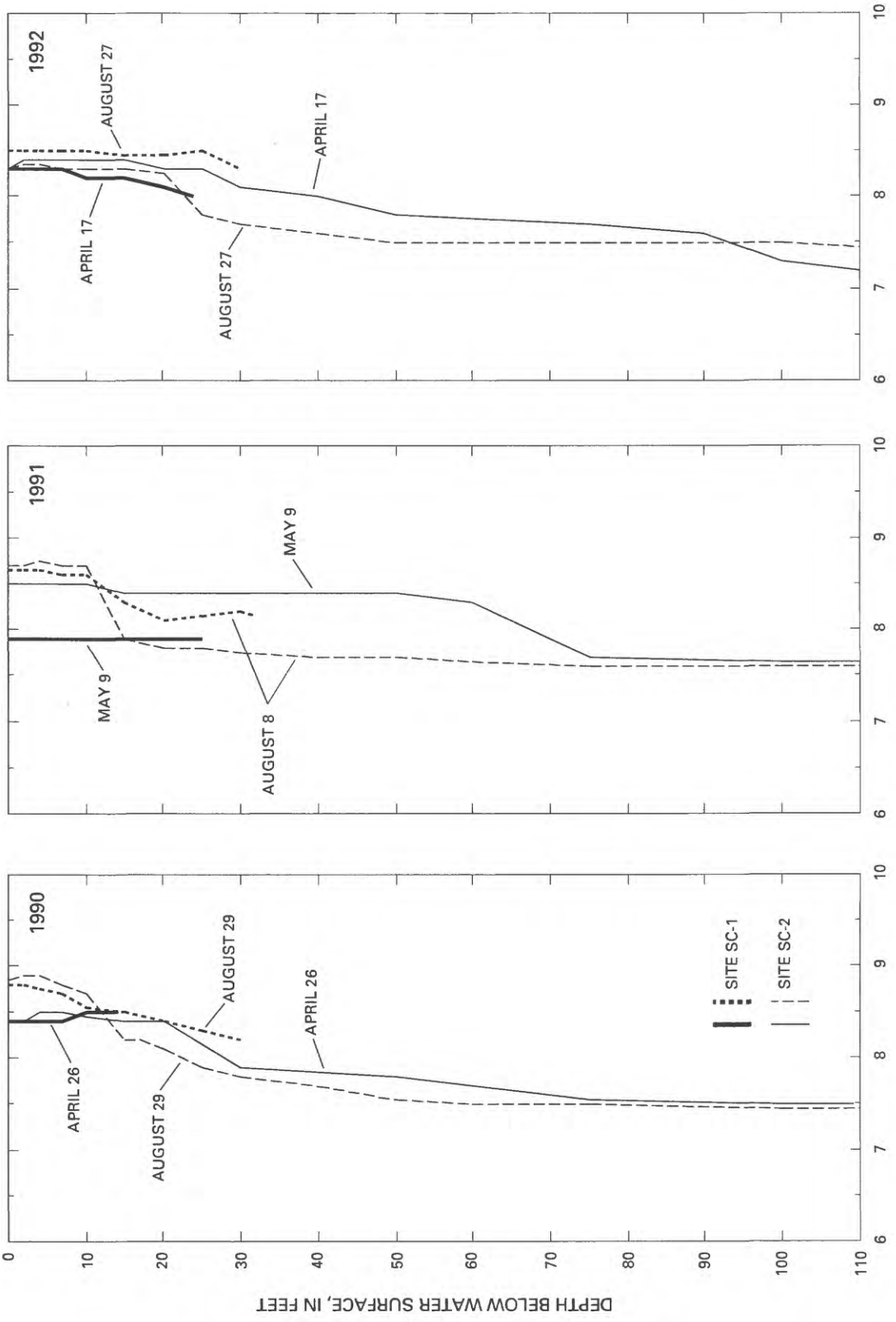


Figure 12. Profile measurements of pH in spring and August at sites SC–1 and SC–2 in Stagecoach Reservoir, 1990–92.

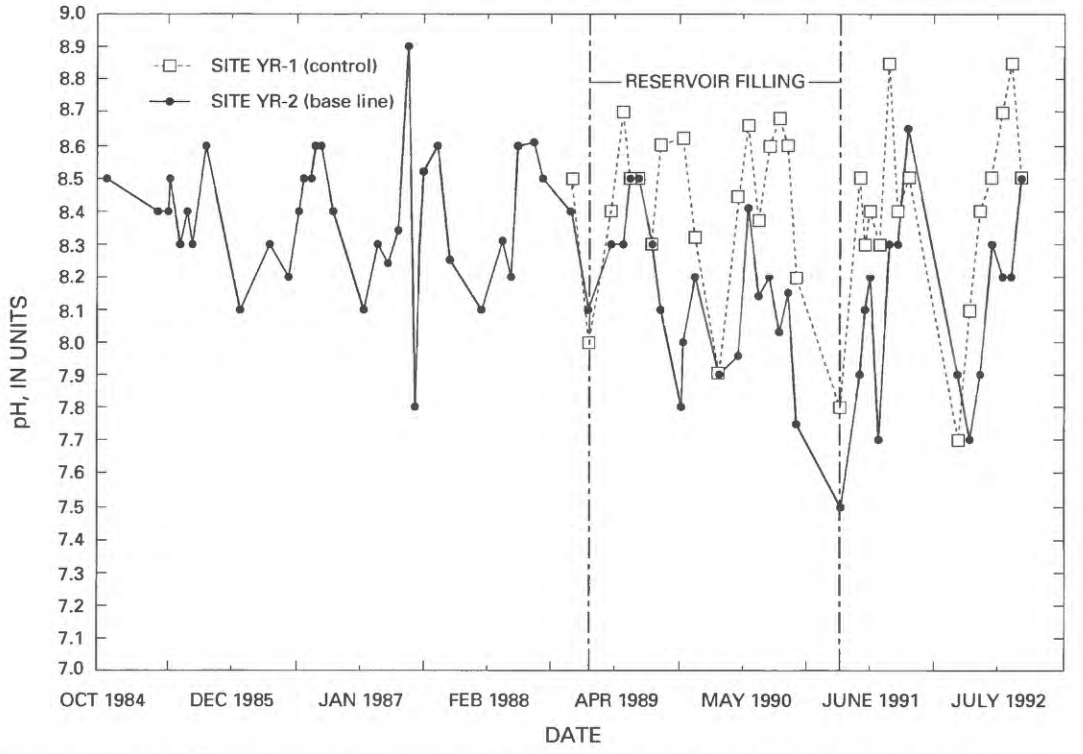


Figure 13. Periodic measurements of pH in the Yampa River at sites YR–1 (water years 1989–92) and YR–2 (water years 1985–92).

Estimates of oxygen depletion in Stagecoach Reservoir, if that water is incubated at 20°C, are shown as BOD, in milligrams per liter per day, in figure 15. The data indicate that the average daily oxygen depletion from DO-saturated samples was greatest during the first few days of incubation. Average daily BOD as great as several milligrams per liter per day was recorded at the 2-ft and the near-bottom depths at site SC–2 during the first 3 days of incubation. The large BOD at the 2-ft depth at site SC–2 probably was from the respiration of large growths of algae; bacterial respiration and the rapid oxidation of reduced chemical constituents presumably were the cause of the large BOD observed in the near-bottom waters at site SC–2. The average daily BOD decreased as the incubation period increased. After 5 days of incubation, the average BOD of all incubations in Stagecoach Reservoir at sites SC–1 and SC–2 (tables 10 and 11) ranged from 0.33 (mg/L)/d from the near-bottom depths at site SC–1 to 0.46 (mg/L)/d near the reservoir bottom at site SC–2. After 20 days of incubation, the average BOD for all samples at sites SC–1 and SC–2 ranged from 0.20 to 0.23 (mg/L)/d. When the temperature of incubation was decreased to winter ranges (0.5 to 4.0°C), measured rates of average daily BOD during 20 days of incubation were decreased about 9 to 54 percent of the incubation rates measured at 20°C (fig. 16).

Because Stagecoach Reservoir was new in 1989, and the filling and flushing rates were small during 1989–92, large amounts of organic debris might have accumulated and decomposed in the bottom water. Also, the inflow of organic material and the seasonal growths and accumulation of reservoir algae added to or renewed substantial amounts of organic matter to the reservoir. These organic accumulations and the small annual inflows during 1990 and 1992 (less than 36,000 acre-ft) might have accounted for the early summer development of anaerobic conditions at depths greater than 30 ft during those years. Although similar anaerobic conditions developed in 1991, the extensive oxygen depletions at depth did not occur until September. This delay might have resulted from the greater flushing rate in 1991 (about 47,000 acre-ft) when compared with 1990 and 1992. Should these conditions apply, then the development and extent of anaerobic zones might be decreased or eliminated in years when annual inflow approaches or exceeds the average annual inflow (about 65,000 acre-ft).

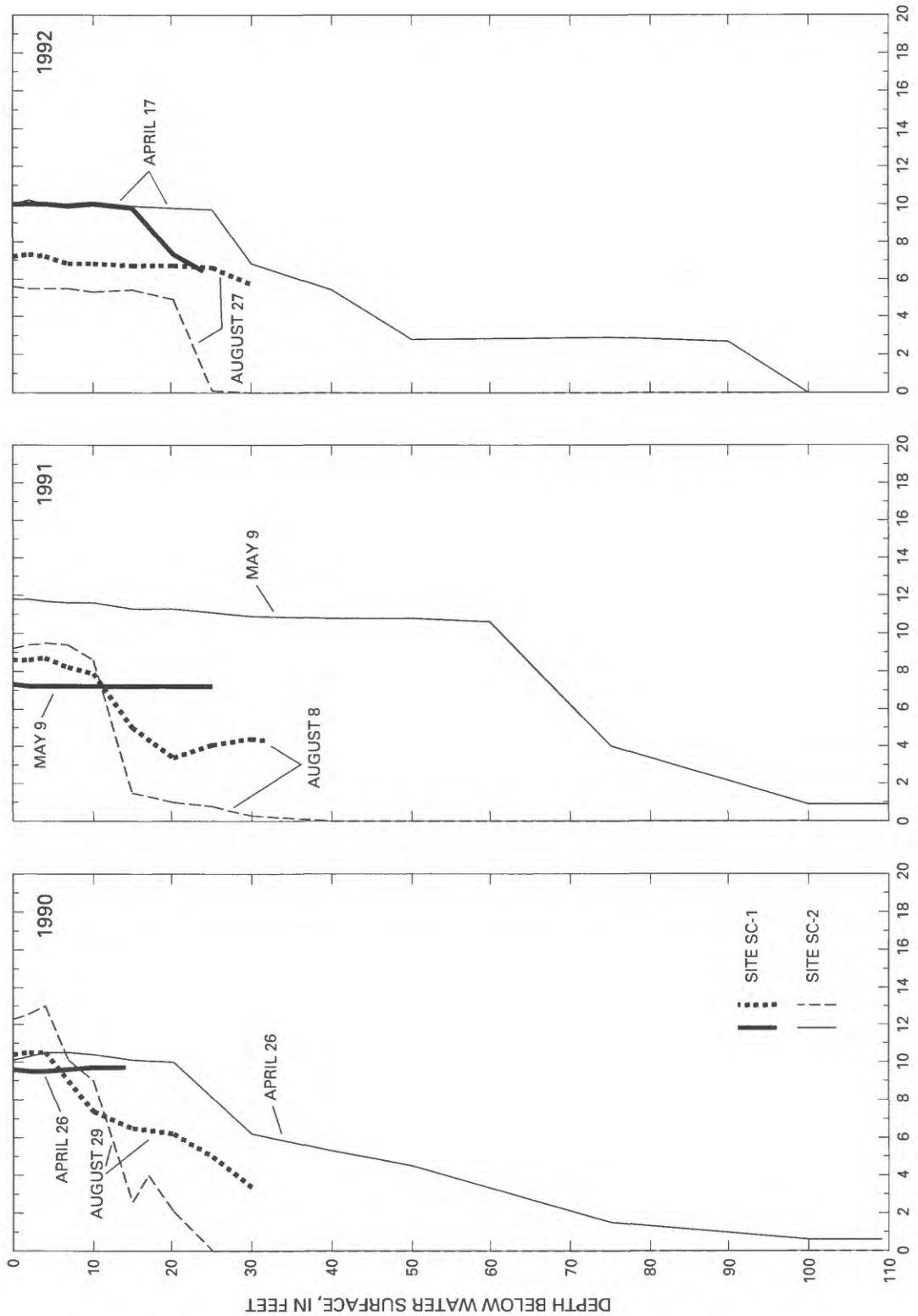


Figure 14. Profile measurements of dissolved-oxygen concentration in spring and August at sites SC–1 and SC–2 in Stagecoach Reservoir, 1990–92.

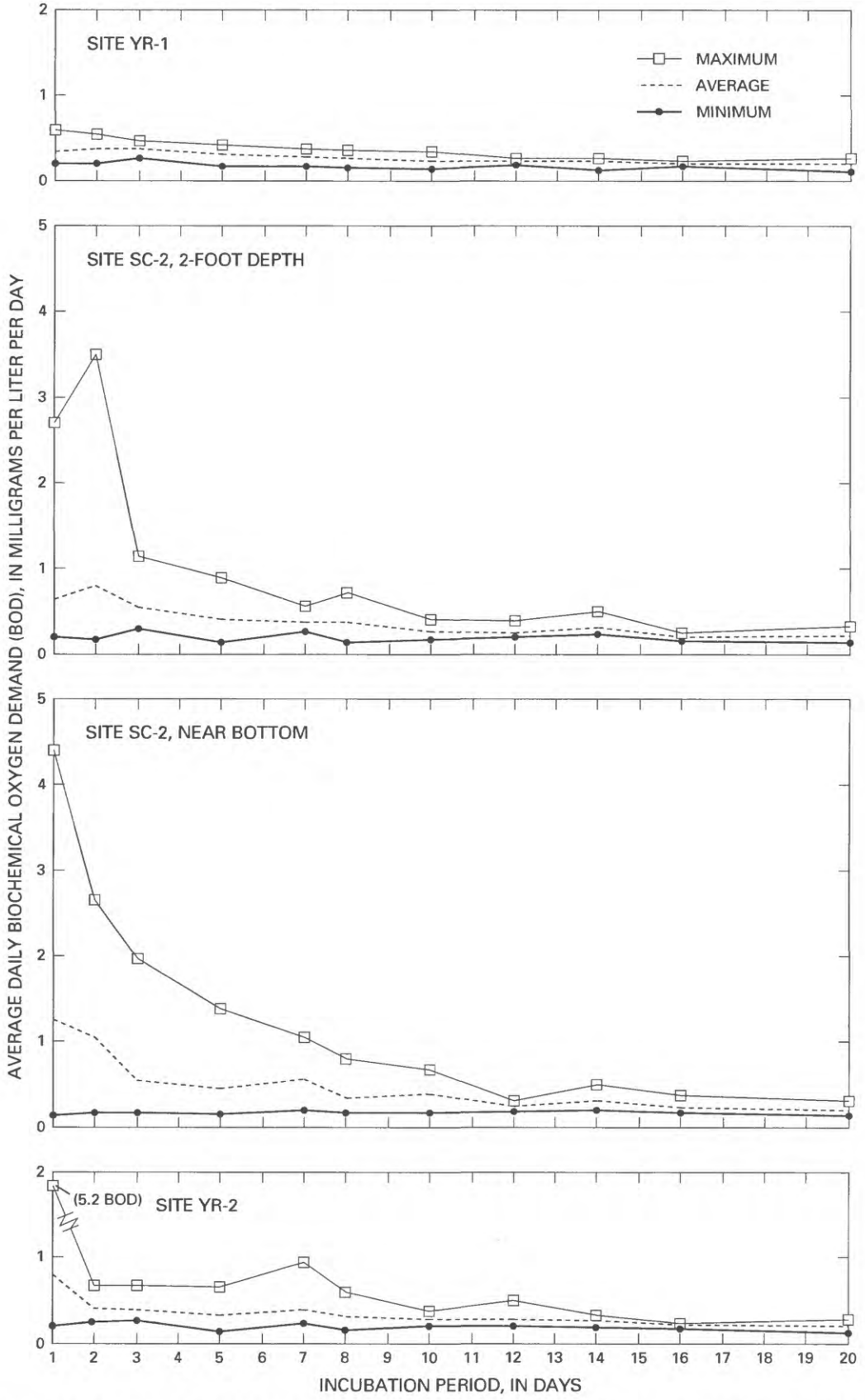


Figure 15. Average daily biochemical oxygen demand in the Yampa River at sites YR–1 and YR–2 (water years 1989–92) and in Stagecoach Reservoir at site SC–2 (1990–92).

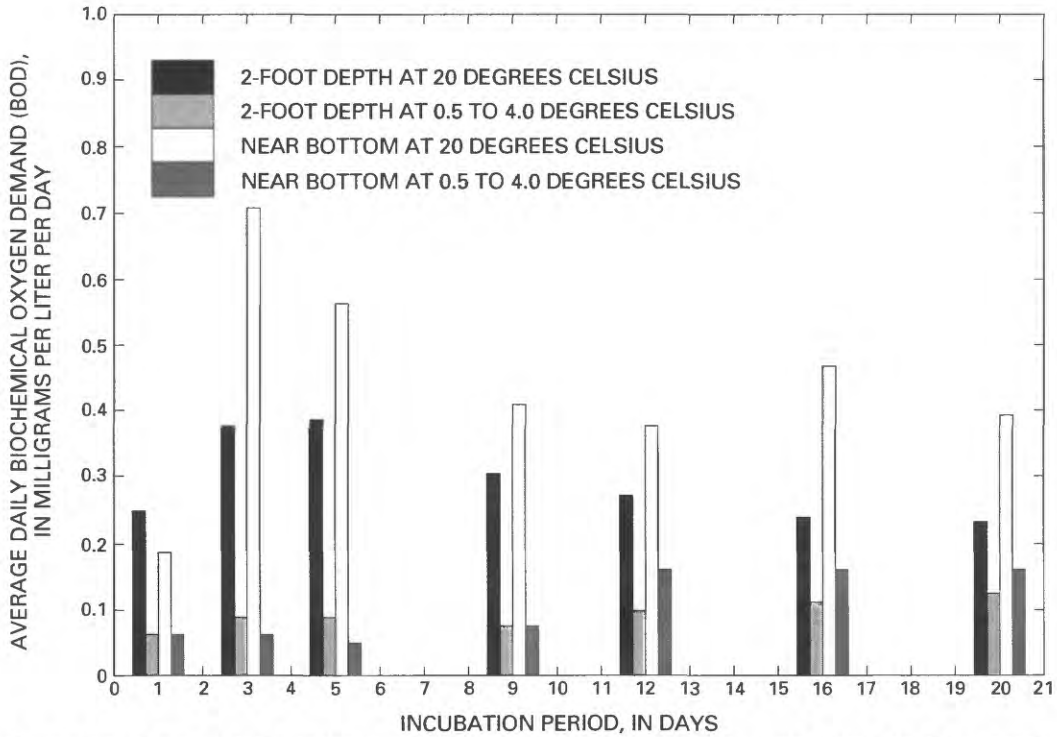


Figure 16. Average daily biochemical oxygen demand of samples incubated at 0.5 to 4.0 degrees Celsius and at 20 degrees Celsius from Stagecoach Reservoir at site SC–2, September 25, 1992.

Periodic measurements of concentrations of DO in the Yampa River at sites YR–1 and YR–2 are shown in figure 17. Control and base-line data in the Yampa River indicate that all concentrations of DO at both sites were greater than 6.0 mg/L, and most concentrations were greater than 100-percent saturation. During the period of reservoir filling, concentrations of DO at site YR–2 ranged from 1.2 to 11.5 mg/L, and concentrations generally were less than values measured at site YR–1. After the reservoir had filled, all measured concentrations of DO at site YR–2 were greater than 6.0 mg/L. The small concentrations of DO at site YR–2 in 1990 resulted when anaerobic water that probably had large rates of BOD was released to the river upstream from site YR–2.

Cool waters that have concentrations of DO greater than 6.0 mg/L are desirable for fish management downstream from Stagecoach Reservoir. However, the summertime supply of cool water near the bottom of the reservoir had small concentrations of DO or was anaerobic. A study was done on August 26, 1992, to determine what effect the cool, bottom-release water would have on DO concentrations downstream from the dam. Data results for two release configurations are shown in figure 18. The discharge during each release was about 83 ft^3/s, and the average 5-day BOD was less than 0.5 (mg/L)/d. Data for the warm (about 17°C) release water from the top gate indicate that concentrations of DO increased from 4.7 to 7.1 mg/L from the dam pool to site YR–2. Concentrations of DO increased from 0 to 4.7 mg/L in the same distance when colder (about 8°C) anaerobic waters were released from the bottom gate. The increases in concentrations of DO were greatest in the bottom-release water because the water was cold and the oxygen gradient between the water and atmosphere was great. Future concentrations of DO in the Yampa River near site YR–2 mostly will depend on the management of the three release gates and the DO distribution in Stagecoach Reservoir.

General Chemical Characteristics

The general chemical constituents in natural water are derived from soils and rocks mainly from the action of water that contains atmospheric and (or) biologically produced CO_2 (Hem, 1985). CO_2 readily dissolves in water, which decreases pH and increases acidity. The chemical constituents are selectively dissolved from the soils and rocks into various states of oxidation and ionization and often are grouped as

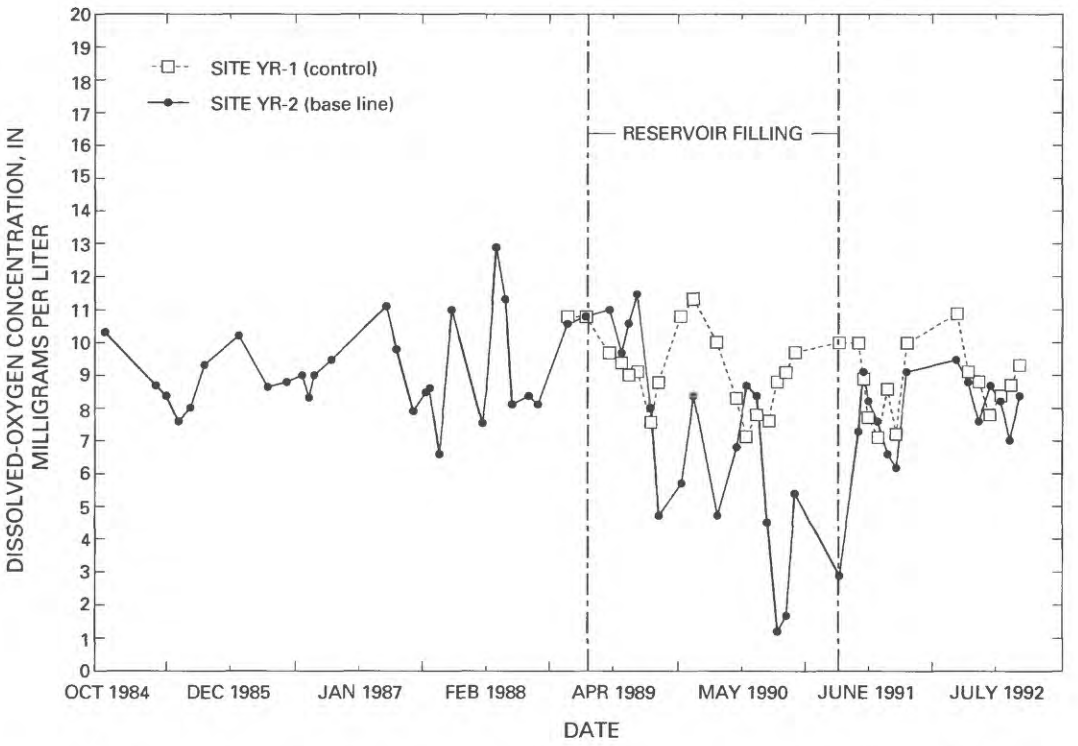


Figure 17. Periodic measurements of concentrations of dissolved oxygen in the Yampa River at sites YR–1 (water years 1989–92) and YR–2 (water years 1985–92).

major constituents or ions, nutrients, and trace constituents. The sum of all dissolved constituents constitutes the total dissolved solids in water. By convention, the sum of the major constituents commonly is used to calculate the sum of dissolved solids.

Specific conductance and dissolved solids

Specific conductance is a measure of the ability of water to conduct an electric current and is reported in microsiemens per centimeter at 25 degrees Celsius. Specific conductance can be used to estimate the dissolved-solids concentration of similar water types (Hem, 1985). Chemical, physical, and biological activities continuously alter specific conductance through chemical solution or precipitation, dilution and evaporation, and metabolic uptake and release of chemicals.

Specific conductance from profile measurements in Stagecoach Reservoir (tables 8 and 9) ranged from 414 to 520 µS/cm. Specific conductance generally increased with depth and seasonally, from spring to fall. Values of specific conductance within the reservoir mostly were related to the specific conductance of the inflow from the Yampa River.

Base-line and control measurements of specific conductance in the Yampa River ranged from about 300 to about 560 µS/cm (fig. 19). When streamflow that had different values of specific conductance entered Stagecoach Reservoir, the waters interlayered and mixed with resident waters. The extent of mixing depended on the temperature of the inflow and the thermal strata characteristics within the reservoir. The effect of the reservoir on specific conductance downstream at site YR–2 is shown in figure 19. Because inflow to Stagecoach Reservoir was pooled and mixed, ranges of specific conductance in the reservoir and at site YR–2 after 1988 decreased compared with ranges of specific conductance at the control site YR–1. Future values of specific conductance at site YR–2 will depend on the release-gate management and on distribution of specific conductance in the reservoir.

The relation of dissolved-solids concentration to specific conductance in the reservoir and in the Yampa River at sites YR–1 and YR–2 is shown in figure 20. Estimates of dissolved solids can be made from values of specific conductance in the reservoir or the Yampa River, or both, by using the regression shown in figure 20.

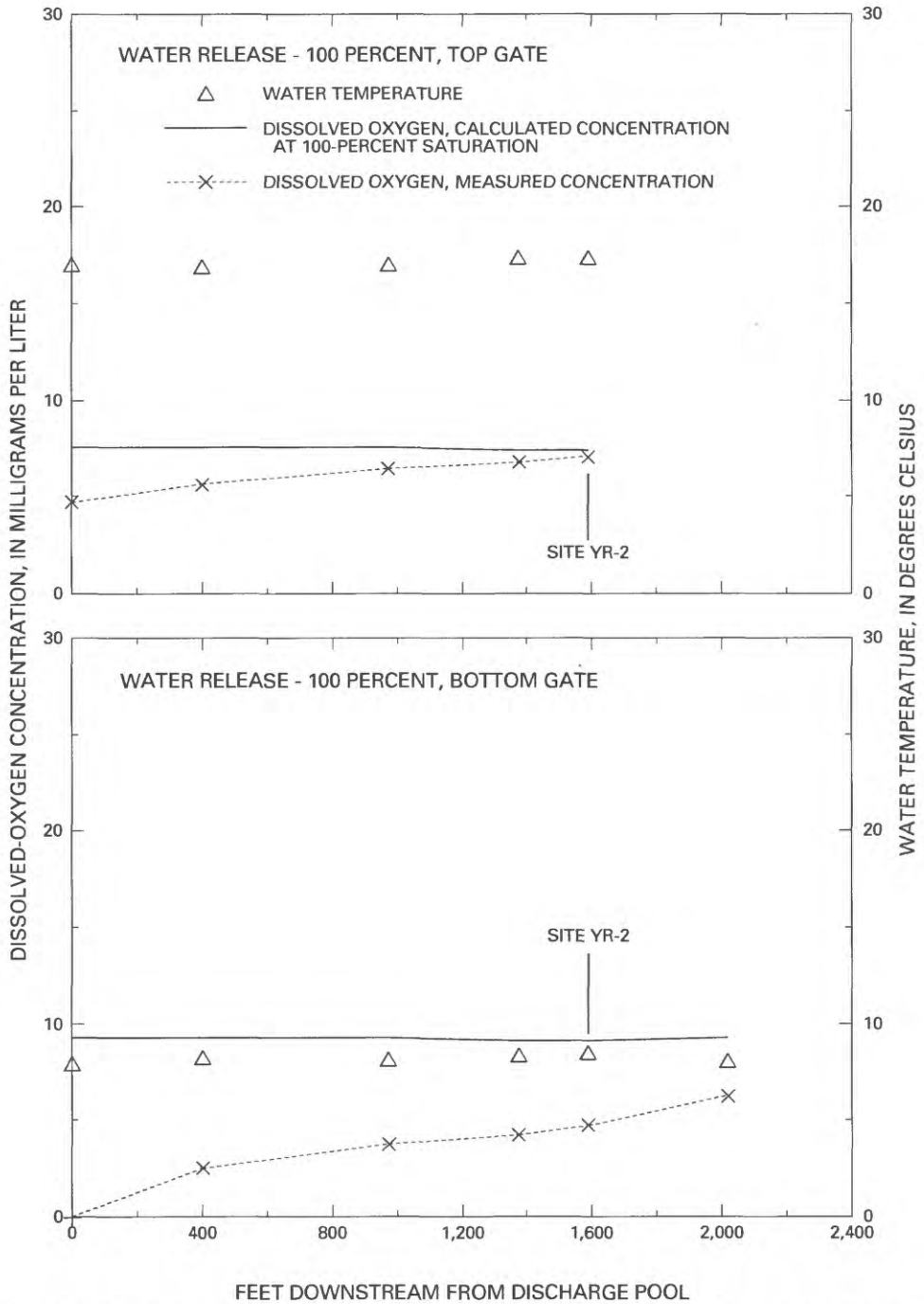


Figure 18. Changes in concentration of dissolved oxygen in the Yampa River downstream from Stagecoach Reservoir in two release configurations, August 26, 1992.

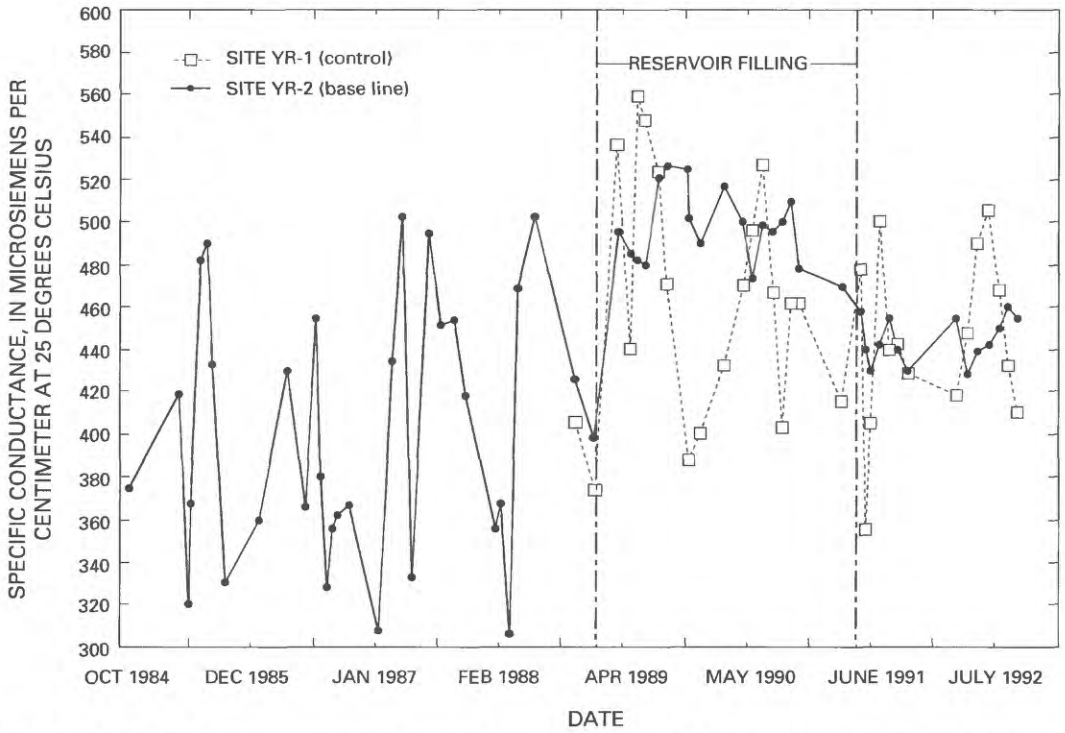


Figure 19. Periodic measurements of specific conductance in the Yampa River at sites YR–1 (water years 1989–92) and YR–2 (water years 1985–92).

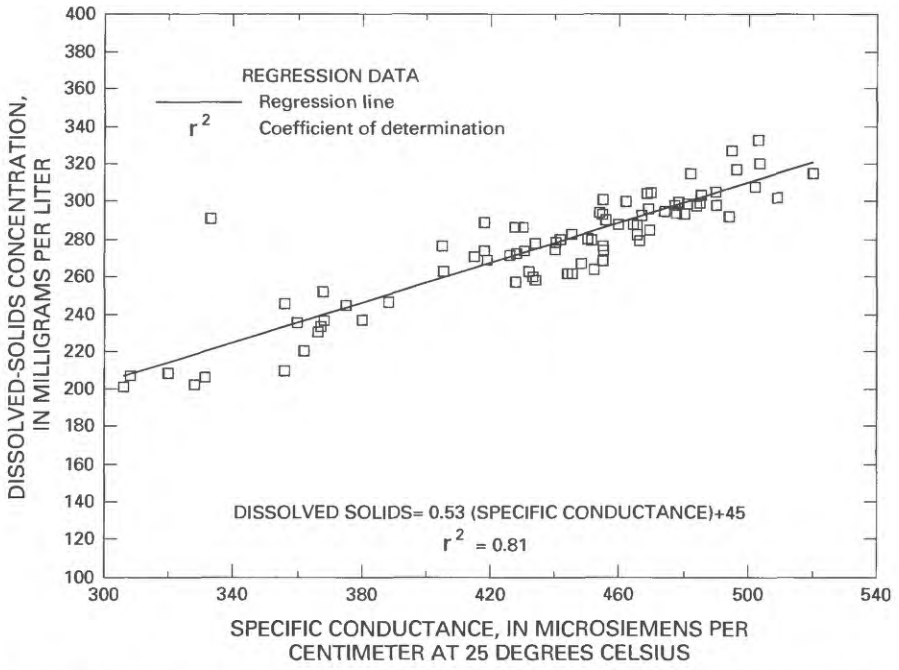


Figure 20. Relation of dissolved-solids concentrations to specific conductance in the Yampa River (sites YR–1 and YR–2, water years 1985–92) and Stagecoach Reservoir (sites SC–1 and SC–2, 1990–92).

Major constituents

The most common major ions that account for most of the dissolved solids in natural water are listed below:

Cations (positive charge)	Anions (negative charge)
Calcium (Ca)	Alkalinity ($CaCO_3$)
Magnesium (Mg)	Bicarbonate (HCO_3)
Potassium (K)	Carbonate (CO_3)
Sodium (Na)	Sulfate (SO_4)
	Chloride (Cl)
	Fluoride (F)

Data for these ions provide a basis for the determination of hardness and the geochemical classifications used in this report (table 4).

The general geochemical type for all periodic measurements of major ions in the Yampa River (U.S. Geological Survey, 1978–86, 1987–93) and in Stagecoach Reservoir (tables 12 and 13), determined from milliequivalent conversions of concentrations of cations and anions, was a very hard, calcium bicarbonate (reported as $CaCO_3$ alkalinity) type. Concentrations of the major ions and values of specific conductance are correlated in figure 21. Changes in concentrations of calcium; bicarbonate alkalinity; and, to a lesser extent, sulfate were the principal causes for changes in specific conductance and dissolved solids.

Nutrients

The biological productivity in lakes and streams is dependent on the availability of nutrients within the aquatic system. Those elements that are essential in large quantities for plant growth, such as nitrogen, phosphorus, and carbon, are termed major nutrients or macronutrients. Those elements needed in minute quantities (molybdenum, zinc, and so on) are classified as trace nutrients or micronutrients.

Although there are several ways for nutrients to enter a lake, most nutrients originate from surface-water inflow; cultural input, such as discharge from septic tanks; and nitrogen fixation by biological processes. Once in the lake, nutrients are subjected to various removal or recycling functions, or both. Nutrients can be removed from the water through chemical activities, adsorption onto sediment and subsequent burial, and biological uses. These processes may be reversed, however, through biochemical action. The conversion of inorganic nutrients into biomass within a zone of substantial algae productivity may be reversed in the profundal zone where nutrients are recycled back into solution as by-products from decomposition. These processes often produce uneven chemical and nutrient distributions when the lake is stratified.

Attempts to classify lakes into trophic categories frequently are based on the concentrations of growth-stimulating macronutrients. Much controversy has been generated during the last several decades as to which nutrients limit growth or are environmentally controllable (Likens, 1972). Nitrogen and especially phosphorus currently are considered the major nutrients that affect the rate of eutrophication in lakes and reservoirs. Sawyer (1947) states that nuisance phytoplankton conditions can occur when inorganic nitrogen levels exceed 0.3 mg/L and phosphorus levels exceed 0.01 mg/L.

Vollenweider (1968) compared the input of nitrogen and phosphorus with lake mean depth and determined that shallow lakes are more sensitive to nuisance growth conditions than deeper lakes. However, a short hydraulic residence time (low C/I ratio) can control phytoplankton production by maintaining high turbidity and rapid flushing rates (Welch, 1969). Various attempts to control the rate and undesirable effects of eutrophication are summarized by Dunst and others (1974).

Table 4. Chemical criteria used to classify water types and hardness

[Water types, modified from Piper and others, 1953, p. 26; hardness, modified from Durfor and Becker, 1964, p. 27]

Milliequivalents per liter		Classification	Bivalent cations; calcium and magnesium (milligrams per liter as $CaCO_3$)
Cations	Anions		
Single cation used when it amounts to 50 percent or more of the total cations; when the above does not exist, the highest two cations are used.	Single anion used when it amounts to 50 percent or more of the total anions; when the above does not exist, the highest two anions are used.	Soft	Less than 60
		Moderately hard	61–120
		Hard	121–180
		Very hard	More than 180

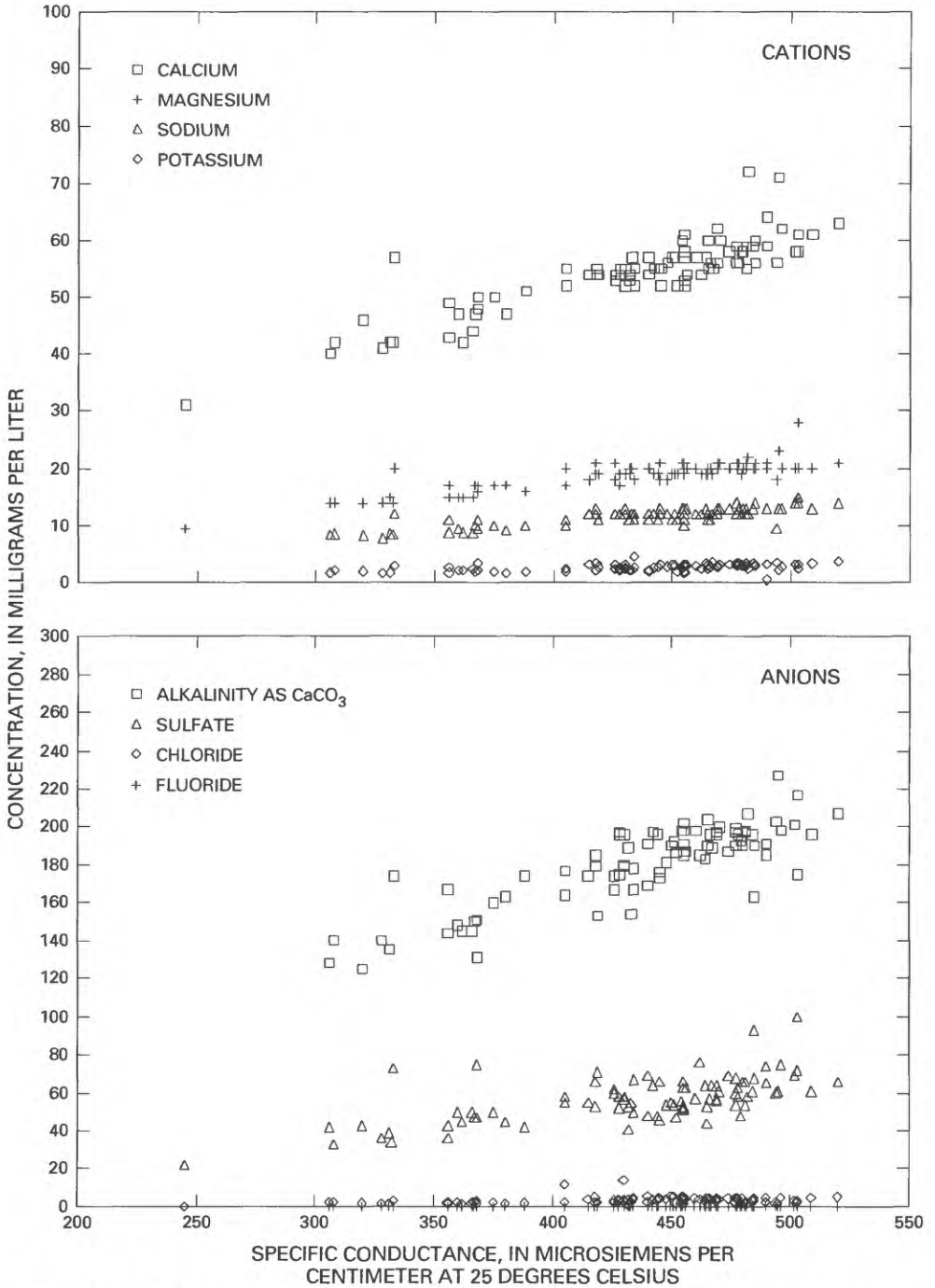


Figure 21. Correlation of concentrations of major ions to values of specific conductance in the Yampa River (sites YR–1 and YR–2, water years 1985–92) and Stagecoach Reservoir (sites SC–1 and SC–2, 1990–92).

A review of nutrient control and base-line data for the Yampa River (U.S. Geological Survey, 1978–86, 1987–93) indicated that concentrations of dissolved and total ammonia at sites YR–1 and YR–2 ranged from less than 0.01 to 0.07 mg/L as nitrogen (N), and concentrations of dissolved and total nitrite plus nitrate only occasionally exceeded the minimal detection limits (0.05 to 0.1 mg/L as N). Concentrations of dissolved and total organic nitrogen at sites YR–1 and YR–2 generally ranged from 0.18 to about 1.0 mg/L. Most nitrogen that entered Stagecoach Reservoir from the Yampa River probably was organic nitrogen. Control and base-line data for dissolved phosphorus measured at sites YR–1 and YR–2 generally ranged from less than 0.01 to about 0.06 mg/L as phosphorus (P), and concentrations of total phosphorus ranged from 0.02 to as great as 0.2 mg/L as P.

Measured concentrations of nitrogen and phosphorus in Stagecoach Reservoir are listed in tables 14 and 15; concentrations of dissolved ammonia and phosphorus at site SC–2 are shown in figures 22 and 23. Data indicate that concentrations of dissolved ammonia and phosphorus increased to about 0.9 to 1.6 mg/L as N and to about 0.32 to 0.35 mg/L as P in the near-bottom waters at site SC–2 during summer. Similar increases in concentrations did not occur at the 2-ft depth. The accumulation of these constituents in the near-bottom waters can be attributed to decomposition of organic matter produced in the epilimnion or decomposition of preexisting organic matter in the bottom of the new reservoir. The presence of large concentrations of ammonia and phosphorus in near-bottom waters at site SC–2 in April of 1990 and 1992, prior to complete spring mixing, indicates that similar conditions probably existed during winter. Concentrations of ammonia and phosphorus increased substantially from previously measured concentrations at the 2-ft depth at site SC–2 in October 1990 and November 1992 (figs. 22 and 23). These increases in concentration were attributed to nutrient-rich water in the hypolimnion mixing with the overlying water column during fall turnover.

The general absence of measurable concentrations of nitrite plus nitrate in the epilimnion compared with measured concentrations near the reservoir bottom in spring and summer (tables 14 and 15) probably was caused from the rapid uptake of these nitrogen compounds by algae that existed within the euphotic zone. Continued reservoir flushing from 1990 to 1992 probably caused the general annual decrease in concentrations of organic carbon and organic nitrogen at site SC–2 shown in figure 24.

The concentrations of inorganic nitrogen and phosphorus in Stagecoach Reservoir shortly after spring and fall mixing were adequate to support extensive algae growth. In addition, nitrogen fixation of atmospheric nitrogen by blue-green algae in the reservoir was possible. Because nutrient recycling is substantial in stratified lakes and reservoirs that have extensive anaerobic zones, continued flushing and near- or above-average annual inflow can decrease, but probably not eliminate, the large concentrations of recycled ammonia and phosphorus generated in the hypolimnion.

The effects of Stagecoach Reservoir on concentrations of ammonia and phosphorus in the Yampa River at site YR–2 are shown in figures 25 and 26. During reservoir filling, a fivefold to twentyfold increase in concentrations of dissolved ammonia and phosphorus, compared with base-line data from the Yampa River, occurred at site YR–2. After the reservoir had filled in 1991, it was possible to release and mix discharge water from reservoir depths having very different nutrient concentrations, and concentrations of ammonia and phosphorus at site YR–2 decreased to ranges similar to base-line data from the Yampa River. Lesser but similar patterns of change in concentrations of organic nitrogen occurred at site YR–2 during the same period. Because nitrates are used rapidly by reservoir algae, all concentrations of nitrite plus nitrate decreased at site YR–2 from less than 0.1 to several tenths of a milligram per liter as N to near or less than detection limits (0.05 mg/L as N) after water year 1991.

Trace constituents

A group of 20 selected trace constituents was analyzed from samples collected annually (1990–92) from the near-bottom depths in Stagecoach Reservoir (tables 16 and 17) and semiannually (water years 1985–92) at sites YR–1 and YR–2 (U.S. Geological Survey, 1978–86, 1987–93). Because some trace constituents can more readily dissolve in oxygen-deficient and chemically reduced waters, samples were obtained from anaerobic water in Stagecoach Reservoir. High- and low-flow conditions in the Yampa River were sampled to measure concentrations during large sediment transport and in base-flow conditions. The reservoir data were compared with base-line and control data from the Yampa River to determine if the reduced chemical conditions near the reservoir bottom increased concentrations of trace constituents greater than measured concentrations in the Yampa River. The data also were collected to determine if concentrations in excess of State-recommended criteria (Colorado Department of Health, 1978) were present in the reservoir during 1990–92 or in the Yampa River during water years 1985–92.

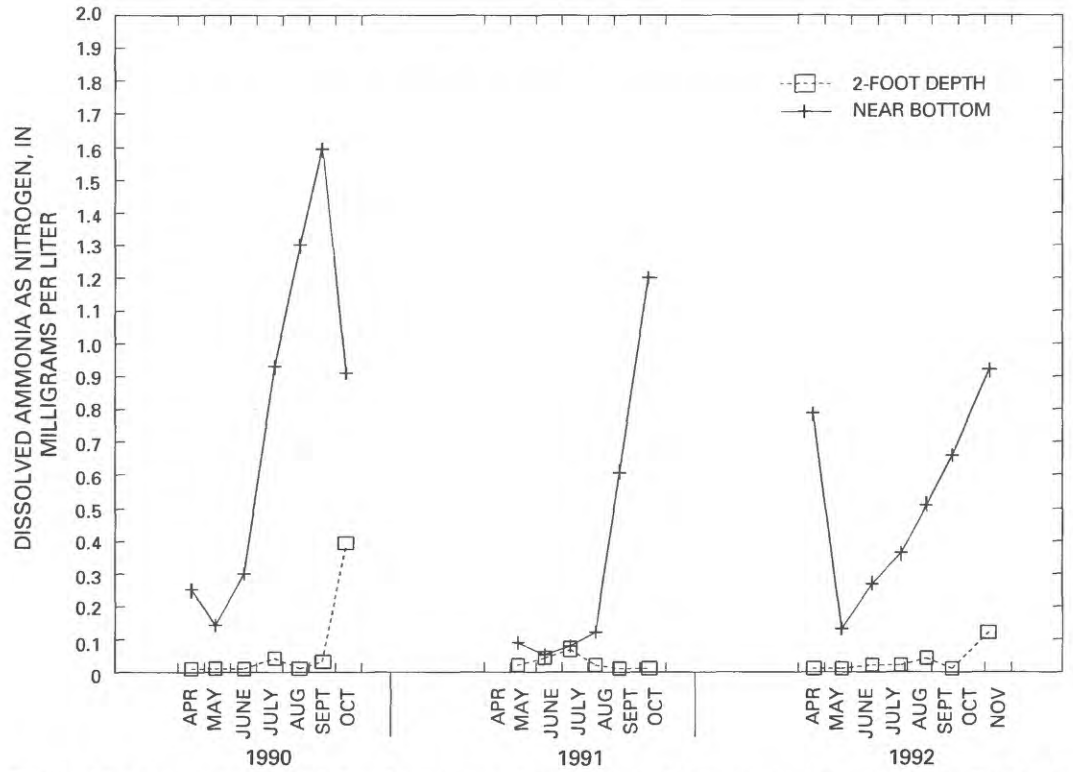


Figure 22. Concentrations of dissolved ammonia as nitrogen in Stagecoach Reservoir at site SC–2, 1990–92.

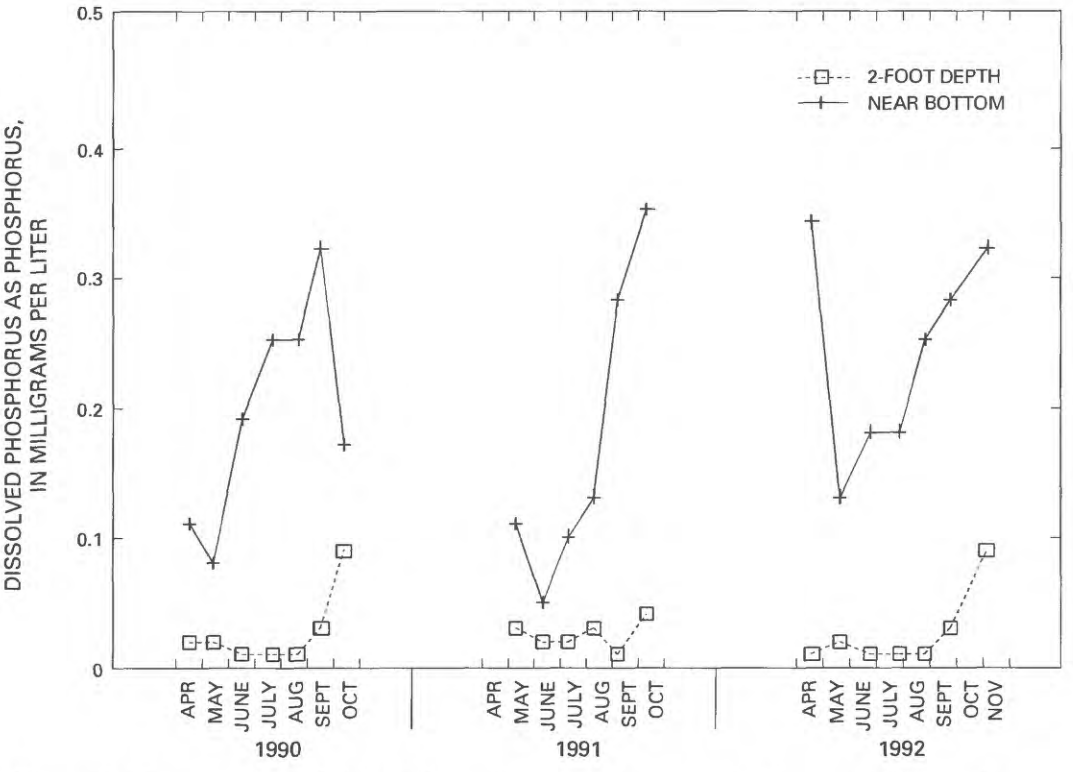


Figure 23. Concentrations of dissolved phosphorus as phosphorus in Stagecoach Reservoir at site SC–2, 1990–92.

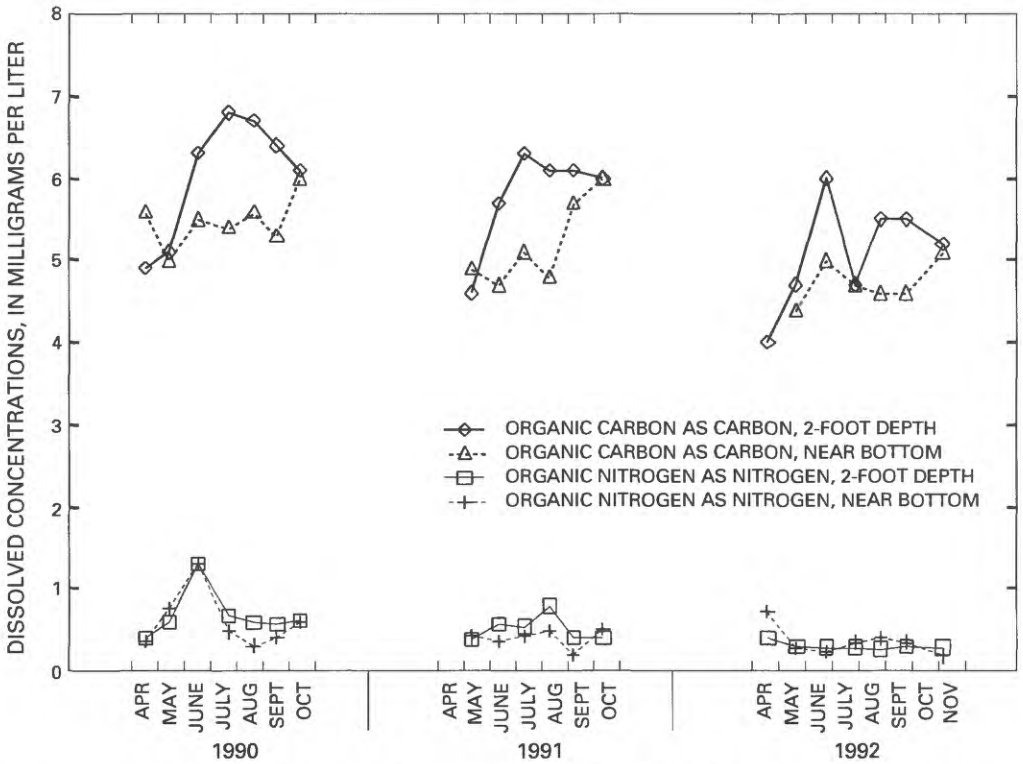


Figure 24. Concentrations of organic carbon and organic nitrogen in Stagecoach Reservoir at site SC–2, 1990–92.

Except for manganese, all total recoverable concentrations of trace constituents in Stagecoach Reservoir were within the ranges of concentrations measured in the Yampa River. Furthermore, most concentrations of trace constituents were measured at or near detection limits. Concentrations of manganese (210 to 440 µg/L) in the chemically reduced water near the reservoir bottom at site SC–2 (table 17) were several times greater than the range (30 to 100 µg/L) measured at site YR–1. In addition, concentrations of manganese (40 to 360 µg/L) downstream from the reservoir at site YR–2 during water years 1988–92 were greater than concentrations measured at site YR–1. However, because most total and total recoverable concentrations of trace constituents were small in the reservoir and the Yampa River, the effects of Stagecoach Reservoir on concentrations of the measured trace constituents in the Yampa River probably were minimal.

Biological Characteristics

Biota in lakes and reservoirs are complex and include plants (particularly phytoplankton), bacteria, zooplankton, insects and other invertebrates, and vertebrates such as fish and waterfowl (Hutchinson, 1967; Odum, 1971). The distributions and densities of organisms vary greatly with season, physical conditions, and nutrient availability. Stagecoach Reservoir was sampled for phytoplankton and the sanitary-indicator bacteria, fecal coliform and fecal streptococci.

Phytoplankton

Biological studies of lakes frequently begin with an investigation of the phytoplankton community. As the primary producers in the ecosystem of the lake, these organisms are fundamental to general productivity. The taxonomy or classification of phytoplankton, commonly known as algae, varies somewhat among taxonomists. In this report, the following divisions or phyla, taken from Prescott (1970), with modifications of Chrysophyta based on Patrick and Reimer (1966), are used:

Bacillariophyta	—diatoms
Chlorophyta	—green algae
Cyanophyta	—blue-green algae
Chrysophyta	—golden algae
Euglenophyta	—euglenoids
Cryptophyta	—cryptomonads
Pyrrhophyta	—dinoflagellates

Phytoplankton in this report is identified to the species level.

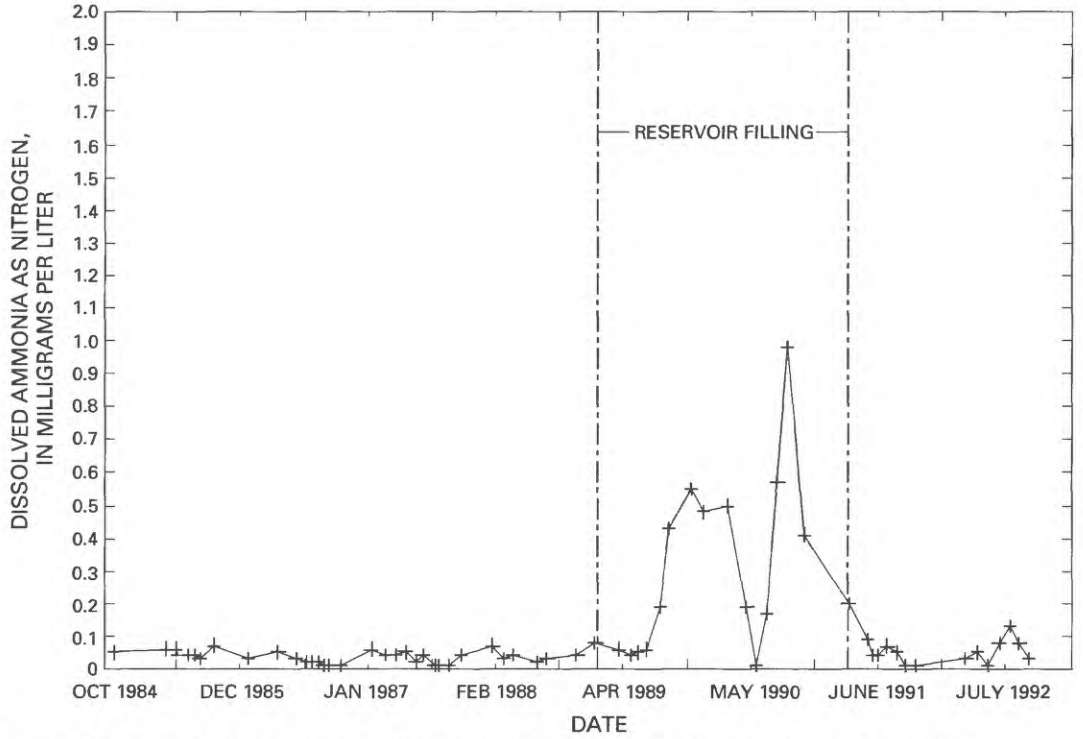


Figure 25. Periodic measurements of concentrations of dissolved ammonia as nitrogen in the Yampa River at site YR–2, water years 1985–92.

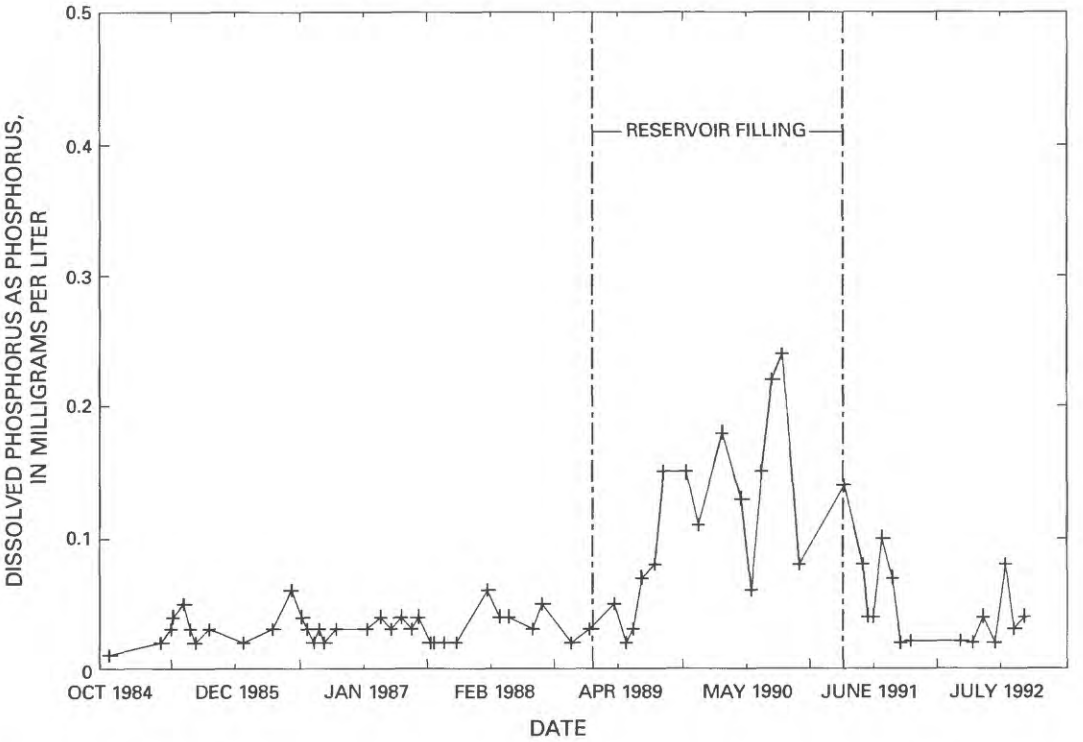


Figure 26. Periodic measurements of concentrations of dissolved phosphorus as phosphorus in the Yampa River at site YR–2, water years 1985–92.

Phytoplankton densities will vary considerably from lake to lake and commonly show seasonal fluctuation or progressions within a given lake (Greeson, 1971). The ratios and dominance or persistence, or both, of phytoplankton groups are sometimes used as an aid in lake classification (Hutchinson, 1967). Other investigators might use a diversity index (DI) such as that proposed by Wilhm and Dorris (1968). The DI per individual is formulated as:

$$DI = -\sum_{i=1}^{S} \frac{n_i}{n} \log_2 \frac{n_i}{n} \qquad (1)$$

where

S = the total number of taxa in each sample of the community;

i = the i^{th} taxon in each sample, which ranges from 1 to s;

n_i = the number of individuals in each taxon; and

n = the total number of individuals in a sample.

The DI is a ratio of the number of species or other taxa to another important value, usually the total number of organisms in a sample of the community. The DI measures the evenness of distribution of individuals within the community (Greeson, 1982). The use of DI as an indicator of water-quality conditions is based on the assumption that the environment in unpolluted water generally is favorable for a greater number of species, thus a greater DI than in polluted water. The DI in unpolluted water is large because a community can develop that has many species of relatively equal abundance. Persistent small DI values are indicative of polluted or environmentally stressed water because these waters will favor only the tolerant organisms. The DI can range from zero (all organisms in the community belong to the same species) to any positive number. The upper limit, however, is about nine and most frequently is less than five.

Because phytoplankton distributions within a reservoir can vary, phytoplankton in Stagecoach Reservoir was sampled at sites SC–1 and SC–2 from depths of maximum concentrations of DO (usually at the 2-ft depth) and as a composite from the euphotic zone (usually 0–20 ft). Phytoplankton identification, cell counts, biovolume, DI, and chlorophyll *a* concentrations for sites SC–1 and SC–2 are listed in tables 18 and 19 in the "Supplemental Data" section. For general descriptive purposes, however, the data from the point depths and composite samples were combined for each site and treated as one phytoplankton sample for each sampling period. A list of identified algae and months detected is presented in table 5.

A total of 119 phytoplankton species from 7 phyla was identified in Stagecoach Reservoir during 1990–92. Small cells of Cyanophyta (blue-green algae) accounted for most of the cell counts during 1990–92 (fig. 27). Biovolume composition mostly was from blue-green algae cells in 1990, but changed to a mixed composition of mostly large algal cells of Bacillariophyta (diatoms), Chlorophyta (green algae), and Euglenophyta (euglenoids) in 1991 (fig. 27).

During reservoir filling in the summer of 1990, extensive growths of the undesirable blue-green alga, *Aphanizomenon*, developed throughout the reservoir. Macrocolonies of the algae were visible at depth, and dead colonies collected as surface scum. During June–August, the photosynthetic activities of the algae most likely caused values of DO saturation to increase in excess of 150 percent (tables 8 and 9 in the "Supplemental Data" section). Large densities of *Aphanizomenon* also occurred in 1991 and 1992, but densities were less in 1991 than 1990 or 1992.

In addition to the significant presence of *Aphanizomenon*, an increase in cell counts of the blue-green alga, *Aphanocapsa*, occurred from 1990 to 1992. In 1990, cell counts of *Aphanocapsa delicatissima* commonly were in the range of a few hundred cells per milliliter. By the summer of 1992, the same species commonly had cell counts that exceeded several hundred thousand cells per milliliter (tables 18 and 19). The metabolic activities associated with these large densities of algae in Stagecoach Reservoir not only caused supersaturation of DO in the epilimnion, but also contributed to the decreases in DO concentrations during respiration and from the decomposition of dead algae.

Values of DI for all samples are listed in tables 18 and 19, and the monthly average DI of the samples are shown in figure 28. The DI values of the phytoplankton community varied greatly during the filling of the reservoir in 1990, ranging from 0.05 at site SC–2 in June to 2.94 at site SC–1 in July. After the reservoir had filled in 1991, values of DI ranged from 1.72 at site SC–1 in June to 3.06 at site SC–2 in May. If the progressive decrease in values of DI during the summer of 1992 is indicative of future seasonal trends, then the community diversity of algae in Stagecoach Reservoir probably will be greatest after spring turnover. Subsequent to mixing of the reservoir in spring, the DI values for algae may decrease during summer as the temperature of the reservoir water increases and the supply of available nutrients decreases or changes.

Table 5. Taxa and monthly occurrences of phytoplankton in Stagecoach Reservoir, 1990–92

[A M J J A S O N, months in order listed, April, May, June, July, August, September, October, and November; X, species detected]

Phylum order	Genus species	Year and month detected																		
		1990							1991							1992				
		A	M	J	J	A	S	O	A	M	J	J	A	S	O	A	M	J	J	A	S	N
BACILLARIOPHYTA (DIATOMS)																						
Centrales	*Aulacoseira italica* var. *tenuissima*																	X				
	Cyclotella kutzingiana			X						X	X											
	Cyclotella meneghiniana													X		X	X					
	Cyclotella ocellata																		X	X		
	Cyclotella sp.			X		X	X	X		X	X					X	X					
	Melosira distans			X																		
	Melosira granulata			X																		
	Melosira italica				X	X																
	Melosira varians													X							X	
	Rhizosolenia longiseta	X				X																
	Stephanodiscus alpinus	X	X	X	X	X	X															
	Stephanodiscus astraea			X										X	X	X	X			X	X	
	Stephanodiscus astraea var. *minutula*									X	X	X		X		X	X					
	Stephanodiscus dubius			X																		
	Stephanodiscus sp.			X																		
Pennales	*Achnanthes lanceolata*	X																				
	Achnanthes marginulata																			X		
	Achnanthes minutissima	X	X	X	X		X	X		X												
	Achnanthes sp.																			X		
	Asterionella formosa			X		X							X	X		X	X	X		X	X	X
	Cocconeis placentula																			X		
	Cocconeis placentula var. *euglypta*												X	X								
	Cymbella affinis						X	X														
	Cymbella cymbiformis																			X		
	Cymbella lunata																		X			
	Cymbella minuta													X								
	Diatoma tenue var. *elongatum*	X																				
	Diatoma vulgare						X							X								
	Epithemia sorex						X									X						
	Fragilaria crotonensis		X	X						X	X							X	X	X	X	
	Fragilaria vaucheriae			X						X				X						X		
	Fragilaria sp.			X		X		X			X											
	Fragilaria sp. 2							X														
	Gomphonema parvulum						X						X	X		X	X	X				
	Gyrosigma sp.																				X	
	Hannaea arcus										X	X										
	Meridion circulare																		X			
	Navicula cryptocephala									X	X			X								
	Navicula cryptocephala var. *veneta*						X	X														
	Navicula lanceolata																X					
	Navicula minima									X				X								

Table 5. Taxa and monthly occurrences of phytoplankton in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Year and month detected																						
		1990							1991							1992								
		A	M	J	J	A	S	O	A	M	J	J	A	S	O	A	M	J	J	A	S	N		
BACILLARIOPHYTA (DIATOMS)--Continued																								
Pennales--Continued	*Navicula pupula*							X										X						
	Navicula radiosa															X								
	Navicula tripunctata																	X						
	Navicula sp.		X											X							X			
	Nitzschia acicularis										X			X	X		X							
	Nitzschia dissipata						X			X				X	X									
	Nitzschia gracilis					X																		
	Nitzschia palea															X	X							
	Nitzschia sp.	X	X																					
	Rhoicosphenia curvata						X																	
	Surirella minuta																X							
	Synedra cyclopum			X																				
	Synedra delicatissima																X	X						
	Synedra ulna												X											
	Tabellaria fenestrata	X				X																		
	Unknown pennate									X		X				X								
CHLOROPHYTA (GREEN ALGAE)																								
	Actinastrum braunii												X											
	Ankistrodesmus falcatus	X	X				X									X		X	X	X	X			
	Ankyra judayi		X	X	X	X	X																	
	Carteria sp.															X	X							
	Chlamydomonas globosa	X																						
	Chlamydomonas sp.	X	X		X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X			
	Chlorella ellipsoidea				X			X		X	X	X	X	X	X	X	X	X						
	Chlorococcum humicola			X	X	X	X	X		X	X	X	X	X	X	X	X	X						
	Chlorococcum sp.	X																						
	Elakatothrix viridis			X			X																	
	Eudorina elegans														X									
	Oocytis pusilla													X				X						
	Oocytis sp.			X																				
	Roya obtusa var. *angelica*			X																				
	Schroederia judayi										X	X									X			
	Selenastrum minutum				X					X	X				X	X	X	X						
	Sphaerocystis schroeteri				X	X												X						
	Staurastrum sp.												X									X		
	Tetraedron muticum	X																						
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)																								
	Chrysococcus rufescens		X																					
	Dinobryon divergens																	X						
	Dinobryon sertularia	X	X																			X		
	Dinobryon sociale																						X	
	Gloeobotrys limneticus	X																						
	Kephyrion sp.	X	X		X								X											

Table 5. Taxa and monthly occurrences of phytoplankton in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Year and month detected																						
		1990							1991							1992								
		A	M	J	J	A	S	O	A	M	J	J	A	S	O	A	M	J	J	A	S	N		
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)--Continued																								
	Mallomonas sp.	X		X	X					X	X				X		X			X				
	Ochromonas sp.				X																			
	Unknown flagellate	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X						
CYANOPHYTA (BLUE-GREEN ALGAE)																								
	Anabaena wisconseninse												X	X										
	Aphanizomenon flos-aquae			X	X	X	X					X					X	X	X	X	X	X		
	Aphanizomenon gracile							X																
	Aphanocapsa delicatissima	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
	Aphanocapsa elachista									X	X	X	X	X		X	X							
	Aphanocapsa rivularis									X		X												
	Aphanothece nidulans																	X						
	Aphanothece saxicola				X																			
	Chroococcus dispersus	X	X	X	X	X	X			X	X	X	X	X	X									
	Chroococcus limneticus																				X		X	
	Chroococcus sp.	X	X		X	X	X	X				X			X	X	X	X	X						
	Coelosphaerium kuetzingianum												X	X										
	Dactylococcopsis fascicularis									X							X	X						
	Dactylococcopsis smithii		X																					
	Lyngbya nana		X																					
	Microcystis aeruginosa																				X			
	Oscillatoria amphibia												X	X										
	Oscillatoria limnetica				X	X																		
	Phormidium tenue																	X	X					
	Pseudanabaena catenata						X	X																
	Spirulina major				X		X																	
	Synechococcus lineare		X																					
	Synechococcus sp.		X			X	X											X						
	Unknown filament															X								
CRYPTOPHYTA (CRYPTOMONADS)																								
	Chroomonas sp.		X		X											X	X							
	Cryptomonas erosa	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X			
	Cryptomonas ovata				X	X	X																	
	Rhodomonas minuta	X	X	X	X	X	X			X	X	X	X		X	X	X							
EUGLENOPHYTA (EUGLENOIDS)																								
	Euglena sp.									X	X	X	X	X	X	X	X	X	X	X	X	X		
	Phacus sp.							X																
	Trachelomonas sp.																			X	X	X	X	
PYRROPHYTA (DINOFLAGELLATES)																								
	Ceratium hirundinella						X	X					X	X				X						
	Glenodinium pulvisculus	X																						
	Peridinium pusillum									X						X								
Total	Number of species	119			71					50						62								

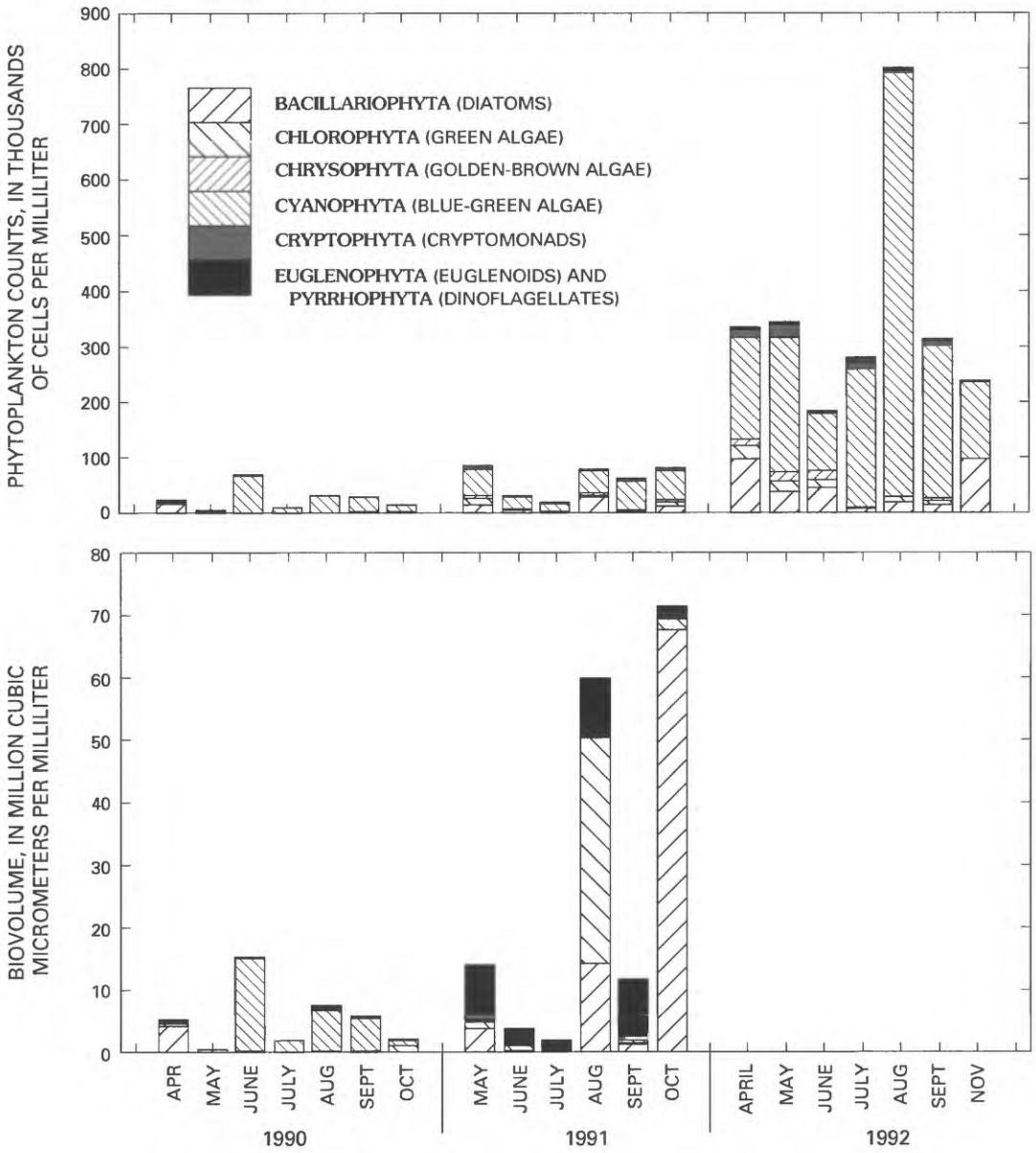


Figure 27. Cell counts and biovolume of phytoplankton in Stagecoach Reservoir (sites SC–1 and SC–2), 1990–92.

Sanitary-indicator bacteria

Fecal coliform and fecal streptococci bacteria are natural inhabitants of the intestinal tract of man and other animals and are excreted in large numbers. The presence of large numbers of fecal coliform and fecal streptococci bacteria in water provides warning of the potential presence of waterborne pathogenic organisms (Federal Water Quality Administration, 1971).

Knowing whether the fecal coliform bacteria originated from human or other animals would be helpful in interpreting or locating the source of contamination. To assist in this determination, the ratio of fecal coliform to fecal streptococci (FC/FS) sometimes is used. A ratio greater than 4.0 indicates a human-waste source; a ratio of less than 1.0 indicates a source that is predominantly livestock or poultry, or both (Federal Water Quality Administration, 1971). The State of Colorado (Colorado Department of Health, 1978) has established the following criteria for recreational waters:

	Fecal coliform bacteria per 100 milliliters
	Geometric mean
Class I - Primary contact	200
Class II - Secondary contact	1,000

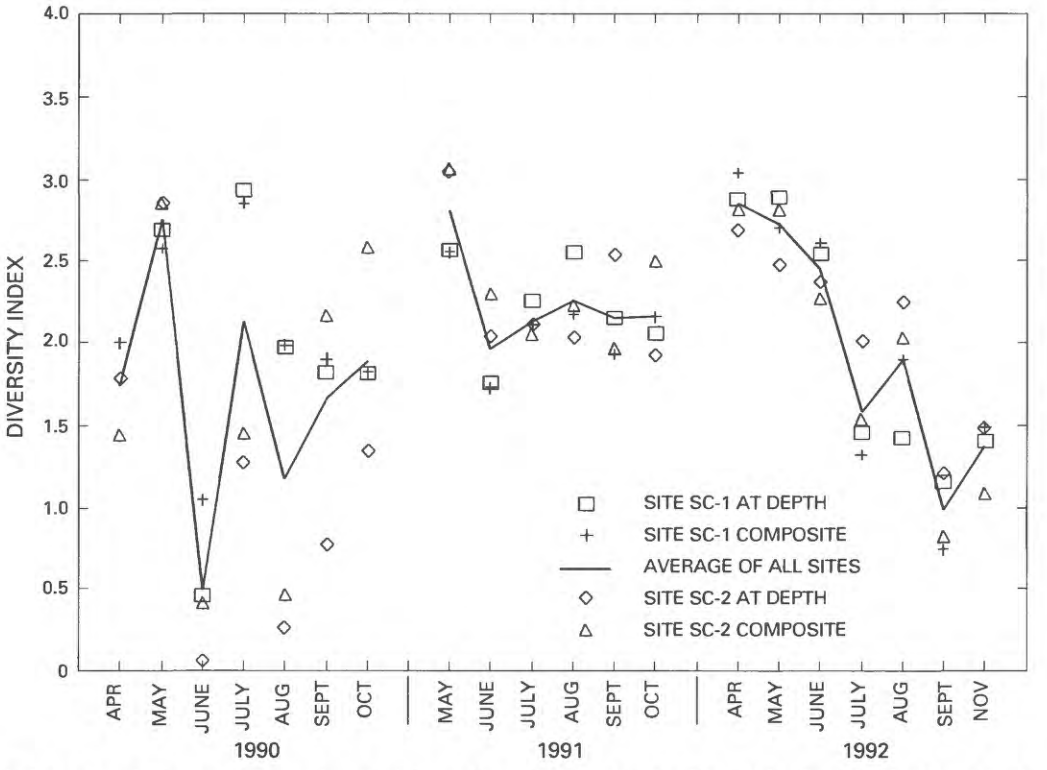


Figure 28. Values of diversity index for phytoplankton in Stagecoach Reservoir (sites SC–1 and SC–2), 1990–92.

Because Stagecoach Reservoir is used for recreation, counts of fecal coliform and fecal streptococci bacteria were determined from the 2-ft and near-bottom depths at sites SC–1 and SC–2 during 1990–92 (tables 10 and 11). Bacteria counts also were determined periodically for sites YR–1 and YR–2 during 1989–92 (fig. 29).

Bacteria colony counts in the Yampa River were greatest during spring and summer when runoff was greatest and least during base-flow conditions. Because suspended solids can adsorb organic material, bacteria densities mostly decreased in Stagecoach Reservoir from sites SC–1 to SC–2 as suspended material settled to the bottom of the reservoir (tables 10 and 11). All colony counts of fecal coliform at sites SC–1 and SC–2 during 1990–92 were less than the criteria limits set by the State of Colorado for recreational water. The large counts of bacteria at site YR–1, when compared with the smaller counts at site YR–2, also indicated that bacteria colony counts were greatly decreased in Stagecoach Reservoir. Most FC/FS ratios were less than 2.0 at site YR–1, and all ratios at sites SC–1, SC–2, and YR–2 were less than 1.0. Because the FC/FS ratios were substantially less than 4, the sources of the bacteria in Stagecoach Reservoir most likely were livestock and other sources indigenous to the basin and not from human origin.

Suspended-Sediment Loads

Colby (1963) defines fluvial sediment as sediment that is transported by or suspended in water or that has been deposited by water. Sediment is transported in suspension (suspended-sediment load) and as particles along the streambed (bedload). The suspended-sediment load normally consists of clay, silt, and sand that usually travels at the velocity of the stream. The sediment particles are held in suspension by the upward components of turbulent currents or by colloidal dispersion. Bedload consists of coarser sized sediment that comes from the bed and banks of the stream. Particles moving as bedload remain close to the streambed, usually within a few grain diameters for uniform sediment (Colby, 1963). The suspended-sediment load plus the bedload compose the total-sediment load. Because bedload was estimated at generally 3.5 percent or less of the total sediment load at several river sites in northwestern Colorado (Butler, 1986; Butler and others, 1990; Tobin and Hollowed, 1990; Tobin, 1993), bedload was considered to be a small part of the sediment load in the Yampa River and was not sampled. Concepts of fluvial sediment are discussed in Colby (1963) and Guy (1970a).

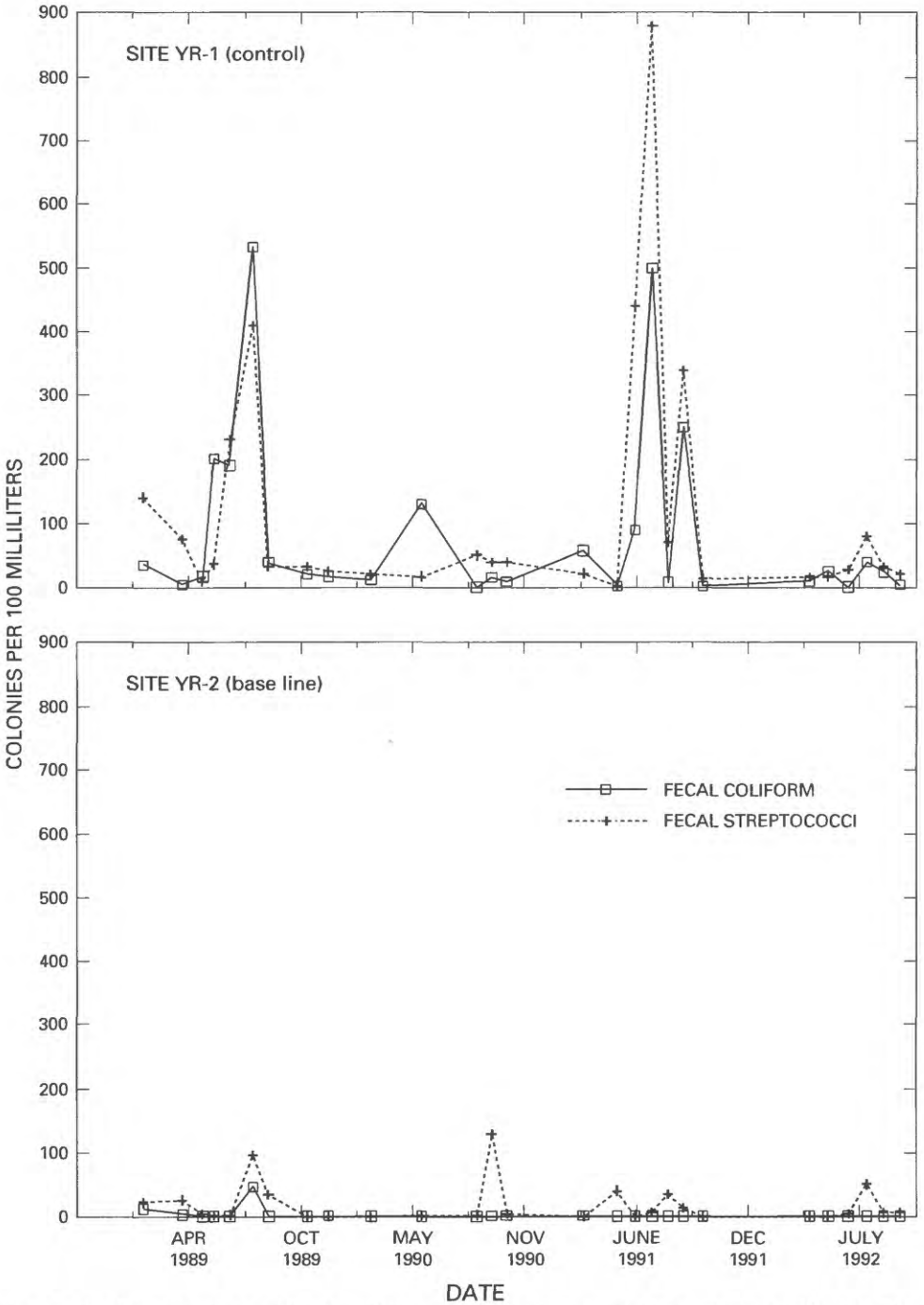


Figure 29. Colony counts of fecal coliform and fecal streptococci bacteria in the Yampa River at sites YR–1 and YR–2, water years 1989–92.

Fluvial sediment generally is deposited in lakes or reservoirs, stream channels, or flood plains. The efficiency of sediment retention in reservoirs is a function of reservoir capacity, inflow volume, mean velocity of flow through the reservoir, and size composition of the sediment load (Churchill, 1948; Brune, 1953). Generally, reservoir retention of sediment will increase as the ratio of the reservoir capacity to inflow volume increases or the percent composition of silt and clay in the sediment load decreases, or both.

Annual loads of suspended sediment transported by the Yampa River at site YR–1 for water years 1989–92 and at site YR–2 for water years 1985–88 were estimated by: (1) Computing least-squares regressions that related instantaneous suspended-sediment load to instantaneous stream discharge, (2) using these relations to compute a daily suspended-sediment discharge from daily stream discharge, and (3) summing these daily values to obtain an annual total. Instantaneous suspended-sediment load (L_s), in tons per day, is a function of instantaneous stream discharge (Q), in cubic feet per second; sediment concentration (C); in milligrams per liter; and the conversion constant (0.0027), and is computed:

$$L_s = (0.0027)\,QC. \qquad (2)$$

The regressions related log transformations of instantaneous suspended-sediment loads with log transformations of instantaneous stream discharge. The regression is expressed as:

$$\log L_s = a + b \log Q, \qquad (3)$$

where

a = the regression constant, and
b = the regression coefficient.

In developing the regression equations, the instantaneous sediment and discharge data for baseline and control periods were grouped by site for three hydrologic situations as follows: (1) Rising and peak streamflows mostly during spring and summer from snowmelt or storm runoff, (2) receding streamflows that follow peak runoff conditions, and (3) base or near-constant streamflows throughout the year. Tests for differences at the 0.05 level of significance between sites YR–1 and YR–2 and among the three data groups for each site were performed by using standard analysis-of-covariance techniques. When tests indicated that data groups between or within the sites were similar, the data were combined and a single regression was used.

Tests for regression differences indicated that the data for site YR–1, water years 1989–92, and the data for site YR–2, water years 1985–88, could be combined to fit a single regression that could be used for both sites. Subsequent tests for differences on the combined data indicated that the hydrologic situation where streamflows were receding or at constant or base-flow (situations 2 and 3 in the above paragraph) could be combined (fig. 30). Thus, two regressions were used to estimate instantaneous suspended-sediment load (L_s) at both sites (Porterfield, 1972).

Because bias is introduced when antilogarithms are taken of log-transformed data for regression analysis, a bias-correction factor (C_b), as presented by Ferguson (1986) and discussed by Elliott and DeFeyter (1986), was applied to each regression. The bias-correction factor for conversion from common logarithms to the general antilogarithm form is a function of the standard error (S) and is expressed as:

$$C_b = e^{\left(2.65s^2\right)} \qquad (4)$$

where

e = 2.71828 and is the base for natural logarithms.

By assuming that the instantaneous relation identified by equation 3 is equal to the daily relation, daily sediment loads were computed using daily stream-discharge values. Regression coefficients used to compute daily suspended-sediment loads (L_{sd}) from daily stream discharge (Q_d) at sites YR–1 and YR–2 are listed in table 6. The annual suspended-sediment loads (L_{sa}) in the Yampa River for site YR–1, water years 1989–92, and site YR–2, water years 1985–88, were computed as the total of daily suspended-sediment loads (L_{sd}) for each water year.

Suspended-sediment concentrations at site YR–2 decreased substantially after completion of the dam in late 1988, and, by water year 1992, the mean concentration was 3.9 mg/L and all measured concentrations during 1992 were less than 7 mg/L (fig. 31) (U.S. Geological Survey, 1978–86, 1987–93). Concentrations of suspended sediment during water years 1989–91 correlated poorly with changes in stream discharge. Concentrations in excess of a few milligrams per liter probably were related to discharge adjustments at the dam and subsequent downstream channel erosion by mostly sediment-free release water. Sediment measurements at site YR–2 probably will continue to identify the amounts of pass-through sediment from Stagecoach Reservoir and sediment from channel erosion downstream from the dam.

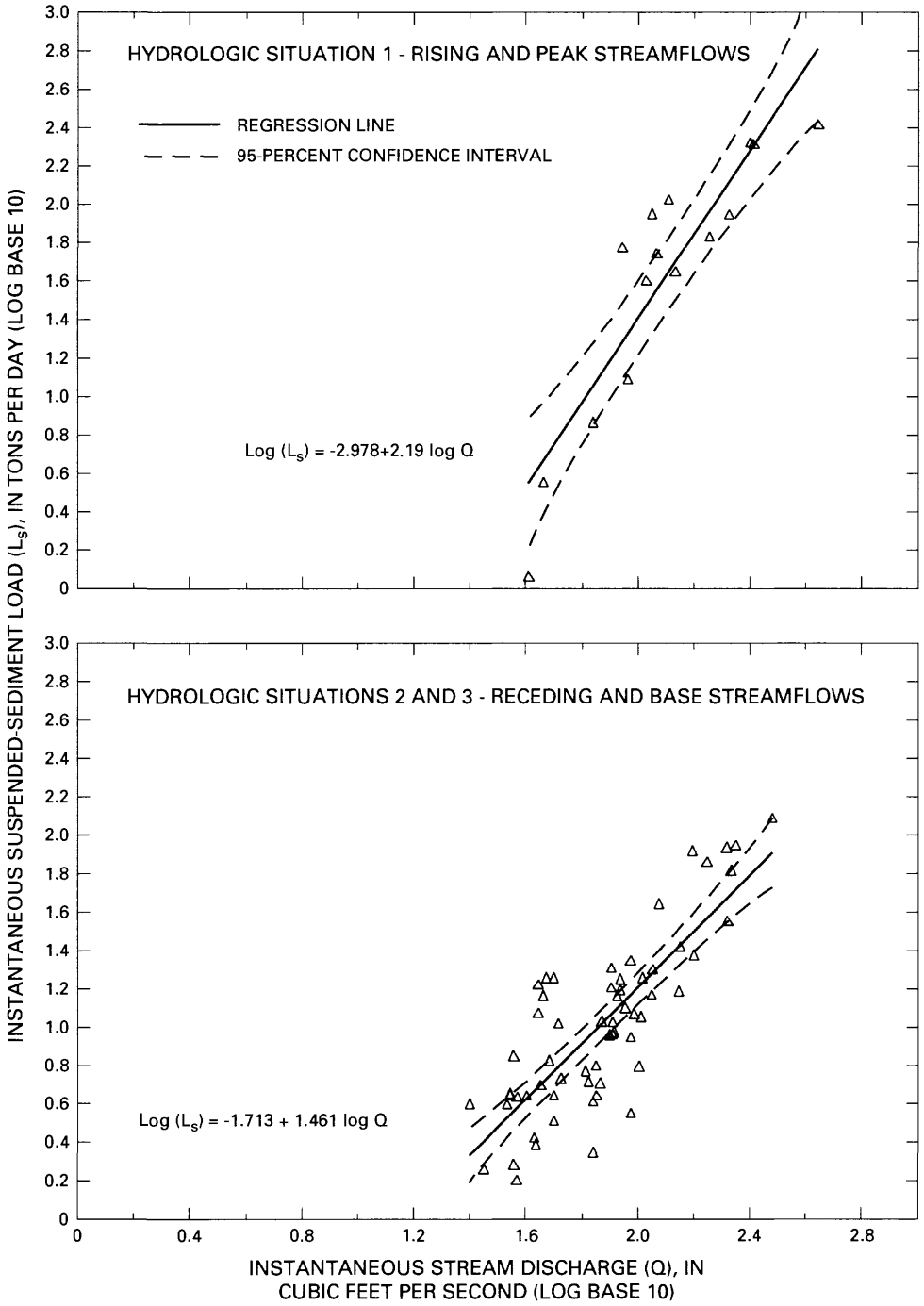


Figure 30. Relation of instantaneous suspended-sediment loads to stream discharge for three hydrologic situations in the Yampa River (sites YR–1 and YR–2), water years 1985–92.

Table 6. Regression information used to determine suspended-sediment loads in the Yampa River at sites YR–1 and YR–2, water years 1985–92

[L_{sd}, daily suspended-sediment load, in tons per day; Q_d, daily discharge, in cubic feet per second. Hydrologic situations are: (1) Rising and peak streamflows during spring and summer from snowmelt or storm runoff, (2) receding streamflows during spring and summer that follow peak runoff conditions, (3) base or near-constant streamflows throughout the year]

Hydrologic situation	Number of samples	Logarithm form (base 10) $\log L_{sd} = a + b \log Q_d$				Regression equation
		Constant (a)	Coefficient (b)	Standard error (S)	Bias correction factor (C_b)	
1	15	–2.978	2.190	0.301	1.271	$L_{sd} = 10^{-2.978} Q_d^{2.190} 1.271$
2, 3	62	–1.713	1.461	.265	1.205	$L_{sd} = 10^{-1.713} Q_d^{1.461} 1.205$

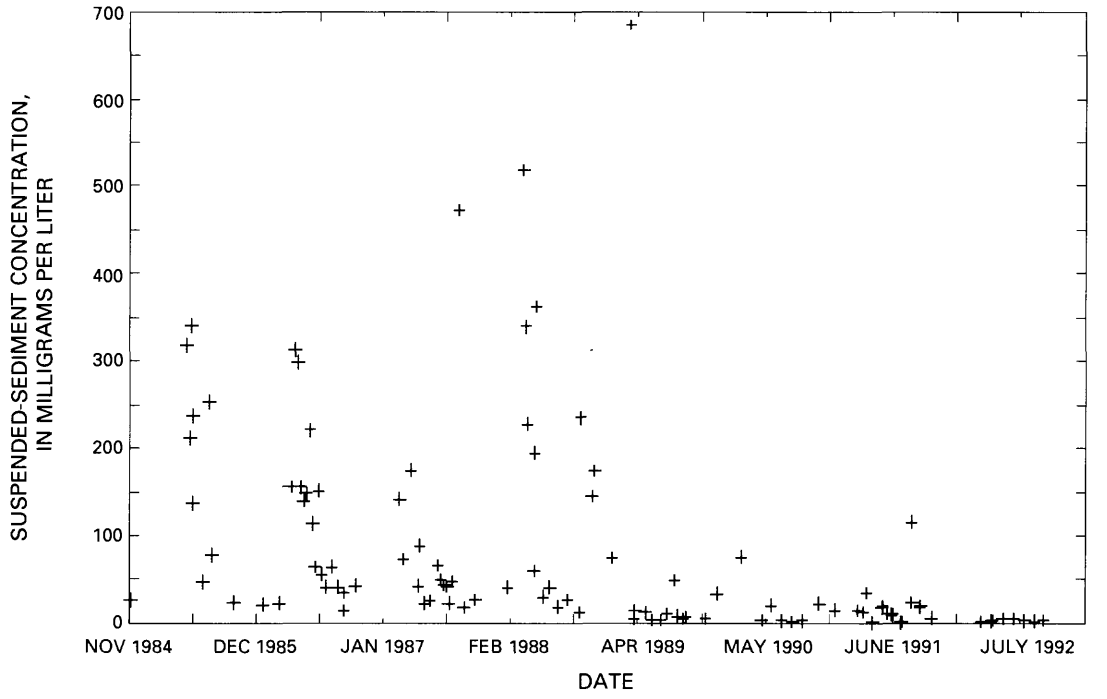


Figure 31. Instantaneous concentrations of suspended sediment in the Yampa River at site YR–2, water years 1985–92.

Maximum and minimum daily suspended-sediment loads, annual suspended-sediment loads, and sediment yields for site YR–1 (water years 1989–92) and site YR–2 (water years 1985–92) are listed in table 7. Annual suspended-sediment loads in the Yampa River ranged from about 2,480 to 5,830 tons at site YR–1 (control data) and from 6,950 to 22,650 tons at site YR–2 (base-line data). The average annual suspended-sediment load for these two sites was about 9,650 tons. The relation of annual suspended-sediment loads and annual stream discharges is shown in figure 32.

The decrease in sediment loads at site YR–2 during water years 1989–92 was mostly a result of sediment retention of Stagecoach Reservoir. The efficiency of the sediment retention in the reservoir is estimated by dividing the average annual value for suspended-sediment loads at site YR–2 for water years 1989–92 (194 tons per year as calculated using data in table 7) by the average annual suspended-sediment load of the Yampa River during water years 1985–92 (9,650 tons per year), which indicates that Stagecoach Reservoir retains about 98 percent of the suspended-sediment loads of the Yampa River.

Displacement of reservoir storage capacity was calculated from techniques presented by Strand and Pemberton (1982), assuming an average sediment-size distribution of retained sediment of 30 percent sand, 40 percent silt, and 30 percent clay. Using a value of 98-percent sediment retention for Stagecoach Reservoir and the average annual suspended-sediment load of 9,650 tons, the expected annual volume loss from uncompacted sediment would be about 7 acre-ft, or about 0.02 percent of the original reservoir capacity. Compaction would further decrease the volume of retained sediment to about 90 percent of the original volume after 20 years.

Table 7. Suspended-sediment loads computed using the regressions in table 6 or estimated from concentrations of suspended sediment and stream discharge (see text) for sites YR–1 and YR–2, Yampa River, water years 1985–92

[tons/acre-ft, tons per acre-foot; tons/mi^2, tons per square mile; --, no data; *, estimated using daily mean discharge and a mean suspended-sediment concentration of 3.9 milligrams per liter]

Water year	Site YR–1						Site YR–2					
	Daily load			Annual			Daily load			Annual		
	Maximum (tons)	Minimum (tons)	Average (tons)	Load (tons)	Yield (tons/acre-ft)	Yield (tons/mi^2)	Maximum (tons)	Minimum (tons)	Average (tons)	Load (tons)	Yield (tons/acre-ft)	Yield (tons/mi^2)
1985	--	--	--	--	--	--	743	7.9	62	22,650	0.23	81
1986	--	--	--	--	--	--	740	4.4	56	20,490	.22	74
1987	--	--	--	--	--	--	230	3.5	19	6,950	.12	25
1988	--	--	--	--	--	--	973	1.5	30	10,880	.19	39
1989	203	3.2	14	5,040	0.11	20	*.90	*.10	*.34	*123	--	--
1990	66	1.1	6.8	2,480	.08	10	*.80	*.21	*.47	*173	--	--
1991	177	2.0	16	5,830	.12	23	*2.64	*.20	*.72	*262	--	--
1992	115	2.0	7.8	2,870	.08	11	*.91	*.26	*.59	*216	--	--
Maximum	203	3.2	16	5,830	.12	23	[1]973	[1]7.9	[1]62	[1]22,650	.23	81
Minimum	66	1.1	6.8	2,480	.08	10	[1]230	[1]1.5	[1]19	[1]6,950	.12	25
Average	140	2.1	11	4,055	.10	16	[1]672	[1]4.3	[1]42	[1]15,243	.19	55

[1]Water years 1985–88.

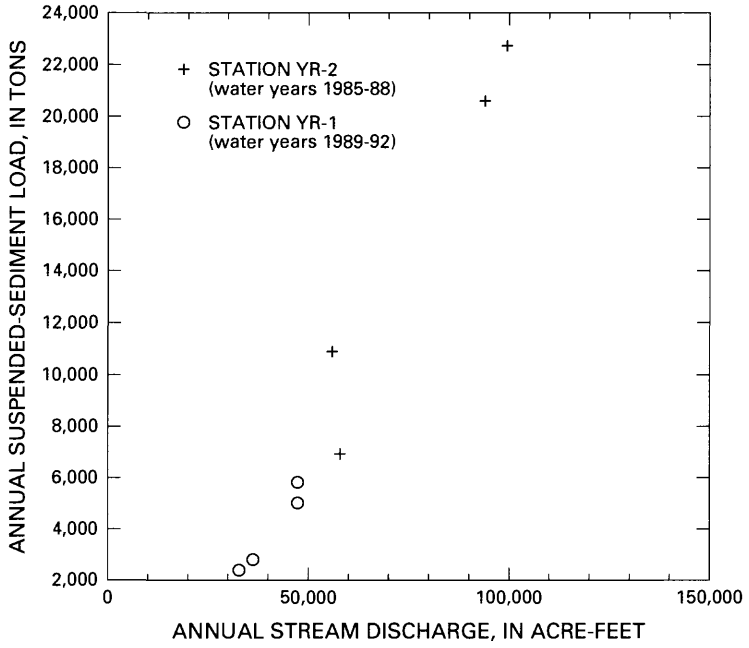


Figure 32. Relation of annual suspended-sediment load to annual stream discharge in the Yampa River (sites YR–1 and YR–2), water years 1985–92.

SUMMARY AND CONCLUSIONS

Stagecoach Dam was constructed on the Yampa River in the late 1980's and initially filled to a capacity of 33,275 acre-ft in spring 1991. To assess the initial effects of the reservoir on the hydrology of the Yampa River, physical, chemical, and biological data were collected at sites upstream (water years 1989–92) and downstream (water years 1985–92) and at two sites in the reservoir (1990–92). Changes in water-quality characteristics caused by the impoundment are evaluated, and base-line and control data from the Yampa River were compared with reservoir data and data from the Yampa River collected downstream from the reservoir after 1988. In addition, annual suspended-sediment loads were determined for the Yampa River for water years 1985–92, and sediment retention in Stagecoach Reservoir was estimated.

Prior to reservoir construction, mean annual discharge for the period of record in the Yampa River downstream from the reservoir (site YR–2) was 64,770 acre-ft. Inflow to Stagecoach Reservoir from the Yampa River (site YR–1) during filling (water years 1989–91) was about 50 to 73 percent of average. Most reservoir storage occurred in 1989 and, except for periods in 1989, stream discharge at site YR–2 generally was at or in excess of minimum discharge regulations.

Secchi-disk measurements in Stagecoach Reservoir ranged from 2.5 to 18 ft. Differences in light penetration between the reservoir site near the inlet (site SC–1) and the dam (site SC–2) were small. Turbidity from the 2-ft depths ranged from 0.5 to 9.0 NTU. Algae growths in summer and suspended sediments transported during stormy weather tended to decrease light penetration in the reservoir; possible algal grazing by zooplankton and sediment deposition improved water clarity. Comparison of data from the Yampa River and the reservoir indicated that Stagecoach Reservoir greatly decreased turbidity in the Yampa River from site YR–1 to site YR–2.

Water temperature in Stagecoach Reservoir ranged from 0°C in winter to surface maximums of about 22°C in summer. Subsequent to spring mixing, water temperature at depth (site SC–2) generally decreased 6.8 to 13.8°C, and thermal stratification was maintained in the reservoir until fall mixing. Data (sites YR–1 and YR–2) indicated that water-temperature maximums were decreased and temperature minimums were increased in the Yampa River at site YR–2 after the reservoir had filled.

Values of pH in Stagecoach Reservoir ranged from 7.2 in the hypolimnion to 8.9 in the epilimnion. The values and range of pH in the Yampa River at site YR–2 were decreased several tenths of a unit when compared with values at site YR–1 during reservoir filling.

Concentrations of dissolved oxygen (DO) in Stagecoach Reservoir ranged from 0 mg/L in the hypolimnion to 13 mg/L in the epilimnion. Average daily biochemical oxygen demand (BOD) as great as several milligrams per liter were measured in samples from site SC–2 during the first 3 days of incubation. Average 5-day BOD ranged from 0.33 to 0.46 (mg/L)/d. However, BOD rates were decreased if incubation temperature was decreased from 20 to 0.5–4°C.

The DO in the reservoir was attenuated principally by photosynthesis and respiration. DO and oxygen production from photosynthesis were greatest in the epilimnion; oxygen depletion and anaerobic conditions from respiration were characteristic of the hypolimnion. The decomposition of resident organic material and the accumulation of new organic material, combined with the small annual inflows during 1990 and 1992 (less than 36,000 acre-ft), probably contributed to the early summer development of anaerobic conditions in the hypolimnion. During reservoir filling, water releases from the reservoir periodically decreased concentrations of DO in the Yampa River at site YR–2 to concentrations near 1.2 mg/L. After the reservoir had filled, all periodic measurements for concentrations for DO at site YR–2 were greater than 6.0 mg/L. A study of DO change in the Yampa River downstream from the reservoir in August 1992 indicated that DO in cold (8°C) anaerobic water released from the reservoir bottom would increase from 0 mg/L at the dam to about 4.7 mg/L at site YR–2.

Specific conductance in Stagecoach Reservoir ranged from 414 to 520 µS/cm. Specific conductance in the Yampa River ranged from about 300 to 560 µS/cm. Values of specific conductance in Stagecoach Reservoir generally increased with depth and from spring to fall, and values of specific conductance within the reservoir were related to the specific conductance of the Yampa River. Because inflow was pooled and mixed in the reservoir, ranges of specific conductance in the reservoir and at site YR–2 after 1988 decreased when compared with control data at site YR–1.

The general geochemical classification for water in Stagecoach Reservoir and the Yampa River was a very hard, calcium bicarbonate type. Changes in concentrations of calcium, bicarbonate alkalinity, and sulfate were the principal causes for changes in values of specific conductance and concentrations of dissolved solids.

Most nitrogen that entered the reservoir probably was organic nitrogen. Base-line and control data for dissolved and total organic nitrogen in the Yampa River ranged in concentration from less than 0.18 to about 1.0 mg/L. Decomposition of organic matter caused dissolved-ammonia concentrations near the bottom of the reservoir (site SC–2) to increase from an inflow range measured in the Yampa River of less than 0.01 to 0.07 mg/L as N to maximum values of about 0.9 to 1.6 mg/L as N during thermal stratification in summer. Dissolved phosphorus also increased near the reservoir bottom (site SC–2) in summer from an inflow range of less than 0.01 to about 0.06 mg/L to maximum values of about 0.32 to 0.35 mg/L. Data analyses indicated that similar large concentrations of ammonia and phosphorus might occur during winter. Furthermore, concentrations of inorganic nitrogen and phosphorus in the reservoir, subsequent to reservoir mixing, would be sufficient to support extensive algae growth. Continued flushing and near- or above-average annual inflow might decrease the large concentrations of recycled ammonia and phosphorus in the hypolimnion.

Ranges of dissolved ammonia and phosphorus at site YR–2 during reservoir filling were 5 to 20 times greater than the ranges of base-line and control data from the Yampa River. After the reservoir had filled in 1991, it was possible to release and mix discharge water from reservoir depths having very different nutrient concentrations, and values of ammonia and phosphorus decreased at site YR–2 to values near those measured prior to reservoir filling.

Except for manganese, all total or total recoverable concentrations of 20 trace constituents in Stagecoach Reservoir were within the range of concentrations measured in the Yampa River. Concentrations of manganese (210 to 440 µg/L) near the reservoir bottom at site SC–2 were several times greater than the range (30 to 100 µg/L) at site YR–1. Most concentrations of trace constituents were measured at or near analytical detection limits.

A total of 119 phytoplankton species from 7 phyla was identified in Stagecoach Reservoir during 1990–92. Blue-green algae accounted for most of the cell counts during 1990–92. In 1990, extensive growths of the blue-green alga, *Aphanizomenon*, developed in the reservoir, and dead colonies collected as surface scum. A second growth of the blue-green alga, *Aphanocapsa delicatissima*, increased from a few hundred cells per milliliter in 1990 to greater than several hundred thousand cells per milliliter by 1992. Phytosynthesis by algae caused values of DO saturation to exceed 150 percent, and respiration and decomposition of dead algae probably decreased concentrations of DO.

Values of diversity index (DI) for phytoplankton ranged from 0.05 to 2.94 in 1990 and from 1.72 to 3.06 in 1991. A progressive decrease in values of DI during the summer of 1992 indicated that the com-

munity diversity of algae in Stagecoach Reservoir could be greatest subsequent to spring turnover, but might decrease during summer, depending on water temperature and nutrient availability.

All colony counts of fecal coliform in Stagecoach Reservoir during 1990–92 were less than criteria limits set by the State of Colorado. A data comparison for fecal coliform and fecal streptococci at sites YR–1 and YR–2 in the Yampa River and sites SC–1 and SC–2 in Stagecoach Reservoir indicated that the colony counts of bacteria were greatly decreased in the reservoir when compared with counts in the Yampa River upstream from the reservoir.

Instantaneous suspended-sediment loads were related to stream discharge to compute annual suspended-sediment loads in the Yampa River at sites YR–1 and YR–2. During water years 1985–88 at site YR–2 and water years 1989–92 at site YR–1, annual suspended-sediment loads ranged from 2,480 to 22,650 tons, and the average annual suspended-sediment load was about 9,650 tons.

The estimated average annual suspended-sediment load at site YR–2 for water years 1989–92 was 194 tons. Data comparisons indicated that Stagecoach Reservoir retained greater than 98 percent of the fluvial suspended-sediment load. The annual displacement of reservoir capacity from uncompacted sediment was about 7 acre-ft or 0.02 percent of the original capacity.

Effects of Stagecoach Reservoir on the hydrology of the Yampa River generally can be categorized as effects that are uncontrolled by reservoir management and those effects that can be modified by selective management of the release gates. Decreases in turbidity and bacteria colony counts and the accumulation of fluvial sediment in the reservoir are examples of uncontrolled effects. Limited modifications to discharge, water temperature, pH, dissolved oxygen, and the general chemical characteristics in the Yampa River at site YR–2 are possible, depending on the distribution of the water-quality characteristics in the reservoir and the management of the release gates.

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SUPPLEMENTAL DATA

Table 8. Water-quality data for selected depths in Stagecoach Reservoir, site SC–1, 1990–92

[ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius]

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
04/26/90	1320	0	7.5	8.40	9.6	106	441
04/26/90	1325	2	7.5	8.40	9.5	104	441
04/26/90	1330	4	7.5	8.40	9.5	104	444
04/26/90	1335	7	7.3	8.40	9.6	105	447
04/26/90	1340	10	7.0	8.50	9.7	105	456
04/26/90	1345	14	7.0	8.50	9.7	105	453
05/23/90	1330	0	11.4	8.35	8.1	97	477
05/23/90	1335	2	11.4	8.35	8.1	97	477
05/23/90	1340	4	11.2	8.35	8.1	97	481
05/23/90	1345	7	11.0	8.35	8.1	96	482
05/23/90	1350	10	10.8	8.35	8.1	96	480
05/23/90	1355	15	10.0	8.30	8.0	93	482
05/23/90	1400	20	9.7	8.30	7.7	89	485
06/26/90	1300	0	21.8	8.65	10.0	147	487
06/26/90	1305	2	21.3	8.65	10.0	146	488
06/26/90	1310	4	20.3	8.70	10.3	147	488
06/26/90	1315	7	20.0	8.75	11.0	156	491
06/26/90	1320	10	18.8	8.50	9.6	133	494
06/26/90	1325	15	17.5	8.40	7.5	101	492
07/31/90	1345	0	22.0	8.80	10.4	154	445
07/31/90	1350	2	21.8	8.80	10.5	155	445
07/31/90	1355	4	21.1	8.80	10.5	153	446
07/31/90	1400	7	20.2	8.80	10.2	146	453
07/31/90	1405	10	19.2	8.60	6.5	91	465
07/31/90	1410	15	19.0	8.40	5.6	78	470
07/31/90	1415	20	18.5	8.30	4.0	55	477
08/29/90	1300	0	20.0	8.80	10.4	148	455
08/29/90	1305	2	20.0	8.80	10.5	149	455
08/29/90	1310	4	18.8	8.75	10.5	145	451
08/29/90	1315	7	18.2	8.70	9.0	123	454
08/29/90	1320	10	17.8	8.55	7.4	100	455
08/29/90	1325	15	17.4	8.50	6.5	87	456
08/29/90	1328	20	17.4	8.40	6.2	83	456
08/29/90	1330	25	17.1	8.30	5.0	67	456
08/29/90	1335	30	16.8	8.20	3.4	45	462
09/25/90	1250	0	17.8	8.30	5.4	73	457
09/25/90	1255	2	16.5	8.30	4.7	62	457
09/25/90	1300	4	16.0	8.25	4.0	52	462

Table 8. Water-quality data for selected depths in Stagecoach Reservoir, site SC–1, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
09/25/90	1305	7	15.9	8.20	3.1	40	463
09/25/90	1310	10	15.9	8.25	4.2	55	458
09/25/90	1315	15	15.7	8.30	4.7	61	460
09/25/90	1320	20	15.7	8.30	4.8	62	460
09/25/90	1325	25	15.5	8.30	4.9	63	461
09/25/90	1330	30	15.2	8.30	4.6	59	462
09/25/90	1335	32	14.8	8.20	3.2	41	467
10/22/90	1545	0	10.8	7.80	4.3	51	477
10/22/90	1550	2	10.8	7.90	4.1	48	477
10/22/90	1555	4	10.8	7.90	4.0	47	477
10/22/90	1600	7	10.7	7.90	3.9	46	480
10/22/90	1605	10	10.4	7.90	4.2	49	477
10/22/90	1610	15	10.1	7.90	3.9	45	479
10/22/90	1615	20	10.0	7.90	4.1	48	477
10/22/90	1620	25	9.5	7.90	4.5	52	478
05/09/91	1050	0	5.5	7.90	7.3	77	464
05/09/91	1055	2	5.5	7.90	7.2	76	464
05/09/91	1100	4	5.5	7.90	7.2	76	458
05/09/91	1105	7	5.5	7.90	7.2	76	458
05/09/91	1110	10	5.5	7.90	7.2	76	454
05/09/91	1115	15	5.5	7.90	7.2	76	454
05/09/91	1120	20	5.5	7.90	7.2	76	454
05/09/91	1125	25	5.5	7.90	7.2	76	454
06/10/91	1015	0	16.8	8.40	7.3	98	419
06/10/91	1020	2	15.6	8.40	7.3	95	425
06/10/91	1025	4	15.1	8.50	7.4	95	429
06/10/91	1030	7	14.6	8.40	6.9	87	431
06/10/91	1035	10	14.0	8.30	6.5	82	427
06/10/91	1040	15	13.5	8.30	6.1	76	422
06/10/91	1045	20	12.7	8.20	5.8	71	424
06/10/91	1050	25	12.0	8.10	5.3	64	423
06/10/91	1055	30	11.5	8.00	4.7	56	427
07/10/91	1015	0	19.1	8.40	6.5	91	447
07/10/91	1020	2	19.1	8.40	6.5	91	447
07/10/91	1025	4	19.0	8.40	6.5	91	447
07/10/91	1030	7	19.0	8.40	6.5	91	447
07/10/91	1035	10	18.9	8.40	6.4	90	449
07/10/91	1040	15	18.0	8.20	4.9	67	449

Table 8. Water-quality data for selected depths in Stagecoach Reservoir, site SC–1, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
07/10/91	1045	20	17.0	8.00	4.1	55	484
07/10/91	1050	25	16.0	7.95	3.4	45	472
07/10/91	1055	30	14.5	7.70	.9	11	454
08/08/91	1000	0	19.5	8.65	8.6	121	450
08/08/91	1005	2	19.5	8.65	8.6	121	450
08/08/91	1010	4	19.0	8.65	8.7	121	452
08/08/91	1015	7	18.7	8.60	8.2	113	452
08/08/91	1020	10	18.5	8.60	7.9	109	451
08/08/91	1025	15	17.9	8.30	5.0	68	457
08/08/91	1030	20	17.5	8.10	3.4	46	459
08/08/91	1035	25	16.6	8.15	4.1	54	463
08/08/91	1040	30	16.0	8.20	4.4	57	465
08/08/91	1045	32	15.8	8.15	4.3	56	464
09/04/91	1020	0	18.7	8.70	8.2	113	427
09/04/91	1025	2	18.7	8.70	8.3	115	427
09/04/91	1030	4	18.5	8.70	8.3	114	429
09/04/91	1035	7	18.4	8.70	8.0	110	426
09/04/91	1040	10	18.0	8.65	7.4	101	426
09/04/91	1045	15	17.9	8.50	6.1	83	432
09/04/91	1050	20	17.5	8.40	5.0	67	434
09/04/91	1055	25	16.3	8.00	2.2	29	443
09/04/91	1100	30	15.8	7.80	0	0	459
10/09/91	1010	0	12.0	8.60	9.4	112	442
10/09/91	1015	2	12.0	8.60	9.4	112	444
10/09/91	1020	4	12.0	8.60	9.5	113	442
10/09/91	1025	7	12.0	8.60	8.8	105	442
10/09/91	1030	10	12.0	8.50	8.1	97	442
10/09/91	1035	15	11.9	8.50	8.4	100	443
10/09/91	1040	20	11.9	8.50	8.9	106	440
10/09/91	1045	25	11.9	8.50	8.9	105	440
10/09/91	1050	30	11.8	8.50	9.1	108	442
10/09/91	1055	34	11.7	8.50	8.8	104	441
04/17/92	1130	0	6.0	8.30	10.0	106	427
04/17/92	1135	2	5.9	8.30	10.0	105	428
04/17/92	1140	4	5.9	8.30	10.0	105	428
04/17/92	1145	7	5.5	8.30	9.9	103	429
04/17/92	1150	10	5.4	8.20	10.0	104	430

Table 8. Water-quality data for selected depths in Stagecoach Reservoir, site SC–1, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
04/17/92	1155	15	5.2	8.20	9.8	101	427
04/17/92	1200	20	4.8	8.10	7.3	75	442
04/17/92	1205	24	4.6	8.00	6.4	65	448
05/20/92	1230	0	15.0	8.30	9.0	117	439
05/20/92	1235	2	15.0	8.35	9.1	118	439
05/20/92	1240	4	14.8	8.40	9.1	118	442
05/20/92	1245	7	14.6	8.40	9.1	117	444
05/20/92	1250	10	14.0	8.40	8.5	108	445
05/20/92	1255	15	12.5	8.35	8.3	102	444
05/20/92	1300	20	11.0	8.15	5.3	63	449
05/20/92	1305	25	9.0	8.00	3.7	42	452
06/24/92	1230	0	20.0	8.75	8.2	118	451
06/24/92	1235	2	20.0	8.80	8.1	116	451
06/24/92	1240	4	19.8	8.80	8.1	116	450
06/24/92	1245	7	18.6	8.70	8.5	119	451
06/24/92	1250	10	18.5	8.70	8.5	118	449
06/24/92	1255	15	17.0	8.65	8.2	111	455
06/24/92	1300	20	15.4	8.25	5.1	67	482
06/24/92	1305	25	13.4	7.90	2.1	26	473
06/24/92	1310	30	10.8	7.65	0	0	469
07/28/92	1230	0	21.0	8.60	7.0	102	460
07/28/92	1235	2	20.3	8.60	7.1	102	461
07/28/92	1240	4	19.5	8.60	6.9	97	461
07/28/92	1245	7	19.5	8.55	7.0	99	459
07/28/92	1250	10	18.5	8.45	6.2	86	467
07/28/92	1255	15	17.8	8.20	5.2	71	475
07/28/92	1300	20	17.3	8.10	4.6	62	479
07/28/92	1305	25	16.3	8.00	4.1	54	491
07/28/92	1310	30	15.0	7.80	.5	6	484
08/27/92	1255	0	17.1	8.50	7.2	96	466
08/27/92	1300	2	17.1	8.50	7.3	98	466
08/27/92	1305	4	17.1	8.50	7.2	96	466
08/27/92	1310	7	16.9	8.50	6.8	91	466
08/27/92	1315	10	16.9	8.50	6.8	91	466
08/27/92	1320	15	16.5	8.45	6.7	89	464
08/27/92	1325	20	16.5	8.45	6.7	89	464
08/27/92	1330	25	16.0	8.50	6.6	86	465
08/27/92	1335	30	15.0	8.30	5.7	73	469

Table 8. Water-quality data for selected depths in Stagecoach Reservoir, site SC–1, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
09/25/92	1130	0	13.5	8.30	6.0	75	463
09/25/92	1135	2	13.5	8.30	6.0	75	466
09/25/92	1140	4	13.5	8.30	6.0	75	466
09/25/92	1145	7	13.5	8.30	5.9	74	463
09/25/92	1150	10	13.4	8.30	5.8	73	462
09/25/92	1155	15	13.4	8.30	5.6	70	462
09/25/92	1200	20	13.2	8.25	5.4	67	469
09/25/92	1205	25	13.1	8.20	5.2	65	468
09/25/92	1210	30	12.9	8.15	4.9	61	464
11/07/92	1130	0	7.0	8.25	7.0	75	477
11/07/92	1135	2	7.0	8.30	7.0	75	477
11/07/92	1140	4	6.7	8.30	7.0	75	475
11/07/92	1145	7	6.7	8.30	6.9	74	475
11/07/92	1150	10	6.6	8.30	6.9	74	477
11/07/92	1155	15	6.4	8.30	7.1	75	479
11/07/92	1200	20	6.1	8.30	7.3	77	477
11/07/92	1205	25	6.0	8.30	7.3	77	477
11/07/92	1210	30	6.0	8.30	7.3	77	477

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92

[ft, feet; °C, degrees Celsius; mg/L, milligrams per liter; µS/cm, microsiemens per centimeter at 25 degrees Celsius]

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
04/26/90	1050	0	8.8	8.40	10.1	115	414
04/26/90	1055	2	7.9	8.40	10.3	114	437
04/26/90	1100	4	7.5	8.50	10.5	115	450
04/26/90	1105	7	7.4	8.50	10.5	115	451
04/26/90	1110	10	7.3	8.45	10.4	114	453
04/26/90	1115	15	7.3	8.40	10.1	110	453
04/26/90	1120	20	7.3	8.40	10.0	109	453
04/26/90	1125	30	5.8	7.90	6.2	65	471
04/26/90	1130	40	5.1	7.85	5.3	55	489
04/26/90	1135	50	5.0	7.80	4.5	46	489
04/26/90	1140	75	4.0	7.55	1.5	15	501
04/26/90	1145	100	4.0	7.50	.6	6	487
04/26/90	1150	109	4.0	7.50	.6	6	487

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
05/23/90	1000	0	12.8	8.40	8.2	102	473
05/23/90	1005	2	12.6	8.40	8.2	101	480
05/23/90	1010	4	12.5	8.40	8.2	101	478
05/23/90	1015	7	12.5	8.40	8.2	101	478
05/23/90	1020	10	12.5	8.40	8.2	101	475
05/23/90	1025	15	12.0	8.40	8.2	100	479
05/23/90	1030	20	10.0	8.40	7.6	88	479
05/23/90	1035	25	9.0	8.20	6.9	78	484
05/23/90	1040	30	8.6	8.20	6.4	72	481
05/23/90	1045	40	8.3	8.10	6.1	68	482
05/23/90	1050	50	8.1	8.00	5.5	61	484
05/23/90	1055	75	6.9	7.80	3.4	37	488
05/23/90	1100	85	6.5	7.70	2.3	25	493
05/23/90	1105	100	6.2	7.70	2.8	30	494
05/23/90	1115	109	6.0	7.70	2.8	30	490
06/26/90	1115	0	21.0	8.75	10.8	157	488
06/26/90	1120	2	20.7	8.75	11.0	159	485
06/26/90	1125	4	20.0	8.85	12.3	175	484
06/26/90	1130	7	19.6	8.80	11.9	168	483
06/26/90	1135	10	18.3	8.50	8.0	110	490
06/26/90	1140	15	16.6	8.25	6.0	80	489
06/26/90	1145	20	15.5	8.10	5.0	65	490
06/26/90	1150	30	13.6	7.90	3.4	42	492
06/26/90	1155	40	11.1	7.80	2.5	29	493
06/26/90	1200	50	9.8	7.70	1.4	16	488
06/26/90	1205	60	8.0	7.65	0	0	486
06/26/90	1210	75	7.8	7.65	0	0	492
06/26/90	1215	85	7.5	7.60	0	0	492
06/26/90	1220	100	7.8	7.65	0	0	492
06/26/90	1230	109	7.7	7.65	0	0	492
07/31/90	1115	0	21.5	8.70	10.4	153	439
07/31/90	1120	2	20.5	8.80	10.5	151	438
07/31/90	1125	4	20.1	8.80	10.6	151	440
07/31/90	1130	7	20.0	8.80	10.7	152	440
07/31/90	1135	10	19.8	8.80	11.6	165	439
07/31/90	1140	15	19.6	8.80	10.0	141	443
07/31/90	1143	18	18.0	8.00	.6	8	506
07/31/90	1145	20	17.5	7.90	0	0	506
07/31/90	1150	30	16.0	7.80	0	0	506
07/31/90	1155	40	14.0	7.80	0	0	503
07/31/90	1200	50	13.0	7.70	0	0	499
07/31/90	1205	60	10.6	7.70	0	0	500

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC-2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
07/31/90	1210	75	9.1	7.70	0	0	497
07/31/90	1220	100	8.7	7.60	0	0	498
07/31/90	1225	110	9.3	7.60	0	0	498
08/29/90	1100	0	19.5	8.85	12.3	173	448
08/29/90	1105	2	19.4	8.90	12.6	177	445
08/29/90	1110	4	18.9	8.90	13.0	180	447
08/29/90	1115	7	18.7	8.80	10.1	140	450
08/29/90	1120	10	18.5	8.70	9.0	124	454
08/29/90	1125	15	18.0	8.20	2.6	35	469
08/29/90	1127	17	17.5	8.20	4.0	54	464
08/29/90	1130	20	17.4	8.10	2.1	28	467
08/29/90	1132	25	17.1	7.90	0	0	492
08/29/90	1135	30	16.5	7.80	0	0	490
08/29/90	1140	40	15.1	7.70	0	0	511
08/29/90	1145	50	14.0	7.55	0	0	508
08/29/90	1150	60	11.1	7.50	0	0	518
08/29/90	1155	75	10.8	7.50	0	0	504
08/29/90	1200	100	10.4	7.45	0	0	516
08/29/90	1205	110	10.3	7.45	0	0	509
09/25/90	1055	0	17.0	8.70	10.6	142	453
09/25/90	1100	2	16.6	8.70	10.3	136	451
09/25/90	1105	4	16.1	8.50	6.0	79	458
09/25/90	1110	7	16.0	8.40	5.6	73	460
09/25/90	1115	10	16.0	8.40	5.3	69	460
09/25/90	1120	15	16.0	8.20	3.2	42	467
09/25/90	1125	20	16.0	8.10	2.4	31	467
09/25/90	1130	25	15.9	8.00	1.5	20	470
09/25/90	1135	30	15.5	7.90	0	0	488
09/25/90	1140	40	15.1	7.80	0	0	496
09/25/90	1145	50	14.5	7.60	0	0	509
09/25/90	1150	60	12.8	7.60	0	0	510
09/25/90	1155	75	11.2	7.55	0	0	508
09/25/90	1200	100	10.2	7.50	0	0	489
09/25/90	1205	110	10.2	7.50	0	0	489
10/22/90	1400	0	11.2	7.75	1.7	20	481
10/22/90	1405	2	10.5	7.70	1.3	15	481
10/22/90	1410	4	10.5	7.70	1.2	14	481
10/22/90	1415	7	10.5	7.70	1.2	14	481
10/22/90	1420	10	10.5	7.70	1.2	14	481
10/22/90	1425	15	10.4	7.65	1.2	14	480
10/22/90	1430	20	10.3	7.65	1.2	14	481

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
10/22/90	1435	25	10.3	7.65	1.2	14	481
10/22/90	1440	30	10.2	7.65	1.3	15	484
10/22/90	1445	40	10.1	7.65	1.2	14	485
10/22/90	1450	50	10.1	7.65	.8	9	485
10/22/90	1455	60	10.1	7.65	1.4	16	485
10/22/90	1500	75	10.0	7.60	.2	2	491
10/22/90	1510	100	10.0	7.55	0	0	494
10/22/90	1515	105	10.0	7.55	0	0	491
05/09/91	1500	0	8.1	8.50	11.8	133	425
05/09/91	1505	2	8.0	8.50	11.8	132	426
05/09/91	1510	4	8.0	8.50	11.7	131	426
05/09/91	1515	7	8.0	8.50	11.6	130	426
05/09/91	1520	10	8.0	8.50	11.6	130	426
05/09/91	1525	15	7.4	8.40	11.3	125	430
05/09/91	1530	20	7.2	8.40	11.3	124	432
05/09/91	1535	30	7.0	8.40	10.9	119	431
05/09/91	1540	40	6.9	8.40	10.8	118	432
05/09/91	1545	50	6.7	8.40	10.8	117	435
05/09/91	1550	60	6.5	8.30	10.6	115	437
05/09/91	1555	75	4.2	7.70	4.0	41	472
05/09/91	1600	100	4.0	7.65	.9	9	484
05/09/91	1605	110	4.0	7.65	.9	9	484
06/10/91	1140	0	16.7	8.50	8.1	108	420
06/10/91	1145	2	16.3	8.60	8.2	109	422
06/10/91	1150	4	15.7	8.60	8.3	109	421
06/10/91	1155	7	15.2	8.60	8.4	109	425
06/10/91	1200	10	15.0	8.60	8.5	110	424
06/10/91	1205	15	14.8	8.60	8.4	108	422
06/10/91	1210	20	12.5	8.30	5.9	72	428
06/10/91	1215	25	12.0	8.25	5.8	70	426
06/10/91	1220	30	11.1	8.10	5.4	64	433
06/10/91	1225	40	8.5	7.90	4.6	51	447
06/10/91	1230	50	7.9	7.85	4.5	49	449
06/10/91	1235	60	7.5	7.80	4.1	45	456
06/10/91	1240	75	6.9	7.80	3.7	40	460
06/10/91	1245	100	6.2	7.75	3.2	34	468
06/10/91	1250	110	6.2	7.75	3.2	34	468
07/10/91	1120	0	20.0	8.40	6.4	92	440
07/10/91	1125	2	19.8	8.40	6.4	91	441
07/10/91	1130	4	19.8	8.40	6.4	91	441
07/10/91	1135	7	19.7	8.40	6.4	91	443

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
07/10/91	1140	10	19.5	8.40	6.4	91	444
07/10/91	1145	15	17.9	8.15	4.3	59	441
07/10/91	1150	20	16.8	8.00	3.3	44	445
07/10/91	1155	25	15.3	7.95	2.9	38	440
07/10/91	1200	30	14.2	7.90	2.6	33	441
07/10/91	1205	40	12.6	7.80	2.1	26	438
07/10/91	1210	50	10.5	7.80	1.8	21	439
07/10/91	1215	60	9.0	7.70	1.0	11	450
07/10/91	1220	75	8.8	7.65	.9	10	452
07/10/91	1225	100	8.3	7.60	0	0	452
07/10/91	1230	110	8.1	7.55	0	0	455
08/08/91	1130	0	20.5	8.70	9.2	132	443
08/08/91	1135	2	20.1	8.70	9.4	133	451
08/08/91	1140	4	20.0	8.75	9.5	135	451
08/08/91	1145	7	19.9	8.70	9.4	133	448
08/08/91	1150	10	19.5	8.70	8.6	121	448
08/08/91	1155	15	17.9	7.90	1.5	20	462
08/08/91	1200	20	16.8	7.80	1.0	13	459
08/08/91	1205	25	16.4	7.80	.8	11	460
08/08/91	1210	30	16.0	7.75	.3	4	457
08/08/91	1215	40	14.4	7.70	0	0	447
08/08/91	1220	50	13.0	7.70	0	0	439
08/08/91	1225	60	10.3	7.65	0	0	445
08/08/91	1230	75	10.3	7.60	0	0	447
08/08/91	1235	100	10.3	7.60	0	0	447
08/08/91	1240	110	10.3	7.60	0	0	445
09/04/91	1150	0	20.0	8.75	8.2	116	431
09/04/91	1155	2	19.5	8.75	8.4	117	428
09/04/91	1200	4	19.3	8.80	8.4	118	427
09/04/91	1205	7	19.0	8.75	8.4	117	429
09/04/91	1210	10	18.5	8.60	6.2	85	433
09/04/91	1215	15	18.0	8.10	1.7	23	451
09/04/91	1220	20	17.0	7.90	0	0	465
09/04/91	1225	25	16.1	7.80	0	0	466
09/04/91	1230	30	15.5	7.80	0	0	459
09/04/91	1235	40	14.0	7.70	0	0	452
09/04/91	1240	50	12.9	7.70	0	0	446
09/04/91	1245	60	11.0	7.70	0	0	444
09/04/91	1250	75	9.5	7.60	0	0	458
09/04/91	1255	100	9.0	7.50	0	0	461
09/04/91	1300	110	9.0	7.50	0	0	461

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
10/09/91	1150	0	13.8	8.70	10.2	127	42[illegible]
10/09/91	1155	2	13.8	8.70	10.0	124	42[illegible]
10/09/91	1200	4	13.5	8.70	9.9	122	42[illegible]
10/09/91	1205	7	12.5	8.65	9.5	115	441
10/09/91	1210	10	12.4	8.50	9.3	112	442
10/09/91	1215	15	12.4	8.50	9.2	111	442
10/09/91	1220	20	12.4	8.50	9.0	108	442
10/09/91	1225	25	12.2	8.40	7.7	92	44[illegible]
10/09/91	1230	30	12.0	7.65	2.3	27	45[illegible]
10/09/91	1235	40	11.7	7.70	0	0	452
10/09/91	1240	50	11.4	7.70	0	0	452
10/09/91	1245	60	10.0	7.65	0	0	451
10/09/91	1250	75	8.8	7.60	0	0	461
10/09/91	1300	100	8.5	7.50	0	0	467
10/09/91	1305	110	7.5	7.45	0	0	483
04/17/92	0905	0	5.7	8.30	10.0	105	427
04/17/92	0910	2	5.0	8.40	10.2	105	434
04/17/92	0915	4	5.0	8.40	10.0	103	434
04/17/92	0920	7	4.9	8.40	10.0	103	432
04/17/92	0925	10	4.9	8.40	10.1	104	432
04/17/92	0930	15	4.8	8.40	9.9	101	435
04/17/92	0935	20	4.8	8.30	9.8	100	435
04/17/92	0940	25	4.6	8.30	9.7	99	438
04/17/92	0945	30	4.1	8.10	6.8	68	450
04/17/92	0950	40	3.9	8.00	5.4	54	463
04/17/92	0955	50	3.5	7.80	2.8	28	476
04/17/92	1000	75	3.5	7.70	2.9	29	486
04/17/92	1005	90	3.5	7.60	2.7	27	490
04/17/92	1010	100	3.5	7.30	0	0	513
04/17/92	1015	110	3.5	7.20	0	0	520
05/20/92	0955	0	13.8	8.40	9.7	123	436
05/20/92	1000	2	13.8	8.45	9.7	123	436
05/20/92	1005	4	13.8	8.50	9.7	123	436
05/20/92	1010	7	13.8	8.50	9.7	123	436
05/20/92	1015	10	13.8	8.50	9.7	123	436
05/20/92	1020	15	13.8	8.50	9.7	123	436
05/20/92	1023	18	11.2	8.20	7.2	86	445
05/20/92	1025	20	10.9	8.20	6.8	81	442
05/20/92	1030	25	9.6	8.10	6.0	69	463
05/20/92	1035	30	7.9	7.95	5.4	60	44[illegible]
05/20/92	1040	40	6.2	7.85	4.7	50	450

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
05/20/92	1045	50	5.8	7.80	4.4	46	446
05/20/92	1047	60	5.5	7.80	4.2	44	448
05/20/92	1050	75	5.2	7.80	3.0	31	453
05/20/92	1053	90	5.0	7.75	1.4	14	460
05/20/92	1055	100	5.0	7.70	1.0	10	460
05/20/92	1100	105	5.0	7.60	.7	7	460
06/24/92	1005	0	19.8	8.80	8.0	114	450
06/24/92	1010	2	19.8	8.80	8.1	116	448
06/24/92	1015	4	19.5	8.80	8.1	115	450
06/24/92	1020	7	19.5	8.80	8.1	115	448
06/24/92	1025	10	17.1	8.75	8.7	118	447
06/24/92	1030	15	15.5	8.55	6.7	88	456
06/24/92	1035	20	13.5	8.00	2.9	36	463
06/24/92	1040	25	10.8	7.65	.7	8	463
06/24/92	1045	30	9.8	7.60	.5	6	457
06/24/92	1050	40	8.6	7.60	1.2	13	454
06/24/92	1055	50	7.5	7.55	1.1	12	456
06/24/92	1100	60	6.9	7.55	1.0	11	457
06/24/92	1105	75	6.9	7.55	1.0	11	457
06/24/92	1110	100	6.0	7.55	0	0	461
06/24/92	1115	110	6.0	7.50	0	0	461
07/28/92	1010	0	19.1	8.50	7.3	102	453
07/28/92	1015	2	19.0	8.55	7.3	102	454
07/28/92	1020	4	19.0	8.50	7.2	100	454
07/28/92	1025	7	18.9	8.50	7.2	100	456
07/28/92	1030	10	18.8	8.50	7.2	100	456
07/28/92	1035	15	18.2	8.40	6.1	84	458
07/28/92	1040	20	16.7	8.10	3.4	45	477
07/28/92	1045	25	14.0	7.80	.3	4	475
07/28/92	1050	30	12.6	7.70	0	0	473
07/28/92	1055	40	10.4	7.60	0	0	466
07/28/92	1100	50	9.5	7.55	0	0	460
07/28/92	1103	60	9.4	7.50	0	0	453
07/28/92	1105	75	7.8	7.45	0	0	461
07/28/92	1115	100	7.4	7.40	0	0	463
07/28/92	1125	110	7.3	7.40	0	0	466
08/27/92	0945	0	16.5	8.30	5.6	74	469
08/27/92	0950	2	16.5	8.35	5.5	73	469
08/27/92	0955	4	16.5	8.35	5.5	73	469
08/27/92	1000	7	16.5	8.30	5.5	73	469

Table 9. Water-quality data for selected depths in Stagecoach Reservoir, site SC–2, 1990–92--Continued

Date	Time (hours)	Sample depth (ft)	Temperature (°C)	pH (units)	Oxygen, dissolved (mg/L)	Oxygen, dissolved saturation (percent)	Specific conductance (µS/cm)
08/27/92	1005	10	16.0	8.30	5.3	69	469
08/27/92	1010	15	16.0	8.30	5.4	70	472
08/27/92	1015	20	16.0	8.25	4.9	64	472
08/27/92	1020	25	15.6	7.80	.1	1	483
08/27/92	1025	30	13.0	7.70	0	0	473
08/27/92	1030	40	10.8	7.60	0	0	465
08/27/92	1035	50	9.0	7.50	0	0	464
08/27/92	1045	75	8.0	7.50	0	0	459
08/27/92	1055	100	7.5	7.50	0	0	465
08/27/92	1100	110	7.5	7.45	0	0	465
09/25/92	0940	0	14.0	8.50	8.1	102	465
09/25/92	0945	2	14.0	8.60	8.1	102	465
09/25/92	0950	4	14.0	8.60	8.0	101	465
09/25/92	0955	7	14.0	8.60	8.0	101	465
09/25/92	1000	10	14.0	8.60	8.0	101	467
09/25/92	1005	15	14.0	8.55	7.9	100	467
09/25/92	1010	20	14.0	8.55	7.9	100	467
09/25/92	1015	25	14.0	8.55	7.9	100	467
09/25/92	1020	30	13.8	8.50	7.5	95	464
09/25/92	1023	35	12.2	7.70	.1	1	465
09/25/92	1025	40	10.6	7.70	0	0	470
09/25/92	1030	50	8.6	7.60	0	0	463
09/25/92	1035	75	7.5	7.55	0	0	465
09/25/92	1040	100	6.8	7.50	0	0	469
09/25/92	1050	110	6.7	7.50	0	0	466
11/07/92	0940	0	6.8	8.00	4.7	50	481
11/07/92	0945	2	6.8	8.00	4.7	50	481
11/07/92	0947	4	6.8	8.00	4.7	50	481
11/07/92	0950	7	6.8	8.00	4.5	48	481
11/07/92	0955	10	6.8	8.00	4.4	47	481
11/07/92	1000	15	6.8	8.00	4.5	48	481
11/07/92	1005	20	6.8	8.00	4.5	48	481
11/07/92	1010	25	6.8	8.00	4.5	48	481
11/07/92	1015	30	6.8	8.00	4.6	49	481
11/07/92	1020	40	6.8	7.95	4.4	47	481
11/07/92	1025	50	6.8	8.00	4.9	53	478
11/07/92	1027	60	6.5	7.75	3.0	32	480
11/07/92	1030	75	6.5	7.90	3.4	36	477
11/07/92	1035	100	6.4	7.60	0	0	475
11/07/92	1040	110	6.4	7.60	0	0	479

Table 10. Selected physical and biological data for near-surface and near-bottom depths in Stagecoach Reservoir near the inlet, site SC-1, 1990–92

[mm of Hg, millimeters of mercury; ft, feet; NTU, nephelometric turbidity units; °C, degrees Celsius; mg/L, milligrams per liter; BOD, biochemical oxygen demand; col/100 mL, colonies per 100 milliliters; <, less than; >, greater than; --, no data]

Date	Time	Barometric pressure (mm of Hg)	Transperency, Secchi disk (ft)	Sample depth (ft)	Turbidity (NTU)	Solids, residue at 105°C, suspended (mg/L)	BOD, 5-day (mg/L)	BOD, 20-day (mg/L)	Coliform bacteria, fecal (col/100 mL)	Streptococci bacteria, fecal (col/100 mL)
04/26/90	1325	578	6.0	2	1.7	7	2.1	5.3	2	<2
04/26/90	1345			14	1.5	5	2.6	5.4	<1	<2
05/23/90	1335	580	12.0	2	1.1	5	1.2	3.0	<1	<1
05/23/90	1400			20	1.4	4	1.6	4.2	7	1
06/26/90	1305	588	8.5	2	2.0	4	2.9	6.0	<1	<1
06/26/90	1325			15	3.5	16	5.6	>7.0	<1	<1
07/31/90	1350	587	9.5	2	1.6	<1	2.0	5.7	<1	32
07/31/90	1415			20	1.9	6	1.5	4.6	2	8
08/29/90	1305	589	8.2	2	1.5	2	3.0	6.9	<1	<1
08/29/90	1330			25	1.5	1	1.6	5.2	<1	<1
09/25/90	1255	589	12.5	2	1.4	<1	2.0	5.3	<1	<1
09/25/90	1325			25	1.1	<1	1.9	5.5	<1	12
10/22/90	1550	582	12.0	2	1.2	<1	3.6	>7.0	<2	1
10/22/90	1620			25	.8	3	1.2	5.5	1	<2
05/09/91	1055	575	4.0	2	3.0	10	1.9	4.6	<2	<2
05/09/91	1125			25	3.0	4	2.0	4.5	1	<2
06/10/91	1020	586	14.0	2	.7	<1	1.6	4.2	<1	<1
06/10/91	1055			30	3.4	10	1.3	4.2	17	25
07/10/91	1020	584	18.0	2	.8	3	.7	2.5	<1	<1
07/10/91	1055			30	1.7	1	.8	3.8	2	<1
08/08/91	1005	590	7.0	2	1.4	1	2.5	5.2	<1	<1
08/08/91	1040			30	4.0	21	1.7	4.0	<1	4
09/04/91	1025	589	9.5	2	1.7	1	2.1	4.6	<1	<1
09/04/91	1100			30	2.2	<1	1.9	4.3	<1	3
10/09/91	1015	591	6.0	2	2.8	5	2.1	5.4	<1	<1
10/09/91	1050			30	3.2	--	2.1	5.9	<1	<1
04/17/92	1135	580	4.5	2	2.8	55	2.8	5.7	1	1
04/17/92	1205			24	2.3	41	1.4	3.3	<1	1
05/20/92	1235	581	9.0	2	1.1	42	1.3	3.3	<1	<1
05/20/92	1305			25	3.0	4	1.6	3.9	<1	2
06/24/92	1235	583	12.0	2	1.2	8	1.7	4.1	<1	<1
06/24/92	1310			30	2.0	6	1.0	3.2	<1	<1
07/28/92	1235	588	14.0	2	.6	<1	1.2	3.0	<1	24
07/28/92	1310			30	5.2	14	1.8	3.9	5	6
08/27/92	1300	589	9.0	2	1.7	2	2.6	5.9	<1	19
08/27/92	1335			30	13	30	2.2	5.7	1	280
09/25/92	1135	582	7.0	2	1.6	<1	1.7	4.1	<1	1
09/25/92	1210			30	5.0	3	1.6	4.0	<1	1
11/07/92	1135	582	9.0	2	--	--	1.3	3.5	<1	<1
11/07/92	1210			30	--	--	1.5	4.2	<1	2

Table 11. Selected physical and biological data for near-surface and near-bottom depths in Stagecoach Reservoir at the dam, site SC–2, 1990–92

[mm of Hg, millimeters of mercury; ft, feet; NTU, nephelometric turbidity units; °C, degrees Celsius; mg/L, milligrams per liter; BOD, biochemical oxygen demand; col/100 mL, colonies per 100 milliliters; <, less than; >, greater than; --, no data]

Date	Time	Barometric pressure (mm of Hg)	Transparency, Secchi disk (ft)	Sample depth (ft)	Turbidity (NTU)	Solids, residue at 105°C, suspended (mg/L)	BOD, 5-day (mg/L)	BOD, 20-day (mg/L)	Coliform bacteria, fecal (col/100 mL)	Streptococci bacteria, fecal (col/100 mL)
04/26/90	1055	578	6.0	2	1.3	2	2.2	4.9	<1	<1
04/26/90	1150			109	1.3	3	1.2	4.2	<1	<1
05/23/90	1005	580	14.0	2	1.0	<1	1.1	2.7	<1	<1
05/23/90	1115			109	.7	<1	.8	3.0	<1	<1
06/26/90	1120	588	13.0	2	1.0	2	2.1	5.4	<1	<1
06/26/90	1230			109	1.0	5	1.1	4.5	<1	<1
07/31/90	1120	587	7.8	2	1.9	1	2.4	6.7	<1	44
07/31/90	1225			110	--	<1	5.2	>7.0	<1	96
08/29/90	1105	589	5.2	2	5.0	1	2.7	>7.0	<1	4
08/29/90	1205			110	25.0	7	6.5	>7.0	<2	<2
09/25/90	1100	589	2.5	2	9.0	4	7.0	>7.0	<1	1
09/25/90	1205			110	28.0	12	6.9	>7.0	<2	24
10/22/90	1405	582	17.0	2	.5	1	.8	5.1	<2	1
10/22/90	1510			100	14.0	10	3.1	>7.0	<2	3
05/09/91	1505	573	3.0	2	4.5	9	4.5	>7.0	<2	6
05/09/91	1605			110	1.0	3	1.2	3.3	<2	<2
06/10/91	1145	585	14.0	2	.7	<1	1.3	3.8	<1	<1
06/10/91	1250			110	.8	<1	.9	2.8	<1	<1
07/10/91	1125	584	18.0	2	.6	3	.9	3.1	<1	<1
07/10/91	1230			110	.7	4	1.3	3.6	<1	<1
08/08/91	1135	590	6.5	2	2.7	12	4.4	>7.0	<1	<1
08/08/91	1240			110	.6	13	1.3	3.3	<1	3
09/04/91	1155	589	10.0	2	1.0	<1	1.8	4.1	<1	<1
09/04/91	1300			110	12.0	2	6.2	>7.0	<1	<1
10/09/91	1155	591	5.5	2	2.6	15	2.5	6.1	<1	<1
10/09/91	1300			100	28.0	1	5.0	>7.0	<1	<1
04/17/92	0910	580	5.0	2	2.9	49	2.6	5.1	<1	<1
04/17/92	1015			110	8.8	86	2.0	>7.0	<1	<1
05/20/92	1000	581	8.0	2	1.0	8	1.5	3.3	<1	<1
05/20/92	1055			100	.8	18	1.1	3.0	<1	<1
06/24/92	1010	583	12.2	2	1.2	14	2.0	4.6	<1	<1
06/24/92	1115			110	.6	8	1.1	3.3	<1	<1
07/28/92	1015	588	14.0	2	.8	<1	1.7	4.2	<1	3
07/28/92	1125			110	.9	<1	1.2	3.9	<1	<1
08/27/92	0950	590	11.0	2	1.1	2	1.6	3.7	<1	<1
08/27/92	1100			110	8.2	4	1.5	4.7	<1	<1
09/25/92	0945	582	8.5	2	1.6	12	1.6	3.7	<1	<1
09/25/92	1050			110	13.0	5	2.3	6.3	<1	<1
11/07/92	0945	582	10.0	2	--	--	1.5	4.0	<1	1
11/07/92	1040			110	--	--	1.9	5.9	<1	<1

Table 12. Concentrations of major constituents in Stagecoach Reservoir near the inlet, site SC–1, 1990–92

[ft, feet; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; <, less than; --, no data]

Date	Time	Sample depth (ft)	pH (units)	pH, laboratory (units)	Specific conductance (µS/cm)	Specific conductance, laboratory (µS/cm)	Calcium, dissolved (mg/L Ca)	Magnesium, dissolved (mg/L Mg)	Potassium, dissolved (mg/L K)	Sodium, dissolved (mg/L Na)	Alkalinity, laboratory (mg/L $CaCO_3$)	Fluoride, dissolved (mg/L F)	Chloride, dissolved (mg/L Cl)	Sulfate, dissolved (mg/L SO_4)	Silica, dissolved (mg/L SiO_2)	Solids, sum of constituents, dissolved (mg/L)	Hardness (mg/L $CaCO_3$)	Sodium adsorption ratio (SAR)
05/23/90	1335	2	8.4	8.3	477	478	59	20	2.9	14	190	0.2	4.6	68	15	298	230	0.4
05/23/90	1400	20	8.3	8.3	485	482	60	20	2.8	14	190	.2	4.7	68	15	299	232	.4
08/29/90	1305	2	8.8	8.6	455	459	53	21	3.1	13	187	.2	4.3	66	20	293	219	.4
08/29/90	1330	25	8.3	8.3	456	462	54	20	3.0	13	187	.2	4.1	63	20	290	217	.4
10/22/90	1550	2	7.9	7.7	477	480	56	21	3.3	14	197	<.1	2.1	60	20	295	226	.4
10/22/90	1620	25	7.9	7.8	478	475	56	21	3.2	13	196	<.1	4.6	63	20	299	226	.4
05/09/91	1055	2	7.9	7.9	464	459	57	19	3.4	13	183	<.1	3.4	64	18	288	221	.4
08/08/91	1005	2	8.7	8.5	450	451	57	19	3.0	11	190	.2	5.6	55	15	280	221	.3
08/08/91	1040	30	8.2	8.1	465	471	60	20	2.3	11	204	.2	4.2	44	18	282	232	.3
10/09/91	1015	2	8.6	8.6	444	442	55	19	2.6	11	196	<.1	3.4	48	5.8	262	216	.3
10/09/91	1050	30	8.5	8.5	442	454	55	19	2.5	12	197	.1	3.4	64	5.8	280	216	.4
04/17/92	1135	2	8.3	8.0	428	429	54	17	2.4	12	175	.1	3.8	52	11	257	205	.4
04/17/92	1205	24	8.0	7.9	448	447	56	18	2.7	12	181	.2	4.1	54	11	267	214	.4
08/27/92	1300	2	8.5	8.4	466	470	56	20	2.7	11	196	.3	4.4	57	10	279	222	.3
08/27/92	1335	30	8.3	8.2	469	471	56	20	2.6	12	196	.2	4.2	56	16	285	222	.4
11/07/92	1135	2	8.3	8.2	477	472	59	20	2.8	12	199	.2	2.3	54	11	281	230	.3
11/07/92	1210	30	8.3	--	477	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 14. Concentrations of nitrogen, phosphorus, and organic carbon in Stagecoach Reservoir near the inlet, site SC–1, 1990–92

[ft, feet; mg/L, milligrams per liter; <, less than; --, no data]

Date	Time	Sample depth (ft)	Nitrogen ammonia, dissolved (mg/L N)	Nitrogen ammonia, total (mg/L N)	Nitrogen nitrite, dissolved (mg/L N)	Nitrogen nitrite, total (mg/L N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L N)	Nitrogen $NO_2 + NO_3$, total (mg/L N)	Nitrogen organic, dissolved (mg/L N)	Nitrogen organic, total (mg/L N)	Nitrogen, dissolved (mg/L N)	Nitrogen, total (mg/L N)	Phosphorus ortho, dissolved (mg/L P)	Phosphorus ortho, total (mg/L P)	Phosphorus, dissolved (mg/L P)	Phosphorus, total (mg/L P)	Carbon organic, dissolved (mg/L C)
04/26/90	1325	2	0.01	--	<0.01	--	<0.10	--	0.39	--	<0.50	--	<0.01	--	0.02	--	4.8
04/26/90	1345	14	.01	--	<.01	--	<.10	--	.39	--	<.50	--	<.01	--	.01	--	4.8
05/23/90	1335	2	.02	--	<.01	--	<.10	<0.10	.38	<0.50	<.50	<0.60	<.01	--	.03	0.04	5.0
05/23/90	1400	20	.01	--	<.01	--	<.10	<.10	.59	<1.00	<.70	<1.10	.01	--	.02	.05	5.2
06/26/90	1305	2	.01	--	<.01	--	<.10	--	3.50	--	<3.60	--	<.01	--	.02	--	6.2
06/26/90	1325	15	<.01	--	<.01	--	<.10	--	<.70	--	<.80	--	.02	--	.04	--	6.4
07/31/90	1350	2	.06	--	<.01	--	<.10	--	.44	--	<.60	--	<.01	--	.02	--	6.5
07/31/90	1415	20	.11	--	.01	--	<.10	--	.49	--	<.70	--	.01	--	.03	--	6.3
08/29/90	1305	2	.01	--	<.01	--	<.10	<.10	.59	<1.20	<.70	<1.30	<.01	--	.01	<.01	6.9
08/29/90	1330	25	.07	--	<.01	--	<.10	<.10	.53	<.80	<.70	<.90	<.01	--	.03	.02	6.5
09/25/90	1255	2	.09	--	<.01	--	<.10	--	.61	--	<.80	--	<.01	--	.03	--	6.4
09/25/90	1325	25	.09	--	<.01	--	<.10	--	.71	--	<.90	--	<.01	--	.02	--	6.2
10/22/90	1550	2	.31	0.29	<.01	<0.01	<.10	<.10	.59	.81	<1.00	<1.20	.07	0.06	.09	.18	6.3
10/22/90	1620	25	.28	.26	<.01	<.01	<.10	.10	.52	.54	<.90	.90	.08	.06	.07	.08	6.0
05/09/91	1055	2	.02	.02	<.01	<.01	.12	.12	.38	.48	.52	.62	.03	.03	.04	.07	4.6
05/09/91	1125	25	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
06/10/91	1020	2	.15	--	<.01	--	<.05	--	.25	--	<.45	--	<.01	--	.02	--	5.7
06/10/91	1055	30	.13	--	.01	--	<.05	--	.47	--	<.65	--	.04	--	.06	--	7.1
07/10/91	1020	2	.05	--	.01	--	<.05	--	.55	--	<.65	--	.01	--	.03	--	6.3
07/10/91	1055	30	.22	--	.02	--	<.05	--	.58	--	<.85	--	.14	--	.15	--	6.3
08/08/91	1005	2	.02	.01	<.01	<.01	<.05	<.05	.48	.49	<.55	<.55	.01	.02	.03	.05	6.0
08/08/91	1040	30	.08	.08	<.01	<.01	.10	.08	.42	.42	.60	.58	.05	.06	.06	.10	5.2
09/04/91	1025	2	<.01	--	<.01	--	<.05	--	<.50	--	<.55	--	<.01	--	.01	--	5.2
09/04/91	1100	30	.19	--	<.01	--	<.05	--	.51	--	<.75	--	.10	--	.13	--	5.5

Table 13. Concentrations of major constituents in Stagecoach Reservoir at the dam, site SC–2, 1990–92

[ft, feet; µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; <, less than]

Date	Time	Sample depth (ft)	pH (units)	pH, laboratory (units)	Specific conductance (µS/cm)	Specific conductance, laboratory (µS/cm)	Calcium, dissolved (mg/L Ca)	Magnesium, dissolved (mg/L Mg)	Potassium, dissolved (mg/L K)	Sodium, dissolved (mg/L Na)	Alkalinity, laboratory (mg/L $CaCO_3$)	Fluoride, dissolved (mg/L F)	Chloride, dissolved (mg/L Cl)	Sulfate, dissolved (mg/L SO_4)	Silica, dissolved (mg/L SiO_2)	Solids, sum of constituents dissolved (mg/L)	Hardness (mg/L $CaCO_3$)	Sodium adsorption ratio (SAR)
05/23/90	1005	2	8.4	8.3	480	478	58	20	2.9	13	190	0.2	4.6	66	14	293	227	0.4
05/23/90	1115	109	7.7	8.0	490	485	59	20	3.1	13	191	.2	4.9	65	18	298	230	.4
08/29/90	1105	2	8.9	8.6	445	442	52	21	3.1	13	173	.2	4.1	66	20	283	216	.4
08/29/90	1205	110	7.4	7.5	509	511	61	20	3.3	13	196	.2	4.7	61	20	302	235	.4
10/22/90	1405	2	7.7	7.7	481	456	55	21	3.3	13	197	<.1	2.1	66	20	299	224	.4
10/22/90	1510	100	7.6	7.4	494	493	56	18	3.4	9.5	203	<.1	1.9	60	20	292	214	.3
05/09/91	1505	2	8.5	8.1	426	431	54	18	3.1	12	174	<.1	3.3	60	17	272	209	.4
05/09/91	1605	110	7.7	7.7	484	480	59	20	3.4	13	196	<.1	3.3	61	20	298	230	.4
08/08/91	1135	2	8.7	8.6	451	450	57	19	3.0	12	192	.2	5.6	54	14	280	221	.4
08/08/91	1240	110	7.6	7.7	445	448	55	18	3.1	12	176	.1	4.6	46	17	262	211	.4
10/09/91	1155	2	8.7	8.6	428	442	55	19	2.5	12	196	.1	3.0	58	5.6	273	216	.4
10/09/91	1300	100	7.5	7.3	467	471	55	19	3.5	12	189	<.1	4.1	64	20	293	216	.4
04/17/92	0910	2	8.4	8.1	434	432	55	18	2.5	11	178	.2	3.9	50	11	258	211	.3
04/17/92	1015	110	7.2	7.3	520	523	63	21	3.7	14	207	.2	5.2	66	16	315	244	.4
08/27/92	0950	2	8.4	8.3	469	473	56	20	2.8	12	196	.2	4.1	57	26	296	222	.4
08/27/92	1100	110	7.5	7.5	465	469	55	19	3.0	12	190	.2	4.9	53	25	287	216	.4
11/07/92	0945	2	8.0	8.1	481	473	59	20	2.8	12	198	.2	2.3	54	12	281	230	.3
11/07/92	1040	110	7.6	7.5	479	474	58	19	3.0	12	193	.2	2.5	48	14	275	220	.3

Table 14. Concentrations of nitrogen, phosphorus, and organic carbon in Stagecoach Reservoir near the inlet, site SC–1, 1990–92--Continued

Date	Time	Sample depth (ft)	Nitrogen ammonia, dissolved (mg/L N)	Nitrogen ammonia, total (mg/L N)	Nitrogen nitrite, dissolved (mg/L N)	Nitrogen nitrite, total (mg/L N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L N)	Nitrogen $NO_2 + NO_3$, total (mg/L N)	Nitrogen organic, dissolved (mg/L N)	Nitrogen organic, total (mg/L N)	Nitrogen, dissolved (mg/L N)	Nitrogen, total (mg/L N)	Phosphorus ortho, dissolved (mg/L P)	Phosphorus ortho, total (mg/L P)	Phosphorus, dissolved (mg/L P)	Phosphorus, total (mg/L P)	Carbon organic, dissolved (mg/L C)
10/09/91	1015	2	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.40	<0.50	<0.46	<0.56	<0.01	0.01	0.03	0.09	5.8
10/09/91	1050	30	.01	.01	<.01	<.01	<.05	<.05	.39	.59	<.45	<.65	<.01	<.01	.04	.09	5.7
04/17/92	1135	2	.01	<.01	<.01	<.01	<.05	<.05	.29	<.30	<.35	<.36	<.01	<.01	<.01	.03	4.0
04/17/92	1205	24	<.01	<.01	<.01	<.01	<.05	<.05	<.30	<.30	<.36	<.36	<.01	<.01	--	.03	4.0
05/20/92	1235	2	.01	--	<.01	--	<.05	--	.29	--	<.35	--	<.01	--	.01	--	4.8
05/20/92	1305	25	.02	--	<.01	--	<.05	--	.28	--	<.35	--	.03	--	.04	--	4.5
06/24/92	1235	2	.03	--	<.01	--	<.05	--	.27	--	<.35	--	<.01	--	<.01	--	6.2
06/24/92	1310	30	.13	--	<.01	--	<.05	--	.27	--	<.45	--	.11	--	.10	--	--
07/28/92	1235	2	.02	--	<.01	--	<.05	--	.28	--	<.35	--	<.01	--	<.01	--	4.7
07/28/92	1310	30	.13	--	<.01	--	<.05	--	.37	--	<.55	--	.04	--	.05	--	5.0
08/27/92	1300	2	.02	.03	<.01	<.01	<.05	<.05	.38	.47	<.45	<.55	<.01	.02	<.01	.04	5.5
08/27/92	1335	30	.09	.09	<.01	<.01	<.05	<.05	.31	.51	<.45	<.65	.02	.04	.03	.08	5.3
09/25/92	1135	2	.02	--	<.01	--	<.05	--	.28	--	<.35	--	.04	--	.04	--	5.3
09/25/92	1210	30	.06	--	<.01	--	<.05	--	.34	--	<.45	--	.04	--	.05	--	5.3
11/07/92	1135	2	.06	.06	.02	.01	<.05	<.05	.24	.54	<.35	<.65	.06	.07	.07	.11	5.5
11/07/92	1210	30	.05	--	.02	--	<.05	--	.25	--	<.35	--	.05	--	.07	--	5.3

Table 15. Concentrations of nitrogen, phosphorus, and organic carbon in Stagecoach Reservoir at the dam, site SC–2, 1990–92

[ft, feet; mg/L, milligrams per liter; <, less than; --, no data]

Date	Time	Sample depth (ft)	Nitrogen ammonia, dissolved (mg/L N)	Nitrogen ammonia, total (mg/L N)	Nitrogen nitrite, dissolved (mg/L N)	Nitrogen nitrite, total (mg/L N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L N)	Nitrogen $NO_2 + NO_3$, total (mg/L N)	Nitrogen organic, dissolved (mg/L N)	Nitrogen organic, total (mg/L N)	Nitrogen, dissolved (mg/L N)	Nitrogen, total (mg/L N)	Phosphorus ortho, dissolved (mg/L P)	Phosphorus ortho, total (mg/L P)	Phosphorus, dissolved (mg/L P)	Phosphorus, total (mg/L P)	Carbon organic, dissolved (mg/L C)
04/26/90	1055	2	<0.01	--	<0.01	--	<0.10	--	<0.40	--	<0.51	--	<0.01	--	0.02	--	4.9
04/26/90	1150	109	.25	--	.02	--	.20	--	.35	--	.80	--	.10	--	.11	--	5.6
05/23/90	1005	2	.01	--	<.01	--	<.10	<0.10	.59	<0.60	<.70	<0.70	<.01	--	.02	0.09	5.1
05/23/90	1115	109	.14	--	<.01	--	.10	.10	.76	<.36	1.00	<.60	.08	--	.08	.10	5.0
06/26/90	1120	2	<.01	--	.01	--	<.10	--	<1.30	--	<1.41	--	<.01	--	.01	--	6.3
06/26/90	1230	109	.30	--	<.01	--	<.10	--	1.30	--	<1.70	--	.18	--	.19	--	5.5
07/31/90	1120	2	.04	--	.01	--	<.10	--	.66	--	<.80	--	<.01	--	.01	--	6.8
07/31/90	1225	110	.93	--	.02	--	<.10	--	.47	--	<1.50	--	.24	--	.25	--	5.4
08/29/90	1105	2	.01	--	<.01	--	<.10	<.10	.59	<1.09	<.70	<1.19	<.01	--	.01	.02	6.7
08/29/90	1205	110	1.30	--	<.01	--	<.10	<.10	.30	<.50	<1.70	<.60	.23	--	.25	.22	5.6
09/25/90	1100	2	.03	--	<.01	--	<.10	--	.57	--	<.70	--	<.01	--	.03	--	6.4
09/25/90	1205	110	1.60	--	<.01	--	<.10	--	.40	--	<2.10	--	.31	--	.32	--	5.3
10/22/90	1405	2	.39	0.38	<.01	<0.01	<.10	<.10	.61	.52	<1.10	<1.00	.09	0.08	.09	.10	6.1
10/22/90	1510	100	.91	.87	<.01	.01	<.10	<.10	.59	.73	<1.60	<1.70	.18	.17	.17	.18	6.0
05/09/91	1505	2	.02	.03	<.01	<.01	<.05	<.05	.38	1.07	<.45	<1.15	<.01	<.01	.03	.08	4.6
05/09/91	1605	110	.09	.08	.01	.02	.36	.38	.41	1.22	.86	1.68	.09	.09	.11	.11	4.9
06/10/91	1145	2	.04	--	<.01	--	<.05	--	.56	--	<.65	--	<.01	--	.02	--	5.7
06/10/91	1250	110	.05	--	.01	--	.08	--	.35	--	.48	--	.03	--	.05	--	4.7
07/10/91	1125	2	.07	--	.01	--	<.05	--	.53	--	<.65	--	.01	--	.02	--	6.3
07/10/91	1230	110	.08	--	.04	--	.15	--	.42	--	.65	--	.09	--	.10	--	5.1
08/08/91	1135	2	.02	<.01	<.01	<.01	<.05	<.05	.78	<.70	<.85	<.76	<.01	.02	.03	.07	6.1
08/08/91	1240	110	.12	.13	.03	.03	.08	.07	.48	.37	.68	.57	.12	.13	.13	.16	4.8
09/04/91	1155	2	<.01	--	<.01	--	<.05	--	<.40	--	<.46	--	<.01	--	.01	--	6.1
09/04/91	1300	110	.61	--	<.01	--	<.05	--	.19	--	<.85	--	.22	--	.28	--	5.7
10/09/91	1155	2	<.01	<.01	<.01	<.01	<.05	<.05	<.40	<.60	<.46	<.66	<.01	<.01	.04	.09	6.0

Table 15. Concentrations of nitrogen, phosphorus, and organic carbon in Stagecoach Reservoir at the dam, site SC–2, 1990–92--Continued

Date	Time	Sample depth (ft)	Nitrogen ammonia, dissolved (mg/L N)	Nitrogen ammonia, total (mg/L N)	Nitrogen nitrite, dissolved (mg/L N)	Nitrogen nitrite, total (mg/L N)	Nitrogen $NO_2 + NO_3$, dissolved (mg/L N)	Nitrogen $NO_2 + NO_3$, total (mg/L N)	Nitrogen organic, dissolved (mg/L N)	Nitrogen organic, total (mg/L N)	Nitrogen, dissolved (mg/L N)	Nitrogen, total (mg/L N)	Phosphorus ortho, dissolved (mg/L P)	Phosphorus ortho, total (mg/L P)	Phosphorus, dissolved (mg/L P)	Phosphorus, total (mg/L P)	Carbon organic, dissolved (mg/L C)
10/09/91	1300	100	1.20	1.20	<0.01	<0.01	<0.05	<0.05	0.50	0.40	<1.75	<1.65	0.32	0.31	0.35	0.39	6.0
04/17/92	0910	2	<.01	<.01	<.01	<.01	<.05	<.05	<.40	<.40	<.46	<.46	<.01	<.01	<.01	.03	4.0
04/17/92	1015	110	.79	.80	<.01	.01	<.05	<.05	.71	.70	<1.55	<1.55	.30	.28	.34	.41	--
05/20/92	1000	2	.01	--	<.01	--	<.05	--	.29	--	<.35	--	<.01	--	.02	--	4.7
05/20/92	1055	100	.13	--	<.01	--	<.05	--	.27	--	<.45	--	.11	--	.13	--	4.4
06/24/92	1010	2	.02	--	<.01	--	<.05	--	.28	--	<.35	--	<.01	--	<.01	--	6.0
06/24/92	1115	110	.27	--	<.01	--	<.05	--	.23	--	<.55	--	.15	--	.18	--	5.0
07/28/92	1015	2	.02	--	<.01	--	<.05	--	.28	--	<.35	--	<.01	--	<.01	--	4.7
07/28/92	1125	110	.36	--	<.01	--	<.05	--	.34	--	<.75	--	.15	--	.18	--	4.7
08/27/92	0950	2	.04	.05	<.01	<.01	<.05	<.05	.26	.35	<.35	<.45	<.01	.03	.01	.03	5.5
08/27/92	1100	110	.51	.50	<.01	<.01	<.05	<.05	.39	.50	<.95	<1.05	.20	.22	.25	.25	4.6
09/25/92	0945	2	.01	--	<.01	--	<.05	--	.29	--	<.35	--	.03	--	.03	--	5.5
09/25/92	1050	110	.66	--	<.01	--	<.05	--	.34	--	<1.05	--	.27	--	.28	--	4.6
11/07/92	0945	2	.12	.12	.02	.01	<.05	<.05	.28	.48	<.45	<.65	.08	.09	.09	.12	5.2
11/07/92	1040	110	.92	.91	.02	.02	<.05	<.05	.18	.39	<1.15	<1.35	.32	.34	.32	.37	5.1

Table 16. Concentrations of selected trace constituents in Stagecoach Reservoir near the inlet, site SC–1, 1990–92

[ft, feet; µS/cm, microsiemens per centimeter at 25 degrees Celsius; µg/L, micrograms per liter; <, less than; --, no data]

Date	Time	Sample depth (ft)	Specific conductance (µS/cm)	Aluminum, total recoverable (µg/L Al)	Antimony, total recoverable (µg/L Sb)	Arsenic, total (µg/L As)	Barium, total recoverable (µg/L Ba)	Beryllium, total recoverable (µg/L Be)	Cadmium, total recoverable (µg/L Cd)	Chromium, total recoverable (µg/L Cr)	Cobalt, total recoverable (µg/L Co)	Copper, total recoverable (µg/L Cu)	Iron, total recoverable (µg/L Fe)
08/29/90	1305	2	455	--	--	--	--	--	--	--	--	--	--
08/29/90	1330	25	456	20	<1	1	<100	<10	<1	<1	1	2	80
08/08/91	1005	2	450	--	--	--	--	--	--	--	--	--	--
08/08/91	1040	30	465	110	<1	1	<100	<10	<1	<1	<1	3	230
08/27/92	1300	2	466	--	--	--	--	--	--	--	--	--	--
08/27/92	1335	30	469	300	<1	1	<100	<10	<1	<1	<1	2	700

Date	Time	Sample depth (ft)	Specific conductance (µS/cm)	Lead, total recoverable (µg/L Pb)	Lithium, total recoverable (µg/L Li)	Manganese, total recoverable (µg/L Mn)	Mercury, total recoverable (µg/L Hg)	Molybdenum, total recoverable (µg/L Mo)	Nickel, total recoverable (µg/L Ni)	Selenium, total (µg/L Se)	Silver, total recoverable (µg/L Ag)	Strontium, total recoverable (µg/L Sr)	Zinc, total recoverable (µg/L Zn)
08/29/90	1305	2	455	--	--	--	--	--	--	--	--	--	--
08/29/90	1330	25	456	1	10	60	<0.01	1	<1	<1	<1	280	<10
08/08/91	1005	2	450	--	--	--	--	--	--	--	--	--	--
08/08/91	1040	30	465	3	10	80	<.01	5	6	<1	<1	310	<10
08/27/92	1300	2	466	--	--	--	--	--	--	--	--	--	--
08/27/92	1335	30	469	1	10	80	<.01	1	2	<1	<1	320	<10

Table 17. Concentrations of selected trace constituents in Stagecoach Reservoir at the dam, site SC–2, 1990–92

[ft, feet; µS/cm, microsiemens per centimeter at 25 degrees Celsius; µg/L, micrograms per liter; <, less than; --, no data]

Date	Time	Sample depth (ft)	Specific conductance (µS/cm)	Aluminum, total recoverable (µg/L Al)	Antimony, total recoverable (µg/L Sb)	Arsenic, total (µg/L As)	Barium, total recoverable (µg/L Ba)	Beryllium, total recoverable (µg/L Be)	Cadmium, total recoverable (µg/L Cd)	Chromium, total recoverable (µg/L Cr)	Cobalt, total recoverable (µg/L Co)	Copper, total recoverable (µg/L Cu)	Iron, total recoverable (µg/L Fe)
08/29/90	1105	2	445	20	<1	1	<100	<10	<1	<1	1	1	20
08/29/90	1205	110	509	600	<1	1	<100	<10	<1	<1	1	2	1,100
08/08/91	1135	2	451	--	--	--	--	--	--	--	--	--	--
08/08/91	1240	110	445	30	<1	<1	<100	<10	<1	<1	<1	2	40
08/27/92	0950	2	469	--	--	--	--	--	--	--	--	--	--
08/27/92	1100	110	465	<10	<1	1	<100	<10	<1	<1	<1	<1	110

Date	Time	Sample depth (ft)	Specific conductance (µS/cm)	Lead, total recoverable (µg/L Pb)	Lithium, total recoverable (µg/L Li)	Manganese, total recoverable (µg/L Mn)	Mercury, total recoverable (µg/L Hg)	Molybdenum, total recoverable (µg/L Mo)	Nickel, total recoverable (µg/L Ni)	Selenium, total (µg/L Se)	Silver, total recoverable (µg/L Ag)	Strontium, total recoverable (µg/L Sr)	Zinc, total recoverable (µg/L Zn)
08/29/90	1105	2	445	<1	10	40	<0.01	<1	1	<1	<1	320	<10
08/29/90	1205	110	509	1	10	440	<01	<1	<3	<1	<1	340	<10
08/08/91	1135	2	451	--	--	--	--	--	--	--	--	--	--
08/08/91	1240	110	445	3	10	210	<01	1	2	<1	<1	260	<10
08/27/92	0950	2	469	--	--	--	--	--	--	--	--	--	--
08/27/92	1100	110	465	<1	10	420	<01	<1	1	<1	<1	320	<10

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92

[Cells, cell numbers per milliliter; ft, feet; % comp, percent composition; biovol, biovolume in cubic micrometers per milliliter; % biovol percent biovolume composition; µg/L, micrograms per liter; --, no data. Cell counts and biovolumes are rounded to standard significant figures (Britton and Greeson, 1989). Total cell counts are based on unrounded values. Because of rounding, percentages might not equal 100]

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		4-ft depth				Composite (0–14 ft)			
		Cells	% comp	Biovol	% biovol	Cells	% comp	Biovol	% biovol
						April 26, 1990			
BACILLARIOPHYTA (DIATOMS)		--	--	--	--	14,000	63.3	3,600,000	78.2
Centrales		--	--	--	--	14,000	62.5	3,500,000	77.2
	Rhizosolenia longiseta	--	--	--	--	84	.4	71,000	1.6
	Stephanodiscus alpinus	--	--	--	--	13,000	62.1	3,400,000	75.6
Pennales		--	--	--	--	170	.8	47,000	1.0
	Achnanthes lanceolata	--	--	--	--	56	.3	17,000	.4
	Achnanthes minutissima	--	--	--	--	56	.3	7,600	.2
	Diatoma tenue var. *elongatum*	--	--	--	--	56	.3	23,000	.5
	Nitzschia sp.	--	--	--	--	--	--	--	--
	Tabellaria fenestrata	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		--	--	--	--	510	2.3	320,000	7.0
	Ankistrodesmus falcatus	--	--	--	--	--	--	--	--
	Chlamydomonas globosa	--	--	--	--	84	.4	92,000	2.0
	Chlamydomonas sp.	--	--	--	--	250	1.2	220,000	4.8
	Chlorococcum sp.	--	--	--	--	84	.4	5,300	.1
	Tetraedron muticum	--	--	--	--	84	.4	3,000	.1
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		--	--	--	--	3,000	14.1	130,000	2.8
	Dinobryon sertularia	--	--	--	--	84	.4	38,000	.8
	Gloeobotrys limneticus	--	--	--	--	--	--	--	--
	Kephyrion sp.	--	--	--	--	170	.8	16,000	.4
	Mallomonas sp.	--	--	--	--	--	--	--	--
	Unknown flagellate	--	--	--	--	2,800	12.9	75,000	1.7
CYANOPHYTA (BLUE-GREEN ALGAE)		--	--	--	--	1,800	8.2	22,000	.5
	Aphanocapsa delicatissima	--	--	--	--	840	3.9	840	.0
	Chroococcus dispersus	--	--	--	--	420	2.0	19,000	.4
	Chroococcus sp.	--	--	--	--	510	2.3	2,000	.0
CRYPTOPHYTA (CRYPTOMONADS)		--	--	--	--	2,500	11.7	380,000	8.3
	Cryptomonas erosa	--	--	--	--	84	.4	110,000	2.4
	Rhodomonas minuta	--	--	--	--	2,400	11.3	270,000	5.9
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	84	.4	140,000	3.1
	Glenodinium pulvisculus	--	--	--	--	84	.4	140,000	3.1
Total cells		--		--		22,000		4,500,000	
Number of species		--				18			
Diversity Index (DI) at species level		--				2.00			
Chlorophyll *a* (µg/L)		--				25.2			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Biovol	% biovol	Cells	% comp	Biovol	% biovol
					May 23, 1990				
BACILLARIOPHYTA (DIATOMS)		780	34.3	200,000	66.5	1,800	38.5	450,000	66.9
Centrales		740	32.8	190,000	65.0	1,700	37.0	430,000	64.2
	Stephanodiscus alpinus	740	32.8	190,000	65.0	1,700	37.0	430,000	64.2
Pennales		34	1.5	4,600	1.6	68	1.5	18,000	2.7
	Achnanthes minutissima	34	1.5	4,600	1.6	--	--	--	--
	Fragilaria crotonensis	--	--	--	--	34	.7	14,000	2.1
	Navicula sp.	--	--	--	--	34	.7	3,700	.5
CHLOROPHYTA (GREEN ALGAE)		68	3.0	30,000	10.3	34	.7	4,600	.7
	Ankistrodesmus falcatus	34	1.5	710	.2	--	--	--	--
	Ankyra judayi	--	--	--	--	34	.7	4,600	.7
	Chlamydomonas sp.	34	1.5	29,000	10.0	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		240	10.5	21,000	7.1	910	20.0	55,000	8.1
	Chrysococcus rufescens	--	--	--	--	68	1.5	17,000	2.6
	Dinobryon sertularia	34	1.5	15,000	5.2	34	.7	15,000	2.3
	Kephyrion sp.	--	--	--	--	--	--	--	--
	Unknown flagellate	200	9.0	5,500	1.9	810	17.8	22,000	3.3
CYANOPHYTA (BLUE-GREEN ALGAE)		910	40.3	18,000	6.0	1,000	22.2	31,000	4.6
	Aphanocapsa delicatissima	440	19.4	440	.1	--	--	--	--
	Chroococcus dispersus	370	16.4	17,000	5.7	640	14.1	29,000	4.3
	Chroococcus sp.	68	3.0	270	.1	200	4.4	810	.1
	Dactylococcopsis smithii	--	--	--	--	--	--	--	--
	Lyngbya nana	--	--	--	--	--	--	--	--
	Synechococcus lineare	--	--	--	--	100	2.2	910	.1
	Synechococcus sp.	34	1.5	240	.1	68	1.5	480	.1
CRYPTOPHYTA (CRYPTOMONADS)		270	11.9	30,000	10.1	850	18.5	130,000	19.7
	Chroomonas sp.	--	--	--	--	--	--	--	--
	Cryptomonas erosa	--	--	--	--	34	.7	43,000	6.4
	Rhodomonas minuta	270	11.9	30,000	10.1	810	17.8	89,000	13.2
Total cells		2,300		290,000		4,600		670,000	
Number of species		11				13			
Diversity Index (DI) at species level		2.70				2.58			
Chlorophyll *a* (µg/L)		21.5				4.7			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		7-ft depth				Composite (0–15 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					June 26, 1990				
BACILLARIOPHYTA (DIATOMS)		400	2.0	140,000	2.9	300	2.3	150,000	5.0
Centrales		270	1.3	80,000	1.7	230	1.7	120,000	4.1
	Cyclotella kutzingiana	62	.3	17,000	.4	17	.1	4,600	.2
	Cyclotella sp.	--	--	--	--	12	.1	580	.0
	Melosira distans	--	--	--	--	12	.1	4,600	.2
	Melosira granulata	--	--	--	--	--	--	--	--
	Stephanodiscus alpinus	190	.9	48,000	1.0	140	1.1	35,000	1.2
	Stephanodiscus astrea	--	--	--	--	12	.1	52,000	1.7
	Stephanodiscus dubius	10	.0	14,000	.3	17	.1	23,000	.8
	Stephanodiscus sp.	10	.0	1,900	.0	17	.1	3,300	.1
Pennales		140	.7	56,000	1.2	75	.6	30,000	1.0
	Achnanthes minutissima	--	--	--	--	4	.0	540	.0
	Asterionella formosa	--	--	--	--	14	.1	5,100	.2
	Fragilaria crotonensis	130	.6	55,000	1.2	--	--	--	--
	Fragilaria vaucheriae	--	--	--	--	57	.4	24,000	.8
	Fragilaria sp.	4	.0	750	.0	--	--	--	--
	Synedra cyclopum	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		45	.2	6,100	.1	340	2.6	150,000	5.0
	Ankyra judayi	45	.2	6,100	.1	38	.3	5,100	.2
	Chlorococcum humicola	--	--	--	--	38	.3	2,400	.1
	Elakatothrix viridis	--	--	--	--	230	1.7	130,000	4.2
	Oocytis sp.	--	--	--	--	38	.3	18,000	.6
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		45	.2	1,200	.0	190	1.4	5,100	.2
	Unknown flagellate	45	.2	1,200	.0	190	1.4	5,100	.2
CYANOPHYTA (BLUE-GREEN ALGAE)		20,000	95.8	4,400,000	92.8	12,000	91.4	2,600,000	84.4
	Aphanizomenon flos-aquae	19,000	94.7	4,400,000	92.8	11,000	85.7	2,600,000	84.2
	Aphanocapsa delicatissima	230	1.1	230	.0	680	5.1	680	.0
	Chroococcus dispersus	--	--	--	--	75	.6	3,400	.1
CRYPTOPHYTA (CRYPTOMONADS)		360	1.8	200,000	4.2	300	2.3	160,000	5.4
	Cryptomonas erosa	140	.7	170,000	3.6	110	.9	140,000	4.7
	Rhodomonas minuta	230	1.1	25,000	.5	190	1.4	21,000	.7
Total cells		20,000		4,700,000		13,000		3,000,000	
Number of species		12				20			
Diversity Index (DI) at species level		.45				1.04			
Chlorophyll *a* (µg/L)		29.0				22.7			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					July 31, 1990				
BACILLARIOPHYTA (DIATOMS)		45	2.8	12,000	6.3	45	3.0	4,100	3.8
Centrales		45	2.8	12,000	6.3	45	3.0	4,100	3.8
	Melosira italica	--	--	--	--	45	3.0	4,100	3.8
	Stephanodiscus alpinus	45	2.8	12,000	6.3	--	--	--	--
Pennales		--	--	--	--	--	--	--	--
	Achnanthes minutissima	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		160	9.9	16,000	8.5	180	12.0	19,000	18.0
	Ankyra judayi	23	1.4	3,000	1.7	110	7.5	15,000	14.1
	Chlamydomonas sp.	90	5.6	9,700	5.3	--	--	--	--
	Chlorella ellipsoidea	--	--	--	--	--	--	--	--
	Chlorococcum humicola	45	2.8	2,800	1.6	68	4.5	4,300	3.9
	Selenastrum minutum	--	--	--	--	--	--	--	--
	Sphaerocystis schroeteri	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		270	16.9	28,000	15.2	410	26.8	17,000	15.4
	Kephyrion sp.	23	1.4	2,200	1.2	--	--	--	--
	Mallomonas sp.	23	1.4	19,000	10.6	--	--	--	--
	Ochromonas sp.	--	--	--	--	45	3.0	6,800	6.4
	Unknown flagellate	230	14.1	6,100	3.3	360	23.9	9,700	9.0
CYANOPHYTA (BLUE-GREEN ALGAE)		630	39.4	47,000	25.8	610	40.3	38,000	35.2
	Aphanizomenon flos-aquae	160	9.9	36,000	19.6	110	7.5	26,000	23.7
	Aphanocapsa delicatissima	230	14.1	230	.1	230	14.9	230	.2
	Aphanothece saxicola	--	--	--	--	--	--	--	--
	Chroococcus dispersus	250	15.5	11,000	6.1	270	17.9	12,000	11.3
	Chroococcus sp.	--	--	--	--	--	--	--	--
	Oscillatoria limnetica	--	--	--	--	--	--	--	--
	Spirulina major	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		500	30.9	81,000	44.2	270	17.9	30,000	27.6
	Chroomonas sp.	--	--	--	--	--	--	--	--
	Cryptomonas erosa	23	1.4	29,000	15.7	--	--	--	--
	Cryptomonas ovata	--	--	--	--	--	--	--	--
	Rhodomonas minuta	470	29.5	52,000	28.5	270	17.9	30,000	27.6
Total cells		1,600		180,000		1,500		110,000	
Number of species		12				9			
Diversity Index (DI) at species level		2.94				2.85			
Chlorophyll *a* (µg/L)		19.6				20.5			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		4-ft depth				Composite (?–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					August 29, 1990				
BACILLARIOPHYTA (DIATOMS)		100	1.6	9,700	0.2	170	2.4	120,000	8.1
Centrales		68	1.1	3,300	.1	100	1.4	40,000	2.7
	Cyclotella sp.	68	1.1	3,300	.1	--	--	--	--
	Melosira italica	--	--	--	--	34	.5	3,100	.2
	Rhizosolenia longiseta	--	--	--	--	34	.5	29,000	1.9
	Stephanodiscus alpinus	--	--	--	--	34	.5	8,700	.6
Pennales		34	.5	6,400	.2	68	.9	83,000	5.4
	Asterionella formosa	--	--	--	--	--	--	--	--
	Fragilaria sp.	34	.5	6,400	.2	--	--	--	--
	Nitzschia gracilis	--	--	--	--	--	--	--	--
	Tabellaria fenestrata	--	--	--	--	68	.9	83,000	5.4
CHLOROPHYTA (GREEN ALGAE)		140	2.2	11,000	.3	340	4.7	31,000	2.1
	Ankyra judayi	34	.5	4,600	.1	34	.5	4,600	.3
	Chlamydomonas sp.	--	--	--	--	34	.5	3,600	.2
	Chlorococcum humicola	100	1.6	6,400	.2	140	1.9	8,500	.6
	Sphaerocystis schroeteri	--	--	--	--	140	1.9	15,000	1.0
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		440	7.1	12,000	.3	710	9.9	19,000	1.3
	Mallomonas sp.	--	--	--	--	--	--	--	--
	Unknown flagellate	440	7.1	12,000	.3	710	9.9	19,000	1.3
CYANOPHYTA (BLUE-GREEN ALGAE)		4,100	66.7	830,000	20.9	5,000	70.3	1,000,000	69.0
	Aphanizomenon flos-aquae	3,500	57.4	800,000	20.3	4,600	64.1	1,000,000	68.4
	Aphanocapsa delicatissima	--	--	--	--	240	3.3	240	.0
	Chroococcus dispersus	510	8.2	23,000	.6	200	2.8	9,100	.6
	Chroococcus sp.	68	1.1	270	.0	--	--	--	--
	Oscillatoria limnetica	--	--	--	--	--	--	--	--
	Synechococcus sp.	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		1,300	21.3	260,000	6.7	910	12.7	300,000	19.6
	Cryptomonas erosa	34	.5	43,000	1.1	100	1.4	130,000	8.5
	Cryptomonas ovata	34	.5	84,000	2.1	34	.5	84,000	5.5
	Rhodomonas minuta	1,200	20.2	140,000	3.5	780	10.9	85,000	5.6
PYRROPHYTA (DINOFLAGELLATES)		68	1.1	2,800,000	71.6	--	--	--	--
	Ceratium hirundinella	68	1.1	2,800,000	71.6	--	--	--	--
Total cells		6,200		4,000,000		7,200		1,500,000	
Number of species		12				15			
Diversity Index (DI) at species level		1.97				1.98			
Chlorophyll *a* (µg/L)		46.7				14.7			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		0-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
						September 25, 1990			
BACILLARIOPHYTA (DIATOMS)		100	2.1	19,000	2.9	68	2.5	28,000	1.5
Centrales		100	2.1	19,000	2.9	34	1.3	5,200	.3
	Cyclotella sp.	34	.7	1,600	.3	17	.6	820	.0
	Stephanodiscus alpinus	67	1.4	17,000	2.6	17	.6	4,400	.2
Pennales		--	--	--	--	34	1.3	23,000	1.2
	Achnanthes minutissima	--	--	--	--	--	--	--	--
	Cymbella affinis	--	--	--	--	17	.6	11,000	.6
	Diatoma vulgare	--	--	--	--	--	--	--	--
	Epithemia sorex	--	--	--	--	17	.6	12,000	.6
	Gomphonema parvulum	--	--	--	--	--	--	--	--
	Navicula cryptocephala var. *veneta*	--	--	--	--	--	--	--	--
	Nitzschia dissipata	--	--	--	--	--	--	--	--
	Nitzschia sp.	--	--	--	--	--	--	--	--
	Rhoicosphenia curvata	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		170	3.5	9,200	1.4	34	1.3	19,000	1.0
	Ankistrodesmus falcatus	34	.7	710	.1	--	--	--	--
	Ankyra judayi	--	--	--	--	--	--	--	--
	Chlamydomonas sp.	--	--	--	--	--	--	--	--
	Chlorococcum humicola	140	2.8	8,500	1.3	--	--	--	--
	Elakatothrix viridis	--	--	--	--	34	1.3	19,000	1.0
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,700	34.3	45,000	6.9	950	35.4	26,000	1.4
	Unknown flagellate	1,700	34.3	45,000	6.9	950	35.4	26,000	1.4
CYANOPHYTA (BLUE-GREEN ALGAE)		2,800	58.0	570,000	87.1	1,400	53.1	300,000	16.1
	Aphanizomenon flos-aquae	2,400	50.3	550,000	85.0	1,300	48.1	290,000	15.8
	Aphanocapsa delicatissima	--	--	--	--	--	--	--	--
	Chroococcus dispersus	300	6.3	14,000	2.1	140	5.1	6,100	.3
	Chroococcus sp.	68	1.4	270	.0	--	--	--	--
	Pseudanabaena catenata	--	--	--	--	--	--	--	--
	Spirulina major	--	--	--	--	--	--	--	--
	Synechococcus sp.	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		100	2.1	11,000	1.7	170	6.3	58,000	3.1
	Cryptomonas erosa	--	--	--	--	34	1.3	43,000	2.3
	Cryptomonas ovata	--	--	--	--	--	--	--	--
	Rhodomonas minuta	100	2.1	11,000	1.7	140	5.1	15,000	.8
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	34	1.3	1,400,000	76.8
	Ceratium hirundinella	--	--	--	--	34	1.3	1,400,000	76.8
Total cells		4,800		650,000		2,700		1,800,000	
Number of species		9				11			
Diversity Index (DI) at species level		1.81				1.90			
Chlorophyll *a* (µg/L)		98.6				11.1			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					October 22, 1990				
BACILLARIOPHYTA (DIATOMS)		1,600	3.4	140,000	2.0	34	0.4	38,000	3.4
Centrales		1,500	3.3	27,000	.4	--	--	--	--
	Cyclotella sp.	1,500	3.3	27,000	.4	--	--	--	--
Pennales		68	.1	110,000	1.6	34	.4	38,000	3.4
	Achnanthes minutissima	34	.1	7,300	.1	--	--	--	--
	Cymbella affinis	--	--	--	--	--	--	--	--
	Fragilaria sp.	--	--	--	--	34	.4	38,000	3.4
	Fragilaria sp. 2	--	--	--	--	--	--	--	--
	Navicula cryptocephala var. *veneta*	--	--	--	--	--	--	--	--
	Navicula pupula	34	.1	100,000	1.5	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		1,500	3.3	2,600,000	38.2	440	4.9	650,000	58.6
	Chlamydomonas sp.	--	--	--	--	34	.4	6,300	.6
	Chlorella ellipsoidea	--	--	--	--	34	.4	510	.0
	Chlorococcum humicola	540	1.2	4,300	.1	140	1.5	1,100	.1
	Roya obtusa var. *angelica*	950	2.1	2,600,000	38.2	240	2.6	650,000	57.9
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		68	.1	6,500	.1	68	.8	6,500	.6
	Unknown flagellate	68	.1	6,500	.1	68	.8	6,500	.6
CYANOPHYTA (BLUE-GREEN ALGAE)		42,000	92.9	3,300,000	47.7	8,500	94.0	420,000	37.4
	Aphanizomenon gracile	24,000	53.1	3,200,000	46.4	2,900	32.6	370,000	34.2
	Aphanocapsa delicatissima	9,700	21.4	19,000	.3	1,300	14.6	2,600	.2
	Chroococcus sp.	--	--	--	--	--	--	--	--
	Pseudanabaena catenata	8,400	18.4	67,000	1.0	4,200	46.8	34,000	3.0
CRYPTOPHYTA (CRYPTOMONADS)		--	--	--	--	--	--	--	--
	Cryptomonas erosa	--	--	--	--	--	--	--	--
EUGLENOPHYTA (EUGLENOIDS)		140	.3	820,000	12.0	--	--	--	--
	Phacus sp.	140	.3	820,000	12.0	--	--	--	--
Total cells		46,000		6,800,000		9,000		1,100,000	
Number of species		10				9			
Diversity Index (DI) at species level		1.82				1.82			
Chlorophyll *a* (µg/L)		10.7				10.7			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					May 09, 1991				
BACILLARIOPHYTA (DIATOMS)		9,800	8.7	5,100,000	48.8	8,000	14.3	1,300,000	13.3
Centrales		8,600	7.6	3,900,000	37.0	6,900	12.2	1,100,000	11.7
	Cyclotella kutzingiana	1,300	1.2	180,000	1.7	920	1.6	120,000	1.3
	Cyclotella sp.	5,100	4.5	630,000	6.0	3,800	6.8	470,000	4.9
	Stephanodiscus astraea var. *minutula*	2,200	1.9	3,100,000	29.3	2,200	3.8	540,000	5.6
Pennales		1,200	1.1	1,200,000	11.8	1,100	2.0	150,000	1.6
	Achnanthes minutissima	250	.2	13,000	.1	160	.3	8,500	.1
	Fragilaria crotonensis	--	--	--	--	--	--	--	--
	Fragilaria vaucheriae	330	.3	49,000	.5	440	.8	65,000	.7
	Navicula cryptocephala	490	.4	1,200,000	11.1	--	--	--	--
	Navicula minima	--	--	--	--	330	.6	61,000	.6
	Nitzschia dissipata	140	.1	11,000	.1	220	.4	16,000	.2
	Unknown pennate	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		12,000	11.0	1,300,000	12.2	4,900	8.7	420,000	4.4
	Chlamydomonas sp.	2,000	1.7	450,000	4.3	--	--	--	--
	Chlorella ellipsoidea	2,000	1.7	27,000	.3	330	.6	4,600	.0
	Chlorococcum humicola	8,500	7.5	790,000	7.6	4,400	7.9	410,000	4.3
	Selenastrum minutum	--	--	--	--	160	.3	4,900	.1
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		5,600	4.9	61,000	.6	2,300	4.1	25,000	.3
	Mallomonas sp.	--	--	--	--	--	--	--	--
	Unknown flagellate	5,600	4.9	61,000	.6	2,300	4.1	25,000	.3
CYANOPHYTA (BLUE-GREEN ALGAE)		79,000	70.2	290,000	2.8	37,000	65.9	130,000	1.3
	Aphanocapsa delicatissima	58,000	51.7	58,000	.6	30,000	53.4	30,000	.3
	Aphanocapsa elachista	11,000	9.8	89,000	.9	1,300	2.3	10,000	.1
	Aphanocapsa rivularis	--	--	--	--	--	--	--	--
	Chroococcus dispersus	9,800	8.7	150,000	1.4	5,700	10.2	86,000	.9
	Dactylococcopsis fascicularis	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		5,200	4.6	720,000	6.9	2,300	4.1	270,000	2.8
	Cryptomonas erosa	4,900	4.3	720,000	6.9	1,800	3.2	260,000	2.7
	Rhodomonas minuta	330	.3	2,300	.0	490	.9	3,400	.0
EUGLENOPHYTA (EUGLENOIDS)		650	.6	3,000,000	28.7	1,600	2.9	7,500,000	78.0
	Euglena sp.	650	.6	3,000,000	28.7	1,600	2.9	7,500,000	78.0
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	--	--	--	--
	Peridinium pusillum	--	--	--	--	--	--	--	--
Total cells		110,000		10,400,000		56,000		9,600,000	
Number of species		17				17			
Diversity Index (DI) at species level		2.56				2.55			
Chlorophyll *a* (µg/L)		11.8				9.6			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0-20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
		June 10, 1991							
BACILLARIOPHYTA (DIATOMS)		490	1.7	370,000	22.5	330	1.2	230,000	10.3
Centrales		160	.6	26,000	1.6	160	.6	20,000	.9
	Cyclotella kutzingiana	41	.1	5,400	.3	--	--	--	--
	Cyclotella sp.	82	.3	10,000	.6	160	.6	20,000	.9
	Stephanodiscus astraea var. *minutula*	41	.1	10,000	.6	--	--	--	--
Pennales		330	1.1	340,000	20.9	160	.6	210,000	9.4
	Fragilaria crotonensis	54	.2	28,000	1.7	--	--	--	--
	Fragilaria sp.	--	--	--	--	--	--	--	--
	Hannaea arcus	270	1.0	310,000	19.2	--	--	--	--
	Navicula cryptocephala	--	--	--	--	82	.3	190,000	8.8
	Nitzschia acicularis	--	--	--	--	82	.3	14,000	.6
CHLOROPHYTA (GREEN ALGAE)		5,600	19.4	830,000	50.9	2,500	9.1	310,000	13.9
	Chlamydomonas sp.	--	--	--	--	--	--	--	--
	Chlorella ellipsoidea	820	2.9	11,000	.7	650	2.4	9,100	.4
	Chlorococcum humicola	160	.6	15,000	.9	330	1.2	30,000	1.4
	Schroederia judayi	4,400	15.4	800,000	49.0	1,500	5.5	270,000	12.1
	Selenastrum minutum	160	.6	4,900	.3	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		2,000	6.9	240,000	14.7	2,300	8.5	25,000	1.1
	Mallomonas sp.	160	.6	220,000	13.5	--	--	--	--
	Unknown flagellate	1,800	6.3	20,000	1.2	2,300	8.5	25,000	1.1
CYANOPHYTA (BLUE-GREEN ALGAE)		19,000	68.0	26,000	1.6	20,000	75.6	31,000	1.4
	Aphanocapsa delicatissima	19,000	66.3	19,000	1.2	19,000	71.3	19,000	.9
	Aphanocapsa elachista	--	--	--	--	820	3.0	6,500	.3
	Chroococcus dispersus	490	1.7	7,400	.4	330	1.2	4,900	.2
CRYPTOPHYTA (CRYPTOMONADS)		1,100	4.0	170,000	10.3	1,100	4.3	120,000	5.5
	Cryptomonas erosa	1,100	4.0	170,000	10.3	820	3.0	120,000	5.4
	Rhodomonas minuta	--	--	--	--	330	1.2	2,300	.1
EUGLENOPHYTA (EUGLENOIDS)		--	--	--	--	330	1.2	1,500,000	67.8
	Euglena sp.	--	--	--	--	330	1.2	1,500,000	67.8
Total cells		29,000		1,600,000		27,000		2,200,000	
Number of species		14				13			
Diversity Index (DI) at species level		1.75				1.72			
Chlorophyll *a* (µg/L)		7.5				10.7			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					July 10, 1991				
BACILLARIOPHYTA (DIATOMS)		160	0.7	160,000	5.5	130	0.5	140,000	5.2
Centrales		82	.3	21,000	.7	--	--	--	--
	Stephanodiscus astraea var. *minutula*	82	.3	21,000	.7	--	--	--	--
Pennales		82	.3	140,000	4.8	130	.5	140,000	5.2
	Hannaea arcus	--	--	--	--	130	.5	140,000	5.2
	Unknown pennate	82	.3	140,000	4.8	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		650	2.6	16,000	.6	750	3.2	51,000	1.8
	Chlorella ellipsoidea	570	2.3	8,000	.3	380	1.6	5,300	.2
	Chlorococcum humicola	82	.3	7,600	.3	250	1.1	23,000	.8
	Schroederia judayi	--	--	--	--	130	.5	23,000	.8
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		900	3.6	9,900	.4	2,000	8.6	22,000	.8
	Unknown flagellate	900	3.6	9,900	.4	2,000	8.6	22,000	.8
CYANOPHYTA (BLUE-GREEN ALGAE)		21,000	83.7	130,000	4.7	18,000	78.4	69,000	2.5
	Aphanizomenon flos-aquae	570	2.3	38,000	1.3	--	--	--	--
	Aphanocapsa delicatissima	12,000	49.0	12,000	.4	13,000	57.8	13,000	.5
	Aphanocapsa elachista	5,500	21.9	44,000	1.6	2,300	9.7	18,000	.6
	Aphanocapsa rivularis	--	--	--	--	--	--	--	--
	Chroococcus dispersus	2,600	10.5	39,000	1.4	2,500	10.8	38,000	1.3
	Chroococcus sp.	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		1,900	7.5	250,000	9.0	1,600	7.0	220,000	7.9
	Cryptomonas erosa	1,700	6.9	250,000	9.0	1,500	6.5	220,000	7.9
	Rhodomonas minuta	160	.7	1,100	.0	130	.5	880	.0
EUGLENOPHYTA (EUGLENOIDS)		490	2.0	2,200,000	79.8	500	2.2	2,300,000	81.9
	Euglena sp.	490	2.0	2,200,000	79.8	500	2.2	2,300,000	81.9
Total cells		25,000		2,800,000		23,000		2,800,000	
Number of species		12				11			
Diversity Index (DI) at species level		2.25				2.10			
Chlorophyll *a* (µg/L)		10.7				9.6			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
		August 08, 1991							
BACILLARIOPHYTA (DIATOMS)		19,000	27.4	11,000,000	86.4	52,000	41.8	23,000,000	11.7
Centrales		--	--	--	--	--	--	--	--
Pennales		19,000	27.4	11,000,000	86.4	52,000	41.8	23,000,000	11.7
	Asterionella formosa	16,000	23.1	7,400,000	60.6	52,000	41.8	23,000,000	11.7
	Cocconeis placentula var. *euglypta*	2,200	3.2	2,800,000	22.9	--	--	--	--
	Gomphonema parvulum	750	1.1	350,000	2.9	--	--	--	--
	Synedra ulna	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		2,600	3.7	210,000	1.7	2,000	1.6	140,000,000	71.3
	Actinastrum braunii	--	--	--	--	--	--	--	--
	Chlamydomonas sp.	490	.7	110,000	.9	330	.3	75,000	.0
	Chlorella ellipsoidea	1,300	1.8	18,000	.1	--	--	--	--
	Chlorococcum humicola	820	1.1	76,000	.6	980	.8	91,000	.0
	Staurastrum sp.	--	--	--	--	650	.5	140,000,000	71.2
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		4,600	6.4	53,000	.4	10,000	8.4	120,000	.1
	Kephyrion sp.	330	.5	5,900	.0	--	--	--	--
	Unknown flagellate	4,200	6.0	47,000	.4	10,000	8.4	120,000	.1
CYANOPHYTA (BLUE-GREEN ALGAE)		42,000	59.8	440,000	3.6	57,000	46.1	480,000	.2
	Anabaena wisconseninse	--	--	--	--	--	--	--	--
	Aphanocapsa delicatissima	30,000	42.8	30,000	.2	40,000	32.4	40,000	.0
	Aphanocapsa elachista	820	1.1	6,500	.1	--	--	--	--
	Chroococcus dispersus	3,800	5.3	56,000	.5	9,800	7.9	150,000	.1
	Coelosphaerium kuetzingianum	7,500	10.6	350,000	2.8	5,900	4.7	270,000	.1
	Oscillatoria amphibia	--	--	--	--	1,300	1.1	18,000	.0
CRYPTOPHYTA (CRYPTOMONADS)		1,800	2.5	220,000	1.8	2,300	1.8	340,000	.2
	Cryptomonas erosa	1,500	2.1	220,000	1.8	2,300	1.8	340,000	.2
	Rhodomonas minuta	330	.5	2,300	.0	--	--	--	--
EUGLENOPHYTA (EUGLENOIDS)		160	.2	750,000	6.1	--	--	--	--
	Euglena sp.	160	.2	750,000	6.1	--	--	--	--
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	330	.3	33,000,000	16.6
	Ceratium hirundinella	--	--	--	--	330	.3	33,000,000	16.6
Total cells		71,000		12,000,000		120,000		290,000,000	
Number of species		15				11			
Diversity Index (DI) at species level		2.56				2.17			
Chlorophyll *a* (µg/L)		5.3				10.7			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					September 04, 1991				
BACILLARIOPHYTA (DIATOMS)		330	0.8	560,000	2.5	490	0.8	220,000	4.5
Centrales		160	.4	510,000	2.3	--	--	--	--
	Cyclotella meneghiniana	--	--	--	--	--	--	--	--
	Melosira varians	--	--	--	--	--	--	--	--
	Stephanodiscus astraea	82	.2	490,000	2.2	--	--	--	--
	Stephanodiscus astraea var. *minutula*	82	.2	21,000	.1	--	--	--	--
Pennales		160	.4	52,000	.2	490	.8	220,000	4.5
	Asterionella formosa	--	--	--	--	490	.8	220,000	4.5
	Cocconeis placentula var. *euglypta*	--	--	--	--	--	--	--	--
	Cymbella minuta	--	--	--	--	--	--	--	--
	Diatoma vulgare	--	--	--	--	--	--	--	--
	Fragilaria vaucheriae	--	--	--	--	--	--	--	--
	Gomphonema parvulum	--	--	--	--	--	--	--	--
	Navicula cryptocephala	--	--	--	--	--	--	--	--
	Navicula minima	--	--	--	--	--	--	--	--
	Navicula sp.	160	.4	52,000	.2	--	--	--	--
	Nitzschia acicularis	--	--	--	--	--	--	--	--
	Nitzschia dissipata	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		2,500	5.7	280,000	1.3	3,100	5.0	300,000	6.1
	Chlamydomonas sp.	490	1.1	110,000	.5	370	.6	85,000	1.7
	Chlorella ellipsoidea	160	.4	2,300	.0	160	.3	2,300	.0
	Chlorococcum humicola	1,800	4.2	170,000	.7	2,000	3.1	180,000	3.7
	Oocytis pusilla	--	--	--	--	650	1.0	31,000	.6
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		2,000	4.6	22,000	.1	2,100	3.4	23,000	.5
	Unknown flagellate	2,000	4.6	22,000	.1	2,100	3.4	23,000	.5
CYANOPHYTA (BLUE-GREEN ALGAE)		35,000	81.6	210,000	.9	54,000	85.7	260,000	5.4
	Anabaena wisconseninse	490	1.1	32,000	.1	330	.5	21,000	.4
	Aphanocapsa delicatissima	23,000	54.8	23,000	.1	39,000	61.5	39,000	.8
	Aphanocapsa elachista	--	--	--	--	820	1.3	6,500	.1
	Chroococcus dispersus	1,800	4.2	27,000	.1	1,800	2.9	27,000	.5
	Coelosphaerium kuetzingianum	--	--	--	--	--	--	--	--
	Oscillatoria amphibia	9,100	21.5	130,000	.6	12,000	19.5	170,000	3.5
CRYPTOPHYTA (CRYPTOMONADS)		2,000	4.6	290,000	1.3	2,500	3.9	360,000	7.3
	Cryptomonas erosa	2,000	4.6	290,000	1.3	2,500	3.9	360,000	7.3
EUGLENOPHYTA (EUGLENOIDS)		980	2.3	4,500,000	20.0	820	1.3	3,700,000	76.2
	Euglena sp.	980	2.3	4,500,000	20.0	820	1.3	3,700,000	76.2
PYRROPHYTA (DINOFLAGELLATES)		160	.4	16,600,000	73.9	--	--	--	--
	Ceratium hirundinella	160	.4	16,600,000	73.9	--	--	--	--
Total cells		43,000		22,000,000		63,000		4,900,000	
Number of species		14				13			
Diversity Index (DI) at species level		2.15				1.93			
Chlorophyll *a* (µg/L)		13.9				8.5			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					October 09, 1991				
BACILLARIOPHYTA (DIATOMS)		15,000	17.3	84,000,000	98.0	13,000	18.0	73,000,000	94.9
Centrales		14,000	15.8	84,000,000	97.6	12,000	16.2	72,000,000	94.4
	Stephanodiscus astraea	14,000	15.8	84,000,000	97.6	12,000	16.2	72,000,000	94.4
Pennales		1,300	1.5	360,000	.4	1,300	1.8	360,000	.5
	Nitzschia acicularis	1,300	1.5	360,000	.4	1,300	1.8	360,000	.5
	Nitzschia dissipata	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		2,300	2.6	160,000	.2	3,300	4.4	290,000	.4
	Chlamydomonas sp.	330	.4	75,000	.1	650	.9	150,000	.2
	Chlorella ellipsoidea	980	1.1	14,000	.0	980	1.3	14,000	.0
	Chlorococcum humicola	650	.7	61,000	.1	1,300	1.8	120,000	.2
	Eudorina elegans	--	--	--	--	--	--	--	--
	Selenastrum minutum	330	.4	8,500	.0	330	.4	8,500	.0
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		6,200	7.0	560,000	.7	5,200	7.0	58,000	.1
	Mallomonas sp.	330	.4	500,000	.6	--	--	--	--
	Unknown flagellate	5,900	6.6	65,000	.1	5,200	7.0	58,000	.1
CYANOPHYTA (BLUE-GREEN ALGAE)		59,000	66.9	190,000	.2	49,000	65.8	160,000	.2
	Aphanocapsa delicatissima	50,000	56.6	50,000	.1	41,000	55.3	41,000	.1
	Chroococcus dispersus	--	--	--	--	7,800	10.5	120,000	.2
	Chroococcus sp.	9,100	10.3	140,000	.2	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		5,600	6.3	770,000	.9	2,900	3.9	390,000	.5
	Cryptomonas erosa	5,200	5.9	770,000	.9	2,600	3.5	380,000	.5
	Rhodomonas minuta	330	.4	2,300	.0	330	.4	2,300	.0
EUGLENOPHYTA (EUGLENOIDS)		--	--	--	--	650	.9	3,000,000	3.9
	Euglena sp.	--	--	--	--	650	.9	3,000,000	3.9
Total cells		89,000		86,000,000		74,000		76,000,000	
Number of species		12				12			
Diversity Index (DI) at species level		2.06				2.15			
Chlorophyll *a* (µg/L)		24.0				24.0			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					April 17, 1992				
BACILLARIOPHYTA (DIATOMS)		83,000	35.8	--	--	85,000	26.6	--	--
Centrales		82,000	35.3	--	--	83,000	26.0	--	--
	Cyclotella meneghiniana	5,900	2.5	--	--	8,100	2.5	--	--
	Cyclotella sp.	61,000	26.5	--	--	58,000	18.0	--	--
	Stephanodiscus astraea	--	--	--	--	--	--	--	--
	Stephanodiscus astraea var. *minutula*	15,000	6.3	--	--	18,000	5.5	--	--
Pennales		1,300	.5	--	--	1,900	.6	--	--
	Asterionella formosa	--	--	--	--	--	--	--	--
	Epithemia sorex	--	--	--	--	470	.1	--	--
	Gomphonema parvulum	--	--	--	--	470	.1	--	--
	Navicula radiosa	--	--	--	--	470	.1	--	--
	Nitzschia palea	1,300	.5	--	--	470	.1	--	--
	Unknown pennate	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		18,000	7.5	--	--	28,000	8.6	--	--
	Ankistrodesmus falcatus	2,500	1.1	--	--	1,300	.4	--	--
	Carteria sp.	2,500	1.1	--	--	1,900	.6	--	--
	Chlamydomonas sp.	2,500	1.1	--	--	5,000	1.6	--	--
	Chlorella ellipsoidea	3,100	1.3	--	--	5,600	1.8	--	--
	Chlorococcum humicola	6,900	3.0	--	--	14,000	4.3	--	--
	Selenastrum minutum	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		14,000	5.9	--	--	16,000	5.1	--	--
	Unknown flagellate	14,000	5.9	--	--	16,000	5.1	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		110,000	46.9	--	--	170,000	54.0	--	--
	Aphanocapsa delicatissima	83,000	35.6	--	--	130,000	40.1	--	--
	Aphanocapsa elachista	7,500	3.2	--	--	10,000	3.1	--	--
	Chroococcus sp.	18,000	7.8	--	--	25,000	7.8	--	--
	Dactylococcopsis fascicularis	630	.3	--	--	3,800	1.2	--	--
	Unknown filament	--	--	--	--	5,600	1.8	--	--
CRYPTOPHYTA (CRYPTOMONADS)		6,300	2.7	--	--	14,000	4.3	--	--
	Chroomonas sp.	1,300	.5	--	--	1,300	.4	--	--
	Cryptomonas erosa	4,400	1.9	--	--	11,000	3.3	--	--
	Rhodomonas minuta	630	.3	--	--	1,900	.6	--	--
EUGLENOPHYTA (EUGLENOIDS)		1,900	.8	--	--	3,100	1.0	--	--
	Euglena sp.	1,900	.8	--	--	3,100	1.0	--	--
PYRROPHYTA (DINOFLAGELLATES)		630	.3	--	--	1,300	.4	--	--
	Peridinium pusillum	630	.3	--	--	1,300	.4	--	--
Total cells		230,000		--		320,000		--	
Number of species		19				23			
Diversity Index (DI) at species level		2.87				3.04			
Chlorophyll *a* (µg/L)		6.7				8.0			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					May 20, 1992				
BACILLARIOPHYTA (DIATOMS)		21,000	9.7	--	--	81,000	11.4	--	--
Centrales		1,900	.9	--	--	6,300	.9	--	--
	Cyclotella meneghiniana	--	--	--	--	--	--	--	--
	Cyclotella sp.	--	--	--	--	--	--	--	--
	Stephanodiscus astraea	--	--	--	--	--	--	--	--
	Stephanodiscus astraea var. *minutula*	1,900	.9	--	--	6,300	.9	--	--
Pennales		19,000	8.9	--	--	75,000	10.5	--	--
	Asterionella formosa	17,000	7.8	--	--	67,000	9.3	--	--
	Gomphonema parvulum	190	.1	--	--	--	--	--	--
	Navicula lanceolata	380	.2	--	--	1,100	.1	--	--
	Nitzschia acicularis	380	.2	--	--	4,200	.6	--	--
	Nitzschia palea	750	.3	--	--	2,100	.3	--	--
	Surirella minuta	--	--	--	--	1,100	.1	--	--
	Synedra delicatissima	560	.3	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		13,000	5.7	--	--	25,000	3.5	--	--
	Carteria sp.	--	--	--	--	3,100	.4	--	--
	Chlamydomonas sp.	5,000	2.3	--	--	3,100	.4	--	--
	Chlorella ellipsoidea	6,900	3.2	--	--	16,000	2.2	--	--
	Chlorococcum humicola	630	.3	--	--	3,100	.4	--	--
	Selenastrum minutum	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		6,300	2.9	--	--	44,000	6.1	--	--
	Mallomonas sp.	630	.3	--	--	--	--	--	--
	Unknown flagellate	5,600	2.6	--	--	44,000	6.1	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		170,000	77.1	--	--	490,000	68.9	--	--
	Aphanizomenon flos-aquae	11,000	4.9	--	--	6,300	.9	--	--
	Aphanocapsa delicatissima	78,000	35.5	--	--	310,000	43.4	--	--
	Aphanocapsa elachista	51,000	23.2	--	--	140,000	20.2	--	--
	Chroococcus sp.	26,000	11.7	--	--	31,000	4.4	--	--
	Dactylococcopsis fascicularis	1,900	.9	--	--	--	--	--	--
	Phormidium tenue	1,900	.9	--	--	--	--	--	--
	Synechococcus sp.	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		8,800	4.0	--	--	63,000	8.8	--	--
	Chroomonas sp.	1,900	.9	--	--	22,000	3.1	--	--
	Cryptomonas erosa	6,300	2.9	--	--	34,000	4.8	--	--
	Rhodomonas minuta	630	.3	--	--	6,300	.9	--	--
EUGLENOPHYTA (EUGLENOIDS)		1,300	.6	--	--	9,400	1.3	--	--
	Euglena sp.	1,300	.6	--	--	9,400	1.3	--	--
Total cells		220,000		--		710,000		--	
Number of species		22				19			
Diversity Index (DI) at species level		2.89				2.70			
Chlorophyll *a* (µg/L)		4.3				2.1			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
						June 24, 1992			
BACILLARIOPHYTA (DIATOMS)		23,000	15.5	--	--	17,000	11.0	--	--
Centrales		--	--	--	--	630	.4	--	--
	Aulacoseira italica var. *tenuissima*	--	--	--	--	630	.4	--	--
Pennales		23,000	15.5	--	--	16,000	10.6	--	--
	Asterionella formosa	--	--	--	--	170	.1	--	--
	Fragilaria crotonensis	22,000	15.1	--	--	16,000	10.2	--	--
	Gomphonema parvulum	150	.1	--	--	87	.1	--	--
	Navicula pupula	--	--	--	--	87	.1	--	--
	Navicula tripunctata	--	--	--	--	87	.1	--	--
	Synedra delicatissima	300	.2	--	--	87	.1	--	--
CHLOROPHYTA (GREEN ALGAE)		9,400	6.4	--	--	29,000	19.1	--	--
	Ankistrodesmus falcatus	--	--	--	--	630	.4	--	--
	Chlamydomonas sp.	5,600	3.9	--	--	6,900	4.5	--	--
	Chlorella ellipsoidea	1,900	1.3	--	--	5,000	3.3	--	--
	Chlorococcum humicola	1,900	1.3	--	--	3,100	2.0	--	--
	Oocytis pusilla	--	--	--	--	--	--	--	--
	Selenastrum minutum	--	--	--	--	630	.4	--	--
	Sphaerocystis schroeteri	--	--	--	--	13,000	8.5	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		12,000	8.2	--	--	15,000	9.8	--	--
	Dinobryon divergens	--	--	--	--	--	--	--	--
	Unknown flagellate	12,000	8.2	--	--	15,000	9.8	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		99,000	67.8	--	--	91,000	58.9	--	--
	Aphanizomenon flos-aquae	28,000	18.9	--	--	4,400	2.8	--	--
	Aphanocapsa delicatissima	56,000	38.2	--	--	74,000	48.0	--	--
	Aphanothece nidulans	--	--	--	--	--	--	--	--
	Chroococcus sp.	16,000	10.7	--	--	13,000	8.1	--	--
	Phormidium tenue	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		1,900	1.3	--	--	1,300	.8	--	--
	Cryptomonas erosa	1,900	1.3	--	--	1,300	.8	--	--
EUGLENOPHYTA (EUGLENOIDS)		1,300	.9	--	--	630	.4	--	--
	Euglena sp.	1,300	.9	--	--	630	.4	--	--
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	--	--	--	--
	Ceratium hirundinella	--	--	--	--	--	--	--	--
Total cells		150,000		--		150,000		--	
Number of species		12				19			
Diversity Index (DI) at species level		2.55				2.61			
Chlorophyll *a* (µg/L)		2.8				1.2			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (?–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					July 28, 1992				
BACILLARIOPHYTA (DIATOMS)		2,600	1.0	--	--	13,000	5.5	--	--
Centrales		--	--	--	--	--	--	--	--
	Cyclotella ocellata	--	--	--	--	--	--	--	--
Pennales		2,600	1.0	--	--	13,000	5.5	--	--
	Cymbella lunata	--	--	--	--	--	--	--	--
	Fragilaria crotonensis	2,600	1.0	--	--	13,000	5.5	--	--
	Meridion circulare	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		3,900	1.5	--	--	1,300	.5	--	--
	Ankistrodesmus falcatus	1,300	.5	--	--	--	--	--	--
	Chlamydomonas sp.	2,600	1.0	--	--	1,300	.5	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		230,000	90.9	--	--	220,000	92.3	--	--
	Aphanizomenon flos-aquae	78,000	30.3	--	--	150,000	63.4	--	--
	Aphanocapsa delicatissima	160,000	60.6	--	--	69,000	29.0	--	--
	Chroococcus sp.	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		13,000	5.1	--	--	2,600	1.1	--	--
	Cryptomonas erosa	13,000	5.1	--	--	2,600	1.1	--	--
EUGLENOPHYTA (EUGLENOIDS)		3,900	1.5	--	--	1,300	.5	--	--
	Euglena sp.	1,300	.5	--	--	1,300	.5	--	--
	Trachelomonas sp.	2,600	1.0	--	--	--	--	--	--
Total cells		260,000		--		240,000		--	
Number of species		8				6			
Diversity Index (DI) at species level		1.46				1.32			
Chlorophyll *a* (µg/L)		26.7				32.0			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					August 27, 1992				
BACILLARIOPHYTA (DIATOMS)		19,000	2.0	--	--	14,000	1.9	--	--
Centrales		2,600	.3	--	--	5,200	.7	--	--
	Cyclotella ocellata	1,700	.2	--	--	580	.1	--	--
	Stephanodiscus astraea	860	.1	--	--	4,600	.6	--	--
Pennales		17,000	1.8	--	--	9,100	1.2	--	--
	Achnanthes marginulata	--	--	--	--	440	.1	--	--
	Achnanthes sp.	2,900	.3	--	--	--	--	--	--
	Asterionella formosa	--	--	--	--	1,500	.2	--	--
	Cocconeis placentula	1,700	.2	--	--	220	.0	--	--
	Cymbella cymbiformis	2,900	.3	--	--	660	.1	--	--
	Fragilaria crotonensis	2,900	.3	--	--	4,600	.6	--	--
	Fragilaria vaucheriae	2,300	.2	--	--	--	--	--	--
	Navicula sp.	4,100	.4	--	--	1,500	.2	--	--
CHLOROPHYTA (GREEN ALGAE)		6,500	.7	--	--	5,200	.7	--	--
	Ankistrodesmus falcatus	2,600	.3	--	--	2,600	.3	--	--
	Chlamydomonas sp.	3,900	.4	--	--	2,600	.3	--	--
	Schroederia judayi	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		--	--	--	--	--	--	--	--
	Mallomonas sp.	--	--	--	--	--	--	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		920,000	96.5	--	--	730,000	96.4	--	--
	Aphanizomenon flos-aquae	700,000	73.5	--	--	410,000	54.6	--	--
	Aphanocapsa delicatissima	120,000	12.2	--	--	140,000	18.8	--	--
	Chroococcus limneticus	31,000	3.3	--	--	52,000	6.8	--	--
	Microcystis aeruginosa	71,000	7.5	--	--	120,000	16.2	--	--
CRYPTOPHYTA (CRYPTOMONADS)		5,200	.5	--	--	6,500	.9	--	--
	Cryptomonas erosa	5,200	.5	--	--	6,500	.9	--	--
EUGLENOPHYTA (EUGLENOIDS)		2,600	.3	--	--	1,300	.2	--	--
	Euglena sp.	1,300	.1	--	--	--	--	--	--
	Trachelomonas sp.	1,300	.1	--	--	1,300	.2	--	--
Total cells		950,000		--		760,000		--	
Number of species		17				16			
Diversity Index (DI) at species level		1.43				1.90			
Chlorophyll *a* (µg/L)		.0				.0			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					September 25, 1992				
BACILLARIOPHYTA (DIATOMS)		9,000	3.5	--	--	17,000	6.4	--	--
Centrales		5,200	2.0	--	--	1,300	.5	--	--
	Melosira varians	--	--	--	--	--	--	--	--
	Stephanodiscus astraea	5,200	2.0	--	--	1,300	.5	--	--
Pennales		3,900	1.5	--	--	16,000	5.9	--	--
	Asterionella formosa	--	--	--	--	250	.1	--	--
	Fragilaria crotonensis	3,900	1.5	--	--	15,000	5.8	--	--
	Gyrosigma sp.	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		2,600	1.0	--	--	6,500	2.5	--	--
	Ankistrodesmus falcatus	2,600	1.0	--	--	5,200	2.0	--	--
	Chlamydomonas sp.	--	--	--	--	--	--	--	--
	Staurastrum sp.	--	--	--	--	1,300	.5	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		26,000	10.0	--	--	--	--	--	--
	Dinobryon sertularia	26,000	10.0	--	--	--	--	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		210,000	79.6	--	--	230,000	88.7	--	--
	Aphanizomenon flos-aquae	--	--	--	--	--	--	--	--
	Aphanocapsa delicatissima	210,000	79.6	--	--	230,000	88.7	--	--
CRYPTOPHYTA (CRYPTOMONADS)		12,000	4.5	--	--	5,200	2.0	--	--
	Cryptomonas erosa	12,000	4.5	--	--	5,200	2.0	--	--
EUGLENOPHYTA (EUGLENOIDS)		3,900	1.5	--	--	1,300	.5	--	--
	Euglena sp.	3,900	1.5	--	--	1,300	.5	--	--
	Trachelomonas sp.	--	--	--	--	--	--	--	--
Total cells		260,000		--		260,000		--	
Number of species		7				8			
Diversity Index (DI) at species level		1.15				.74			
Chlorophyll *a* (µg/L)		.2				.5			

Table 18. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–1 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir near inlet (site SC–1)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
						November 07, 1992			
BACILLARIOPHYTA (DIATOMS)		150,000	50.4	--	--	72,000	33.9	--	--
Pennales		150,000	50.4	--	--	72,000	33.9	--	--
	Asterionella formosa	150,000	50.4	--	--	72,000	33.9	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,300	.4	--	--	3,900	1.8	--	--
	Dinobryon sociale	1,300	.4	--	--	3,900	1.8	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		140,000	46.6	--	--	130,000	63.0	--	--
	Aphanizomenon flos-aquae	13,000	4.2	--	--	--	--	--	--
	Aphanocapsa delicatissima	130,000	42.4	--	--	120,000	54.5	--	--
	Chroococcus limneticus	--	--	--	--	18,000	8.5	--	--
EUGLENOPHYTA (EUGLENOIDS)		7,800	2.5	--	--	2,600	1.2	--	--
	Euglena sp.	5,200	1.7	--	--	--	--	--	--
	Trachelomonas sp.	2,600	.8	--	--	2,600	1.2	--	--
Total cells		310,000		--		210,000		--	
Number of species		6				5			
Diversity Index (DI) at species level		1.41				1.49			
Chlorophyll *a* (µg/L)		.2				.2			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92

[Cells, cell numbers per milliliter; ft, feet; % comp, percent composition; biovol, biovolume in cubic micrometers per milliliter; % biovol, percent biovolume composition; µg/L, micrograms per liter; --, no data. Cell counts and biovolumes are rounded to standard significant figures (Britton and Greeson, 1989). Total cell counts are based on unrounded values. Because of rounding, percentages might not equal 100]

Phylum order	Genus species	Stagecoach Reservoir at dsm (site SC–2)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Biovol	% biovol	Cells	% comp	Biovol	% biovol
		April 26, 1990							
BACILLARIOPHYTA (DIATOMS)		17,000	67.6	4,400,000	74.4	18,000	78.9	4,600,000	90.0
Centrales		16,000	66.7	4,300,000	71.8	18,000	78.4	4,600,000	88.7
	Rhizosolenia longiseta	110	.5	95,000	1.6	97	.4	82,000	1.6
	Stephanodiscus alpinus	16,000	66.2	4,200,000	70.2	17,000	78.0	4,500,000	87.1
Pennales		230	.9	150,000	2.6	97	.4	64,000	1.2
	Achnanthes lanceolata	--	--	--	--	--	--	--	--
	Achnanthes minutissima	110	.5	15,000	.3	--	--	--	--
	Diatoma tenue var. *elongatum*	--	--	--	--	--	--	--	--
	Nitzschia sp.	--	--	--	--	97	.4	64,000	1.2
	Tabellaria fenestrata	110	.5	140,000	2.3	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		1,000	4.1	720,000	12.1	770	3.5	110,000	2.1
	Ankistrodesmus falcatus	110	.5	2,400	.0	390	1.7	8,100	.2
	Chlamydomonas globosa	110	.5	120,000	2.1	--	--	--	--
	Chlamydomonas sp.	680	2.7	580,000	9.8	97	.4	84,000	1.6
	Chlorococcum sp.	110	.5	7,100	.1	290	1.3	18,000	.4
	Tetraedron muticum	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		3,300	13.2	410,000	6.9	1,800	8.2	110,000	2.2
	Dinobryon sertularia	230	.9	100,000	1.7	97	.4	43,000	.8
	Gloeobotrys limneticus	230	.9	14,000	.2	390	1.7	24,000	.5
	Kephyrion sp.	450	1.8	43,000	.7	97	.4	9,300	.2
	Mallomonas sp.	230	.9	190,000	3.3	--	--	--	--
	Unknown flagellate	2,100	8.7	58,000	1.0	1,300	5.6	34,000	.7
CYANOPHYTA (BLUE-GREEN ALGAE)		110	.5	450	.0	870	3.9	2,000	.0
	Aphanocapsa delicatissima	--	--	--	--	480	2.2	480	.0
	Chroococcus dispersus	--	--	--	--	--	--	--	--
	Chroococcus sp.	110	.5	450	.0	390	1.7	1,500	.0
CRYPTOPHYTA (CRYPTOMONADS)		3,600	14.6	400,000	6.7	1,200	5.2	130,000	2.5
	Cryptomonas erosa	--	--	--	--	--	--	--	--
	Rhodomonas minuta	3,600	14.6	400,000	6.7	1,200	5.2	130,000	2.5
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	97	.4	160,000	3.2
	Glenodinium pulvisculus	--	--	--	--	97	.4	160,000	3.2
Total cells		25,000		6,000,000		22,000		5,100,000	
Number of species		15				14			
Diversity Index (DI) at species level		1.79				1.44			
Chlorophyll *a* (µg/L)		15.9				21.5			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Biovol	% biovol	Cells	% comp	Biovol	% biovol
					May 23, 1990				
BACILLARIOPHYTA (DIATOMS)		980	34.9	240,000	75.5	1,400	25.0	360,000	58.0
Centrales		910	32.5	230,000	72.6	1,300	23.8	340,000	54.2
	Stephanodiscus alpinus	910	32.5	230,000	72.6	1,300	23.8	340,000	54.2
Pennales		68	2.4	9,200	2.9	68	1.2	24,000	3.8
	Achnanthes minutissima	68	2.4	9,200	2.9	17	.3	2,300	.4
	Fragilaria crotonensis	--	--	--	--	51	.9	22,000	3.5
	Navicula sp.	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		100	3.6	6,000	1.9	--	--	--	--
	Ankistrodesmus falcatus	68	2.4	1,400	.4	--	--	--	--
	Ankyra judayi	34	1.2	4,600	1.4	--	--	--	--
	Chlamydomonas sp.	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		740	26.5	22,000	7.0	880	15.9	40,000	6.5
	Chrysococcus rufescens	--	--	--	--	68	1.2	1,800	.3
	Dinobryon sertularia	--	--	--	--	34	.6	15,000	2.4
	Kephyrion sp.	34	1.2	3,300	1.0	34	.6	3,300	.5
	Unknown flagellate	710	25.3	19,000	6.0	740	13.4	20,000	3.2
CYANOPHYTA (BLUE-GREEN ALGAE)		640	22.9	13,000	4.1	1,500	26.8	22,000	3.5
	Aphanocapsa delicatissima	100	3.6	100	.0	440	7.9	440	.1
	Chroococcus dispersus	200	7.2	9,100	2.8	370	6.7	17,000	2.7
	Chroococcus sp.	68	2.4	270	.1	200	3.7	810	.1
	Dactylococcopsis smithii	68	2.4	2,100	.7	--	--	--	--
	Lyngbya nana	68	2.4	680	.2	200	3.7	2,000	.3
	Synechococcus lineare	--	--	--	--	--	--	--	--
	Synechococcus sp.	140	4.8	950	.3	270	4.9	1,900	.3
CRYPTOPHYTA (CRYPTOMONADS)		340	12.0	37,000	11.6	1,800	32.3	200,000	32.0
	Chroomonas sp.	--	--	--	--	68	1.2	9,900	1.6
	Cryptomonas erosa	--	--	--	--	--	--	--	--
	Rhodomonas minuta	340	12.0	37,000	11.6	1,700	31.1	190,000	30.4
Total cells		2,800		320,000		5,500		620,000	
Number of species		13				14			
Diversity Index (DI) at species level		2.86				2.85			
Chlorophyll *a* (µg/L)		8.4				7.4			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					June 26, 1990				
BACILLARIOPHYTA (DIATOMS)		200	0.1	53,000	0.1	130	1.3	92,000	3.9
Centrales		200	.1	53,000	.1	100	1.0	28,000	1.2
	Cyclotella kutzingiana	68	.0	18,000	.0	5	.0	1,400	.1
	Cyclotella sp.	--	--	--	--	32	.3	1,500	.1
	Melosira distans	--	--	--	--	--	--	--	--
	Melosira granulata	--	--	--	--	5	.0	5,900	.3
	Stephanodiscus alpinus	140	.1	35,000	.1	32	.3	8,200	.3
	Stephanodiscus astrea	--	--	--	--	--	--	--	--
	Stephanodiscus dubius	--	--	--	--	5	.0	6,800	.3
	Stephanodiscus sp.	--	--	--	--	21	.2	4,000	.2
Pennales		--	--	--	--	34	.3	64,000	2.7
	Achnanthes minutissima	--	--	--	--	--	--	--	--
	Asterionella formosa	--	--	--	--	--	--	--	--
	Fragilaria crotonensis	--	--	--	--	--	--	--	--
	Fragilaria vaucheriae	--	--	--	--	--	--	--	--
	Fragilaria sp.	--	--	--	--	--	--	--	--
	Synedra cyclopum	--	--	--	--	34	.3	64,000	2.7
CHLOROPHYTA (GREEN ALGAE)		200	.1	23,000	.0	34	.3	2,100	.1
	Ankyra judayi	140	.1	18,000	.0	--	--	--	--
	Chlorococcum humicola	68	.0	4,300	.0	34	.3	2,100	.1
	Elakatothrix viridis	--	--	--	--	--	--	--	--
	Oocytis sp.	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		68	.0	1,800	.0	100	1.0	2,700	.1
	Unknown flagellate	68	.0	1,800	.0	100	1.0	2,700	.1
CYANOPHYTA (BLUE-GREEN ALGAE)		220,000	99.6	51,000,000	99.6	9,800	95.4	2,200,000	94.9
	Aphanizomenon flos-aquae	220,000	99.6	51,000,000	99.6	9,800	95.1	2,200,000	94.8
	Aphanocapsa delicatissima	--	--	--	--	--	--	--	--
	Chroococcus dispersus	--	--	--	--	34	.3	1,500	.1
CRYPTOPHYTA (CRYPTOMONADS)		470	.2	130,000	.3	200	2.0	22,000	1.0
	Cryptomonas erosa	68	.0	87,000	.2	--	--	--	--
	Rhodomonas minuta	410	.2	45,000	.1	200	2.0	22,000	1.0
Total cells		220,000		51,000,000		10,000		2,300,000	
Number of species		8				12			
Diversity Index (DI) at species level		.05				.41			
Chlorophyll *a* (µg/L)		19.2				11.2			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		10-ft depth				Composite (0–15 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					July 31, 1990				
BACILLARIOPHYTA (DIATOMS)		270	1.0	53,000	1.0	200	1.8	41,000	1.9
Centrales		140	.5	35,000	.7	200	1.8	41,000	1.9
	Melosira italica	--	--	--	--	68	.6	6,200	.3
	Stephanodiscus alpinus	140	.5	35,000	.7	140	1.2	35,000	1.6
Pennales		140	.5	18,000	.3	--	--	--	--
	Achnanthes minutissima	140	.5	18,000	.3	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		200	.8	11,000	.2	240	2.1	20,000	.9
	Ankyra judayi	--	--	--	--	--	--	--	--
	Chlamydomonas sp.	--	--	--	--	--	--	--	--
	Chlorella ellipsoidea	--	--	--	--	34	.3	1,600	.1
	Chlorococcum humicola	140	.5	8,500	.2	34	.3	2,100	.1
	Selenastrum minutum	68	.3	2,700	.1	34	.3	1,400	.1
	Sphaerocystis schroeteri	--	--	--	--	140	1.2	15,000	.7
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,700	6.4	54,000	1.0	610	5.4	16,000	.7
	Kephyrion sp.	--	--	--	--	--	--	--	--
	Mallomonas sp.	--	--	--	--	--	--	--	--
	Ochromonas sp.	68	.3	10,000	.2	--	--	--	--
	Unknown flagellate	1,600	6.1	44,000	.8	610	5.4	16,000	.7
CYANOPHYTA (BLUE-GREEN ALGAE)		23,000	87.2	4,900,000	92.3	9,900	88.0	2,000,000	89.5
	Aphanizomenon flos-aquae	21,000	80.6	4,800,000	91.5	8,500	76.0	1,900,000	88.6
	Aphanocapsa delicatissima	270	1.0	270	.0	1,100	9.6	1,100	.0
	Aphanothece saxicola	410	1.5	2,000	.0	--	--	--	--
	Chroococcus dispersus	810	3.1	36,000	.7	200	1.8	9,100	.4
	Chroococcus sp.	270	1.0	1,100	.0	--	--	--	--
	Oscillatoria limnetica	--	--	--	--	34	.3	4,100	.2
	Spirulina major	--	--	--	--	34	.3	4,600	.2
CRYPTOPHYTA (CRYPTOMONADS)		1,200	4.6	290,000	5.5	300	2.7	150,000	7.0
	Chroomonas sp.	60	.2	6,500	.1	--	--	--	--
	Cryptomonas erosa	140	.5	170,000	3.3	34	.3	43,000	2.0
	Cryptomonas ovata	--	--	--	--	34	.3	84,000	3.9
	Rhodomonas minuta	1,000	3.8	110,000	2.1	240	2.1	26,000	1.2
Total cells		26,000		5,300,000		11,000		2,200,000	
Number of species		14				15			
Diversity Index (DI) at species level		1.28				1.45			
Chlorophyll *a* (µg/L)		17.8				14.0			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
						August 29, 1990			
BACILLARIOPHYTA (DIATOMS)		--	--	--	--	200	0.3	61,000	0.4
Centrales		--	--	--	--	68	.1	8,900	.1
	Cyclotella sp.	--	--	--	--	41	.1	2,000	.0
	Melosira italica	--	--	--	--	--	--	--	--
	Rhizosolenia longiseta	--	--	--	--	--	--	--	--
	Stephanodiscus alpinus	--	--	--	--	27	.0	6,900	.0
Pennales		--	--	--	--	140	.2	52,000	.4
	Asterionella formosa	--	--	--	--	68	.1	25,000	.2
	Fragilaria sp.	--	--	--	--	--	--	--	--
	Nitzschia gracilis	--	--	--	--	68	.1	28,000	.2
	Tabellaria fenestrata	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		140	0.3	18,000	0.2	740	1.2	79,000	.6
	Ankyra judayi	140	.3	18,000	.2	68	.1	9,100	.1
	Chlamydomonas sp.	--	--	--	--	68	.1	7,300	.1
	Chlorococcum humicola	--	--	--	--	68	.1	4,300	.0
	Sphaerocystis schroeteri	--	--	--	--	540	.8	58,000	.4
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		340	.7	66,000	.6	810	1.3	22,000	.2
	Mallomonas sp.	68	.1	58,000	.6	--	--	--	--
	Unknown flagellate	270	.6	7,300	.1	810	1.3	22,000	.2
CYANOPHYTA (BLUE-GREEN ALGAE)		46,000	98.4	10,300,000	98.9	62,000	96.9	14,000,000	98.1
	Aphanizomenon flos-aquae	45,000	97.1	10,300,000	98.7	61,000	94.8	14,000,000	97.5
	Aphanocapsa delicatissima	--	--	--	--	--	--	--	--
	Chroococcus dispersus	470	1.0	21,000	.2	410	.6	18,000	.1
	Chroococcus sp.	140	.3	540	.0	200	.3	810	.0
	Oscillatoria limnetica	--	--	--	--	610	.9	73,000	.5
	Synechococcus sp.	--	--	--	--	140	.2	950	.0
CRYPTOPHYTA (CRYPTOMONADS)		270	.6	30,000	.3	200	.3	100,000	.7
	Cryptomonas erosa	--	--	--	--	68	.1	86,000	.6
	Cryptomonas ovata	--	--	--	--	--	--	--	--
	Rhodomonas minuta	270	.6	30,000	.3	140	.2	15,000	.1
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	--	--	--	--
	Ceratium hirundinella	--	--	--	--	--	--	--	--
Total cells		46,736		10,000,000		64,000		14,000,000	
Number of species		7				16			
Diversity Index (DI) at species level		.26				.46			
Chlorophyll *a* (µg/L)		167				64.1			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		0-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					September 25, 1990				
BACILLARIOPHYTA (DIATOMS)		410	0.4	85,000	0.4	140	1.3	42,000	2.3
Centrales		270	.3	50,000	.3	100	1.0	22,000	1.2
	Cyclotella sp.	90	.1	4,300	.0	17	.2	820	.0
	Stephanodiscus alpinus	180	.2	46,000	.2	84	.8	22,000	1.2
Pennales		140	.1	35,000	.2	36	.3	20,000	1.1
	Achnanthes minutissima	68	.1	9,200	.0	6	.1	810	.0
	Cymbella affinis	--	--	--	--	--	--	--	--
	Diatoma vulgare	--	--	--	--	6	.1	8,600	.5
	Epithemia sorex	--	--	--	--	--	--	--	--
	Gomphonema parvulum	--	--	--	--	6	.1	3,200	.2
	Navicula cryptocephala var. *veneta*	--	--	--	--	6	.1	2,000	.1
	Nitzschia dissipata	--	--	--	--	6	.1	1,400	.1
	Nitzschia sp.	--	--	--	--	6	.1	3,900	.2
	Rhoicosphenia curvata	68	.1	26,000	.1	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		410	.4	32,000	.2	340	3.2	31,000	1.7
	Ankistrodesmus falcatus	--	--	--	--	--	--	--	--
	Ankyra judayi	--	--	--	--	34	.3	4,600	.2
	Chlamydomonas sp.	140	.1	15,000	.1	170	1.6	18,000	1.0
	Chlorococcum humicola	270	.3	17,000	.1	140	1.3	8,500	.5
	Elakatothrix viridis	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		2,700	2.9	73,000	.4	1,700	16.1	46,000	2.5
	Unknown flagellate	2,700	2.9	73,000	.4	1,700	16.1	46,000	2.5
CYANOPHYTA (BLUE-GREEN ALGAE)		90,000	96.0	19,000,000	98.9	7,800	74.8	1,400,000	75.5
	Aphanizomenon flos-aquae	82,000	87.5	18,000,000	97.8	5,900	56.8	1,300,000	73.2
	Aphanocapsa delicatissima	--	--	--	--	170	1.6	170	.0
	Chroococcus dispersus	410	.4	18,000	.1	270	2.6	12,000	.7
	Chroococcus sp.	--	--	--	--	100	1.0	410	.0
	Pseudanabaena catenata	7,200	7.6	160,000	.9	1,300	12.6	30,000	1.6
	Spirulina major	140	.1	18,000	.1	--	--	--	--
	Synechococcus sp.	270	.3	1,900	.0	34	.3	240	.0
CRYPTOPHYTA (CRYPTOMONADS)		270	.3	30,000	.2	470	4.5	330,000	18.0
	Cryptomonas erosa	--	--	--	--	100	1.0	130,000	7.0
	Cryptomonas ovata	--	--	--	--	68	.6	170,000	9.2
	Rhodomonas minuta	270	.3	30,000	.2	300	2.9	33,000	1.8
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	--	--	--	--
	Ceratium hirundinella	--	--	--	--	--	--	--	--
Total cells		94,000		19,000,000		10,000		1,800,000	
Number of species		13				21			
Diversity Index (DI) at species level		.77				2.16			
Chlorophyll *a* (µg/L)		586				116			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					October 22, 1990				
BACILLARIOPHYTA (DIATOMS)		34	0.7	13,000	5.1	69	4.3	18,000	4.7
Centrales		--	--	--	--	34	2.1	610	.2
	Cyclotella sp.	--	--	--	--	34	2.1	610	.2
Pennales		34	.7	13,000	5.1	35	2.2	17,000	4.6
	Achnanthes minutissima	--	--	--	--	--	--	--	--
	Cymbella affinis	--	--	--	--	9	.6	6,600	1.8
	Fragilaria sp.	--	--	--	--	--	--	--	--
	Fragilaria sp. 2	--	--	--	--	17	1.1	7,100	1.9
	Navicula cryptocephala var. *veneta*	34	.7	13,000	5.1	9	.6	3,400	.9
	Navicula pupula	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		810	15.8	190,000	77.5	410	25.5	98,000	26.1
	Chlamydomonas sp.	--	--	--	--	--	--	--	--
	Chlorella ellipsoidea	68	1.3	1,000	.4	270	17.0	4,100	1.1
	Chlorococcum humicola	680	13.1	5,400	2.2	100	6.4	810	.2
	Roya obtusa var. *angelica*	68	1.3	190,000	74.9	34	2.1	93,000	24.8
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		300	5.9	29,000	11.7	140	8.5	13,000	3.5
	Unknown flagellate	300	5.9	29,000	11.7	140	8.5	13,000	3.5
CYANOPHYTA (BLUE-GREEN ALGAE)		4,000	77.6	14,000	5.7	810	51.0	4,700	1.2
	Aphanizomenon gracile	--	--	--	--	--	--	--	--
	Aphanocapsa delicatissima	3,800	73.7	7,600	3.0	710	44.6	1,400	.4
	Chroococcus sp.	200	4.0	6,500	2.6	100	6.4	3,200	.9
	Pseudanabaena catenata	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		--	--	--	--	140	8.5	36,000	9.7
	Cryptomonas erosa	--	--	--	--	140	8.5	36,000	9.7
EUGLENOPHYTA (EUGLENOIDS)		--	--	--	--	34	2.1	210,000	54.7
	Phacus sp.	--	--	--	--	34	2.1	210,000	54.7
Total cells		5,100		250,000		1,600		370,000	
Number of species		7				12			
Diversity Index (DI) at species level		1.35				2.58			
Chlorophyll a (µg/L)		.0				.0			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					May 09, 1991				
BACILLARIOPHYTA (DIATOMS)		22,000	28.6	4,800,000	32.5	17,000	17.6	4,100,000	19.0
Centrales		22,000	28.2	4,700,000	31.3	17,000	17.5	4,000,000	18.4
	Cyclotella kutzingiana	6,200	8.1	820,000	5.5	2,300	2.3	300,000	1.4
	Cyclotella sp.	--	--	--	--	--	--	--	--
	Stephanodiscus astraea var. *minutula*	15,000	20.1	3,900,000	25.8	15,000	15.2	3,700,000	17.0
Pennales		330	.4	170,000	1.1	120	.1	130,000	.6
	Achnanthes minutissima	--	--	--	--	--	--	--	--
	Fragilaria crotonensis	330	.4	170,000	1.1	--	--	--	--
	Fragilaria vaucheriae	--	--	--	--	--	--	--	--
	Navicula cryptocephala	--	--	--	--	23	.0	55,000	.3
	Navicula minima	--	--	--	--	--	--	--	--
	Nitzschia dissipata	--	--	--	--	54	.1	4,100	.0
	Unknown pennate	--	--	--	--	41	.0	68,000	.3
CHLOROPHYTA (GREEN ALGAE)		12,000	16.0	990,000	6.7	12,000	12.4	1,100,000	5.2
	Chlamydomonas sp.	160	.2	38,000	.3	330	.3	75,000	.4
	Chlorella ellipsoidea	2,100	2.8	30,000	.2	330	.3	4,600	.0
	Chlorococcum humicola	10,000	13.0	930,000	6.2	11,000	11.7	1,000,000	4.9
	Selenastrum minutum	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		2,500	3.2	27,000	.2	9,800	10.2	770,000	3.6
	Mallomonas sp.	--	--	--	--	490	.5	670,000	3.1
	Unknown flagellate	2,500	3.2	27,000	.2	9,300	9.7	100,000	.5
CYANOPHYTA (BLUE-GREEN ALGAE)		32,000	42.1	330,000	2.2	47,000	48.6	400,000	1.8
	Aphanocapsa delicatissima	22,000	29.3	22,000	.1	29,000	30.4	29,000	.1
	Aphanocapsa elachista	3,800	4.9	30,000	.2	8,200	8.5	65,000	.3
	Aphanocapsa rivularis	2,600	3.4	230,000	1.5	2,100	2.2	190,000	.9
	Chroococcus dispersus	3,400	4.5	51,000	.3	7,000	7.3	110,000	.5
	Dactylococcopsis fascicularis	--	--	--	--	160	.2	9,300	.0
CRYPTOPHYTA (CRYPTOMONADS)		5,900	7.7	820,000	5.5	7,700	8.0	1,100,000	4.9
	Cryptomonas erosa	5,600	7.3	820,000	5.5	7,200	7.5	1,100,000	4.9
	Rhodomonas minuta	330	.4	2,300	.0	490	.5	3,400	.0
EUGLENOPHYTA (EUGLENOIDS)		1,500	1.9	6,700,000	45.2	2,900	3.1	14,000,000	62.7
	Euglena sp.	1,500	1.9	6,700,000	45.2	2,900	3.1	14,000,000	62.7
PYRROPHYTA (DINOFLAGELLATES)		330	.4	1,200,000	7.8	160	.2	580,000	2.7
	Peridinium pusillum	330	.4	1,200,000	7.8	160	.2	580,000	2.7
Total cells		76,000		15,000,000		96,000		22,000,000	
Number of species		15				19			
Diversity Index (DI) at species level		3.05				3.06			
Chlorophyll *a* (µg/L)		27.8				19.22			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		10-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
		June 10, 1991							
BACILLARIOPHYTA (DIATOMS)		440	1.7	59,000	1.2	1,300	3.4	350,000	6.2
Centrales		330	1.2	40,000	.8	820	2.1	100,000	1.8
	Cyclotella kutzingiana	--	--	--	--	--	--	--	--
	Cyclotella sp.	330	1.2	40,000	.8	820	2.1	100,000	1.8
	Stephanodiscus astraea var. *minutula*	--	--	--	--	--	--	--	--
Pennales		110	.4	19,000	.4	490	1.3	250,000	4.4
	Fragilaria crotonensis	--	--	--	--	--	--	--	--
	Fragilaria sp.	--	--	--	--	490	1.3	250,000	4.4
	Hannaea arcus	--	--	--	--	--	--	--	--
	Navicula cryptocephala	--	--	--	--	--	--	--	--
	Nitzschia acicularis	110	.4	19,000	.4	2	.0	370	.0
CHLOROPHYTA (GREEN ALGAE)		4,900	18.7	690,000	13.8	6,700	17.6	980,000	17.2
	Chlamydomonas sp.	--	--	--	--	330	.9	75,000	1.3
	Chlorella ellipsoidea	870	3.3	12,000	.2	1,100	3.0	16,000	.3
	Chlorococcum humicola	650	2.5	61,000	1.2	650	1.7	61,000	1.1
	Schroederia judayi	3,400	12.9	610,000	12.3	4,600	12.0	830,000	14.6
	Selenastrum minutum	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,200	4.6	13,000	.3	2,100	5.6	240,000	4.3
	Mallomonas sp.	--	--	--	--	160	.4	220,000	3.9
	Unknown flagellate	1,200	4.6	13,000	.3	2,000	5.1	22,000	.4
CYANOPHYTA (BLUE-GREEN ALGAE)		17,000	66.0	34,000	.7	25,000	65.7	80,000	1.4
	Aphanocapsa delicatissima	16,000	61.4	16,000	.3	21,000	55.4	21,000	.4
	Aphanocapsa elachista	--	--	--	--	--	--	--	--
	Chroococcus dispersus	1,200	4.6	18,000	.4	3,900	10.3	59,000	1.0
CRYPTOPHYTA (CRYPTOMONADS)		1,500	5.8	210,000	4.2	2,100	5.6	310,000	5.5
	Cryptomonas erosa	1,400	5.4	210,000	4.2	2,100	5.6	310,000	5.5
	Rhodomonas minuta	110	.4	760	.0	--	--	--	--
EUGLENOPHYTA (EUGLENOIDS)		870	3.3	4,000,000	79.9	820	2.1	3,700,000	65.5
	Euglena sp.	870	3.3	4,000,000	79.9	820	2.1	3,700,000	65.5
Total cells		26,000		5,000,000		38,000		5,700,000	
Number of species		11				13			
Diversity Index (DI) at species level		2.05				2.29			
Chlorophyll *a* (µg/L)		5.3				--			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
		July 10, 1991							
BACILLARIOPHYTA (DIATOMS)		82	0.5	95,000	17.8	110	1.0	76,000	6.2
Centrales		--	--	--	--	54	.5	14,000	1.1
	Stephanodiscus astraea var. *minutula*	--	--	--	--	54	.5	14,000	1.1
Pennales		82	.5	95,000	17.8	54	.5	62,000	5.1
	Hannaea arcus	82	.5	95,000	17.8	54	.5	62,000	5.1
	Unknown pennate	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		1,500	9.2	46,000	8.7	600	5.5	26,000	2.1
	Chlorella ellipsoidea	1,100	7.1	16,000	3.0	440	4.0	6,100	.5
	Chlorococcum humicola	330	2.0	30,000	5.7	110	1.0	10,000	.8
	Schroederia judayi	--	--	--	--	54	.5	9,900	.8
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,600	9.7	17,000	3.2	1,000	9.5	11,000	.9
	Unknown flagellate	1,600	9.7	17,000	3.2	1,000	9.5	11,000	.9
CYANOPHYTA (BLUE-GREEN ALGAE)		11,000	67.3	73,000	13.7	8,400	77.0	29,000	2.4
	Aphanizomenon flos-aquae	--	--	--	--	--	--	--	--
	Aphanocapsa delicatissima	9,200	57.6	9,200	1.7	6,500	60.0	6,500	.5
	Aphanocapsa elachista	570	3.6	4,600	.9	1,300	11.5	10,000	.8
	Aphanocapsa rivularis	570	3.6	50,000	9.5	--	--	--	--
	Chroococcus dispersus	--	--	--	--	--	--	--	--
	Chroococcus sp.	410	2.5	8,600	1.6	600	5.5	13,000	1.0
CRYPTOPHYTA (CRYPTOMONADS)		2,100	13.3	300,000	56.6	550	5.0	80,000	6.6
	Cryptomonas erosa	2,000	12.8	300,000	56.5	550	5.0	80,000	6.6
	Rhodomonas minuta	82	.5	570	.1	--	--	--	--
EUGLENOPHYTA (EUGLENOIDS)		--	--	--	--	220	2.0	1,000,000	81.8
	Euglena sp.	--	--	--	--	220	2.0	1,000,000	81.8
Total cells		16,000		530,000		11,000		1,200,000	
Number of species		10				11			
Diversity Index (DI) at species level		2.11				2.05			
Chlorophyll *a* (µg/L)		26.7				12.8			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		4-ft depth				Composite (~–15 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
		August 08, 1991							
BACILLARIOPHYTA (DIATOMS)		17,000	28.7	7,500,000	85.2	25,000	46.5	15,700,000	84.9
Centrales		--	--	--	--	--	--	--	--
Pennales		17,000	28.7	7,500,000	85.2	25,000	46.5	15,700,000	84.9
	Asterionella formosa	17,000	28.7	7,500,000	85.2	24,000	44.5	10,700,000	58.0
	Cocconeis placentula var. *euglypta*	--	--	--	--	--	--	--	--
	Gomphonema parvulum	--	--	--	--	--	--	--	--
	Synedra ulna	--	--	--	--	1,100	2.0	5,000,000	26.9
CHLOROPHYTA (GREEN ALGAE)		1,600	2.8	180,000	2.1	3,100	5.8	230,000	1.2
	Actinastrum braunii	160	.3	15,000	.2	--	--	--	--
	Chlamydomonas sp.	330	.6	75,000	.9	490	.9	110,000	.6
	Chlorella ellipsoidea	160	.3	2,300	.0	1,600	3.1	23,000	.1
	Chlorococcum humicola	980	1.7	91,000	1.0	980	1.8	91,000	.5
	Staurastrum sp.	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		2,800	4.8	31,000	.3	2,900	5.5	32,000	.2
	Kephyrion sp.	--	--	--	--	--	--	--	--
	Unknown flagellate	2,800	4.8	31,000	.3	2,900	5.5	32,000	.2
CYANOPHYTA (BLUE-GREEN ALGAE)		36,000	61.2	220,000	2.5	20,000	37.6	83,000	.4
	Anabaena wisconseninse	1,500	2.5	96,000	1.1	--	--	--	--
	Aphanocapsa delicatissima	30,000	51.7	30,000	.3	18,000	33.3	18,000	.1
	Aphanocapsa elachista	--	--	--	--	--	--	--	--
	Chroococcus dispersus	3,100	5.3	47,000	.5	1,300	2.4	20,000	.1
	Coelosphaerium kuetzingianum	980	1.7	45,000	.5	980	1.8	45,000	.2
	Oscillatoria amphibia	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		1,300	2.2	120,000	1.4	2,000	3.7	200,000	1.1
	Cryptomonas erosa	820	1.4	120,000	1.4	1,300	2.4	190,000	1.0
	Rhodomonas minuta	490	.8	3,400	.0	650	1.2	4,600	.0
EUGLENOPHYTA (EUGLENOIDS)		160	.3	750,000	8.5	490	.9	2,200,000	12.2
	Euglena sp.	160	.3	750,000	8.5	490	.9	2,200,000	12.2
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	--	--	--	--
	Ceratium hirundinella	--	--	--	--	--	--	--	--
Total cells		58,000		8,800,000		53,000		18,000,000	
Number of species		13				12			
Diversity Index (DI) at species level		2.03				2.22			
Chlorophyll *a* (µg/L)		7.5				12.8			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		4-ft depth				Composite (0–15 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					September 04, 1991				
BACILLARIOPHYTA (DIATOMS)		660	1.0	710,000	6.5	650	0.8	3,300,000	38.0
Centrales		160	.3	170,000	1.6	490	.6	2,900,000	34.0
	Cyclotella meneghiniana	10	.0	1,200	.0	--	--	--	--
	Melosira varians	150	.2	170,000	1.6	--	--	--	--
	Stephanodiscus astraea	--	--	--	--	490	.6	2,900,000	34.0
	Stephanodiscus astraea var. *minutula*	--	--	--	--	--	--	--	--
Pennales		490	.8	540,000	4.9	160	.2	340,000	3.9
	Asterionella formosa	20	.0	8,800	.1	--	--	--	--
	Cocconeis placentula var. *euglypta*	59	.1	74,000	.7	--	--	--	--
	Cymbella minuta	20	.0	49,000	.4	--	--	--	--
	Diatoma vulgare	20	.0	93,000	.9	--	--	--	--
	Fragilaria vaucheriae	78	.1	12,000	.1	--	--	--	--
	Gomphonema parvulum	78	.1	37,000	.3	--	--	--	--
	Navicula cryptocephala	120	.2	240,000	2.2	160	.2	340,000	3.9
	Navicula minima	39	.1	10,000	.1	--	--	--	--
	Navicula sp.	--	--	--	--	--	--	--	--
	Nitzschia acicularis	39	.1	11,000	.1	--	--	--	--
	Nitzschia dissipata	20	.0	3,900	.0	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		1,500	2.2	130,000	1.2	2,000	2.5	220,000	2.6
	Chlamydomonas sp.	160	.2	38,000	.3	650	.8	150,000	1.8
	Chlorella ellipsoidea	330	.5	4,600	.0	650	.8	9,100	.1
	Chlorococcum humicola	980	1.5	91,000	.8	650	.8	61,000	.7
	Oocytis pusilla	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		3,100	4.7	34,000	.3	3,400	4.4	38,000	.4
	Unknown flagellate	3,100	4.7	34,000	.3	3,400	4.4	38,000	.4
CYANOPHYTA (BLUE-GREEN ALGAE)		50,000	76.2	560,000	5.1	68,000	87.1	660,000	7.7
	Anabaena wisconseninse	3,400	5.3	220,000	2.0	820	1.0	53,000	.6
	Aphanocapsa delicatissima	29,000	44.7	29,000	.3	26,000	32.9	26,000	.3
	Aphanocapsa elachista	--	--	--	--	--	--	--	--
	Chroococcus dispersus	3,300	5.0	49,000	.4	2,800	3.5	42,000	.5
	Coelosphaerium kuetzingianum	2,000	3.0	90,000	.8	--	--	--	--
	Oscillatoria amphibia	12,000	18.2	170,000	1.5	39,000	49.6	540,000	6.3
CRYPTOPHYTA (CRYPTOMONADS)		8,500	13.0	1,200,000	11.4	3,400	4.4	500,000	5.9
	Cryptomonas erosa	8,500	13.0	1,200,000	11.4	3,400	4.4	500,000	5.9
EUGLENOPHYTA (EUGLENOIDS)		1,800	2.7	8,200,000	75.4	490	.6	2,200,000	26.1
	Euglena sp.	1,800	2.7	8,200,000	75.4	490	.6	2,200,000	26.1
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	160	.2	1,700,000	19.3
	Ceratium hirundinella	--	--	--	--	160	.2	1,700,000	19.3
Total cells		65,000		11,000,000		78,000		8,600,000	
Number of species		23				13			
Diversity Index (DI) at species level		2.54				1.96			
Chlorophyll *a* (µg/L)		10.7				8.5			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92–Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					October 09, 1991				
BACILLARIOPHYTA (DIATOMS)		12,000	12.4	67,000,000	94.0	9,100	15.2	47,000,000	90.1
Centrales		11,000	11.7	66,000,000	93.8	7,800	13.0	47,000,000	89.4
	Stephanodiscus astraea	11,000	11.7	66,000,000	93.8	7,800	13.0	47,000,000	89.4
Pennales		650	.7	160,000	.2	1,300	2.2	360,000	.7
	Nitzschia acicularis	330	.3	91,000	.1	1,300	2.2	360,000	.7
	Nitzschia dissipata	330	.3	66,000	.1	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		5,600	5.8	2,100,000	3.0	11,000	17.9	4,300,000	8.1
	Chlamydomonas sp.	--	--	--	--	1,300	2.2	300,000	.6
	Chlorella ellipsoidea	980	1.0	14,000	.0	1,300	2.2	18,000	.0
	Chlorococcum humicola	1,600	1.7	150,000	.2	2,600	4.3	240,000	.5
	Eudorina elegans	2,900	3.1	2,000,000	2.8	5,600	9.2	3,700,000	7.1
	Selenastrum minutum	--	--	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		5,600	5.8	61,000	.1	5,600	9.2	550,000	1.1
	Mallomonas sp.	--	--	--	--	330	.5	500,000	.9
	Unknown flagellate	5,600	5.8	61,000	.1	5,200	8.7	58,000	.1
CYANOPHYTA (BLUE-GREEN ALGAE)		68,000	71.8	180,000	.3	32,000	52.7	55,000	.1
	Aphanocapsa delicatissima	60,000	63.6	60,000	.1	30,000	50.0	30,000	.1
	Chroococcus dispersus	7,800	8.2	120,000	.2	1,600	2.7	25,000	.0
	Chroococcus sp.	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		3,600	3.8	390,000	.6	2,900	4.9	340,000	.7
	Cryptomonas erosa	2,600	2.7	380,000	.5	2,300	3.8	340,000	.6
	Rhodomonas minuta	980	1.0	6,900	.0	650	1.1	4,600	.0
EUGLENOPHYTA (EUGLENOIDS)		330	.3	1,500,000	2.1	--	--	--	--
	Euglena sp.	330	.3	1,500,000	2.1	--	--	--	--
Total cells		95,000		71,000,000		60,000		52,000,000	
Number of species		12				12			
Diversity Index (DI) at species level		1.93				2.50			
Chlorophyll *a* (µg/L)		17.4				20.3			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92–Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					April 17, 1992				
BACILLARIOPHYTA (DIATOMS)		100,000	25.1	--	--	110,000	29.7	--	--
Centrales		100,000	24.8	--	--	110,000	29.6	--	--
	Cyclotella meneghiniana	19,000	4.5	--	--	11,000	3.1	--	--
	Cyclotella sp.	64,000	15.4	--	--	65,000	17.7	--	--
	Stephanodiscus astraea	650	.2	--	--	--	--	--	--
	Stephanodiscus astraea var. *minutula*	20,000	4.7	--	--	32,000	8.8	--	--
Pennales		1,300	.3	--	--	630	.2	--	--
	Asterionella formosa	1,300	.3	--	--	310	.1	--	--
	Epithemia sorex	--	--	--	--	--	--	--	--
	Gomphonema parvulum	--	--	--	--	--	--	--	--
	Navicula radiosa	--	--	--	--	--	--	--	--
	Nitzschia palea	--	--	--	--	--	--	--	--
	Unknown pennate	--	--	--	--	310	.1	--	--
CHLOROPHYTA (GREEN ALGAE)		24,000	5.9	--	--	28,000	7.5	--	--
	Ankistrodesmus falcatus	2,500	.6	--	--	--	--	--	--
	Carteria sp.	1,300	.3	--	--	1,900	.5	--	--
	Chlamydomonas sp.	4,400	1.1	--	--	10,000	2.7	--	--
	Chlorella ellipsoidea	1,900	.5	--	--	2,500	.7	--	--
	Chlorococcum humicola	14,000	3.5	--	--	13,000	3.4	--	--
	Selenastrum minutum	--	--	--	--	630	.2	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		11,000	2.7	--	--	11,000	3.1	--	--
	Unknown flagellate	11,000	2.7	--	--	11,000	3.1	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		250,000	60.2	--	--	200,000	55.0	--	--
	Aphanocapsa delicatissima	200,000	48.3	--	--	150,000	40.9	--	--
	Aphanocapsa elachista	9,400	2.3	--	--	9,400	2.6	--	--
	Chroococcus sp.	37,000	8.9	--	--	39,000	10.8	--	--
	Dactylococcopsis fascicularis	3,100	.8	--	--	3,100	.9	--	--
	Unknown filament	--	--	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		21,000	5.1	--	--	17,000	4.6	--	--
	Chroomonas sp.	3,100	.8	--	--	3,800	1.0	--	--
	Cryptomonas erosa	17,000	4.1	--	--	13,000	3.4	--	--
	Rhodomonas minuta	1,300	.3	--	--	630	.2	--	--
EUGLENOPHYTA (EUGLENOIDS)		4,400	1.1	--	--	--	--	--	--
	Euglena sp.	4,400	1.1	--	--	--	--	--	--
PYRROPHYTA (DINOFLAGELLATES)		--	--	--	--	--	--	--	--
	Peridinium pusillum	--	--	--	--	--	--	--	--
Total cells		420,000		--		370,000		--	
Number of species		19				18			
Diversity index (DI) at species level		2.68				281			
Chlorophyll *a* (µg/L)		12.0				13.4			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92–Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					May 20, 1992				
BACILLARIOPHYTA (DIATOMS)		18,000	7.3	--	--	28,000	14.6	--	--
Centrales		3,800	1.5	--	--	2,500	1.3	--	--
	Cyclotella meneghiniana	1,900	.8	--	--	--	--	--	--
	Cyclotella sp.	--	--	--	--	2,500	1.3	--	--
	Stephanodiscus astraea	940	.4	--	--	--	--	--	--
	Stephanodiscus astraea var. *minutula*	940	.4	--	--	--	--	--	--
Pennales		14,000	5.8	--	--	26,000	13.3	--	--
	Asterionella formosa	11,000	4.3	--	--	19,000	9.7	--	--
	Gomphonema parvulum	--	--	--	--	--	--	--	--
	Navicula lanceolata	--	--	--	--	--	--	--	--
	Nitzschia acicularis	3,200	1.3	--	--	5,800	3.0	--	--
	Nitzschia palea	--	--	--	--	--	--	--	--
	Surirella minuta	--	--	--	--	--	--	--	--
	Synedra delicatissima	460	.2	--	--	1,100	.6	--	--
CHLOROPHYTA (GREEN ALGAE)		23,000	9.3	--	--	18,000	9.4	--	--
	Carteria sp.	630	.3	--	--	1,300	.6	--	--
	Chlamydomonas sp.	8,100	3.3	--	--	1,300	.6	--	--
	Chlorella ellipsoidea	13,000	5.3	--	--	12,000	6.1	--	--
	Chlorococcum humicola	1,300	.5	--	--	3,100	1.6	--	--
	Selenastrum minutum	--	--	--	--	630	.3	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		7,500	3.0	--	--	7,500	3.9	--	--
	Mallomonas sp.	--	--	--	--	--	--	--	--
	Unknown flagellate	7,500	3.0	--	--	7,500	3.9	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		190,000	78.1	--	--	130,000	66.3	--	--
	Aphanizomenon flos-aquae	--	--	--	--	2,500	1.3	--	--
	Aphanocapsa delicatissima	120,000	46.2	--	--	92,000	47.6	--	--
	Aphanocapsa elachista	65,000	26.1	--	--	21,000	11.0	--	--
	Chroococcus sp.	13,000	5.0	--	--	11,000	5.8	--	--
	Dactylococcopsis fascicularis	630	.3	--	--	--	--	--	--
	Phormidium tenue	--	--	--	--	1,300	.6	--	--
	Synechococcus sp.	1,300	.5	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		4,400	1.8	--	--	11,000	5.5	--	--
	Chroomonas sp.	1,300	.5	--	--	3,100	1.6	--	--
	Cryptomonas erosa	2,500	1.0	--	--	6,300	3.2	--	--
	Rhodomonas minuta	630	.3	--	--	1,300	.6	--	--
EUGLENOPHYTA (EUGLENOIDS)		1,300	.5	--	--	630	.3	--	--
	Euglena sp.	1,300	.5	--	--	630	.3	--	--
Total cells		250,000		--		190,000		--	
Number of species		20				19			
Diversity index (DI) at species level		2.47				2.81			
Chlorophyll *a* (µg/L)		3.7				4.8			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92–Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		4-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
						June 24, 1992			
BACILLARIOPHYTA (DIATOMS)		4,400	3.5	--	--	130,000	44.0	--	--
Centrales		1,900	1.5	--	--	4,200	1.4	--	--
	Aulacoseira italica var. *tenuissima*	1,900	1.5	--	--	4,200	1.4	--	--
Pennales		2,500	2.0	--	--	130,000	42.7	--	--
	Asterionella formosa	--	--	--	--	--	--	--	--
	Fragilaria crotonensis	2,500	2.0	--	--	130,000	42.7	--	--
	Gomphonema parvulum	--	--	--	--	--	--	--	--
	Navicula pupula	--	--	--	--	--	--	--	--
	Navicula tripunctata	--	--	--	--	--	--	--	--
	Synedra delicatissima	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		10,000	7.9	--	--	9,400	3.1	--	--
	Ankistrodesmus falcatus	--	--	--	--	--	--	--	--
	Chlamydomonas sp.	3,800	3.0	--	--	1,000	.3	--	--
	Chlorella ellipsoidea	3,100	2.5	--	--	2,100	.7	--	--
	Chlorococcum humicola	3,100	2.5	--	--	2,100	.7	--	--
	Oocytis pusilla	--	--	--	--	2,100	.7	--	--
	Selenastrum minutum	--	--	--	--	--	--	--	--
	Sphaerocystis schroeteri	--	--	--	--	2,100	.7	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		13,000	9.9	--	--	23,000	7.5	--	--
	Dinobryon divergens	2,500	2.0	--	--	2,100	.7	--	--
	Unknown flagellate	10,000	7.9	--	--	21,000	6.8	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		94,000	74.3	--	--	140,000	44.4	--	--
	Aphanizomenon flos-aquae	18,000	14.4	--	--	23,000	7.5	--	--
	Aphanocapsa delicatissima	69,000	55.0	--	--	100,000	32.8	--	--
	Aphanothece nidulans	--	--	--	--	7,300	2.4	--	--
	Chroococcus sp.	6,300	5.0	--	--	4,200	1.4	--	--
	Phormidium tenue	--	--	--	--	1,000	.3	--	--
CRYPTOPHYTA (CRYPTOMONADS)		2,500	2.0	--	--	2,100	.7	--	--
	Cryptomonas erosa	2,500	2.0	--	--	2,100	.7	--	--
EUGLENOPHYTA (EUGLENOIDS)		630	.5	--	--	1,000	.3	--	--
	Euglena sp.	630	.5	--	--	1,000	.3	--	--
PYRROPHYTA (DINOFLAGELLATES)		2,500	2.0	--	--	--	--	--	--
	Ceratium hirundinella	2,500	2.0	--	--	--	--	--	--
Total cells		130,000		--		310,000		--	
Number of species		13				16			
Diversity index (DI) at species level		2.37				2.27			
Chlorophyll *a* (µg/L)		3.2				3.7			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
						July 28, 1992			
BACILLARIOPHYTA (DIATOMS)		3,900	1.4	--	--	3,900	1.1	--	--
Centrales		1,300	.5	--	--	1,300	.4	--	--
	Cyclotella ocellata	1,300	.5	--	--	1,300	.4	--	--
Pennales		2,600	.9	--	--	2,600	.7	--	--
	Cymbella lunata	110	.0	--	--	--	--	--	--
	Fragilaria crotonensis	2,500	.9	--	--	--	--	--	--
	Meridion circulare	--	--	--	--	2,600	.7	--	--
CHLOROPHYTA (GREEN ALGAE)		5,200	1.9	--	--	1,300	.4	--	--
	Ankistrodesmus falcatus	--	--	--	--	--	--	--	--
	Chlamydomonas sp.	5,200	1.9	--	--	1,300	.4	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		240,000	86.1	--	--	310,000	89.3	--	--
	Aphanizomenon flos-aquae	92,000	32.9	--	--	180,000	52.2	--	--
	Aphanocapsa delicatissima	130,000	46.3	--	--	130,000	37.0	--	--
	Chroococcus sp.	19,000	6.9	--	--	--	--	--	--
CRYPTOPHYTA (CRYPTOMONADS)		18,000	6.5	--	--	23,000	6.7	--	--
	Cryptomonas erosa	18,000	6.5	--	--	23,000	6.7	--	--
EUGLENOPHYTA (EUGLENOIDS)		12,000	4.2	--	--	9,100	2.6	--	--
	Euglena sp.	7,800	2.8	--	--	9,100	2.6	--	--
	Trachelomonas sp.	3,900	1.4	--	--	--	--	--	--
Total cells		280,000		--		350,000		--	
Number of species		10				7			
Diversity index (DI) at species level		2.00				1.53			
Chlorophyll *a* (µg/L)		10.7				10.7			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					August 27, 1992				
BACILLARIOPHYTA (DIATOMS)		35,000	4.8	--	--	5,200	0.7	--	--
Centrales		1,300	.2	--	--	1,300	.2	--	--
	Cyclotella ocellata	--	--	--	--	92	.0	--	--
	Stephanodiscus astraea	1,300	.2	--	--	1,200	.2	--	--
Pennales		34,000	4.6	--	--	3,900	.5	--	--
	Achnanthes marginulata	--	--	--	--	--	--	--	--
	Achnanthes sp.	--	--	--	--	650	.1	--	--
	Asterionella formosa	2,600	.4	--	--	3,200	.4	--	--
	Cocconeis placentula	--	--	--	--	--	--	--	--
	Cymbella cymbiformis	--	--	--	--	--	--	--	--
	Fragilaria crotonensis	31,000	4.3	--	--	--	--	--	--
	Fragilaria vaucheriae	--	--	--	--	--	--	--	--
	Navicula sp.	--	--	--	--	--	--	--	--
CHLOROPHYTA (GREEN ALGAE)		12,000	1.6	--	--	17,000	2.2	--	--
	Ankistrodesmus falcatus	2,600	.4	--	--	1,300	.2	--	--
	Chlamydomonas sp.	1,300	.2	--	--	--	--	--	--
	Schroederia judayi	7,800	1.1	--	--	16,000	2.0	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,300	.2	--	--	--	--	--	--
	Mallomonas sp.	1,300	.2	--	--	--	--	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		680,000	92.7	--	--	730,000	94.9	--	--
	Aphanizomenon flos-aquae	250,000	33.7	--	--	310,000	40.6	--	--
	Aphanocapsa delicatissima	220,000	30.1	--	--	190,000	25.4	--	--
	Chroococcus limneticus	62,000	8.5	--	--	21,000	2.7	--	--
	Microcystis aeruginosa	150,000	20.4	--	--	200,000	26.2	--	--
CRYPTOPHYTA (CRYPTOMONADS)		5,200	.7	--	--	10,000	1.4	--	--
	Cryptomonas erosa	5,200	.7	--	--	10,000	1.4	--	--
EUGLENOPHYTA (EUGLENOIDS)		--	--	--	--	6,500	.8	--	--
	Euglena sp.	--	--	--	--	2,600	.3	--	--
	Trachelomonas sp.	--	--	--	--	3,900	.5	--	--
Total cells		730,000		--		760,000		--	
Number of species		12				13			
Diversity index (DI) at species level		2.24				2.02			
Chlorophyll *a* (µg/L)		.0				.0			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					September 25, 1992				
BACILLARIOPHYTA (DIATOMS)		7,800	1.9	--	--	27,000	8.6	--	--
Centrales		3,900	.9	--	--	1,300	.4	--	--
	Melosira varians	--	--	--	--	840	.3	--	--
	Stephanodiscus astraea	3,900	.9	--	--	460	.1	--	--
Pennales		3,900	.9	--	--	26,000	8.2	--	--
	Asterionella formosa	--	--	--	--	--	--	--	--
	Fragilaria crotonensis	3,900	.9	--	--	25,000	8.1	--	--
	Gyrosigma sp.	--	--	--	--	400	.1	--	--
CHLOROPHYTA (GREEN ALGAE)		5,200	1.2	--	--	6,500	2.1	--	--
	Ankistrodesmus falcatus	3,900	.9	--	--	5,200	1.6	--	--
	Chlamydomonas sp.	--	--	--	--	1,300	.4	--	--
	Staurastrum sp.	1,300	.3	--	--	--	--	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		--	--	--	--	--	--	--	--
	Dinobryon sertularia	--	--	--	--	--	--	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		390,000	95.3	--	--	270,000	86.4	--	--
	Aphanizomenon flos-aquae	110,000	26.6	--	--	--	--	--	--
	Aphanocapsa delicatissima	280,000	68.8	--	--	270,000	86.4	--	--
CRYPTOPHYTA (CRYPTOMONADS)		5,200	1.3	--	--	7,800	2.5	--	--
	Cryptomonas erosa	5,200	1.3	--	--	7,800	2.5	--	--
EUGLENOPHYTA (EUGLENOIDS)		1,300	.3	--	--	1,300	.4	--	--
	Euglena sp.	--	--	--	--	--	--	--	--
	Trachelomonas sp.	1,300	.3	--	--	1,300	.4	--	--
Total cells		410,000		--		310,000		--	
Number of species		8				9			
Diversity index (DI) at species level		1.20				.82			
Chlorophyll *a* (µg/L)		.7				.1			

Table 19. Taxa, cell counts, biovolume, percent composition, and diversity index of phytoplankton and chlorophyll *a* concentrations at site SC–2 in Stagecoach Reservoir, 1990–92--Continued

Phylum order	Genus species	Stagecoach Reservoir at dam (site SC–2)							
		2-ft depth				Composite (0–20 ft)			
		Cells	% comp	Volume	% vol	Cells	% comp	Volume	% vol
					November 07, 1992				
BACILLARIOPHYTA (DIATOMS)		75,000	29.9	--	--	81,000	43.4		
Pennales		75,000	29.9	--	--	81,000	43.4	--	--
	Asterionella formosa	75,000	29.9	--	--	81,000	43.4	--	--
CHRYSOPHYTA (GOLDEN-BROWN ALGAE)		1,300	.5	--	--	2,600	1.4	--	--
	Dinobryon sociale	1,300	.5	--	--	2,600	1.4	--	--
CYANOPHYTA (BLUE-GREEN ALGAE)		170,000	68.0	--	--	100,000	55.2	--	--
	Aphanizomenon flos-aquae	--	--	--	--	--	--	--	--
	Aphanocapsa delicatissima	140,000	56.7	--	--	100,000	55.2	--	--
	Chroococcus limneticus	28,000	11.3	--	--	--	--	--	--
EUGLENOPHYTA (EUGLENOIDS)		3,900	1.5	--	--	--	--	--	--
	Euglena sp.	1,300	.5	--	--	--	--	--	--
	Trachelomonas sp.	2,600	1.0	--	--	--	--	--	--
Total cells		250,000		--		190,000		--	
Number of species		6				3			
Diversity index (DI) at species level		1.49				1.08			
Chlorophyll *a* (µg/L)		.1				.2			

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