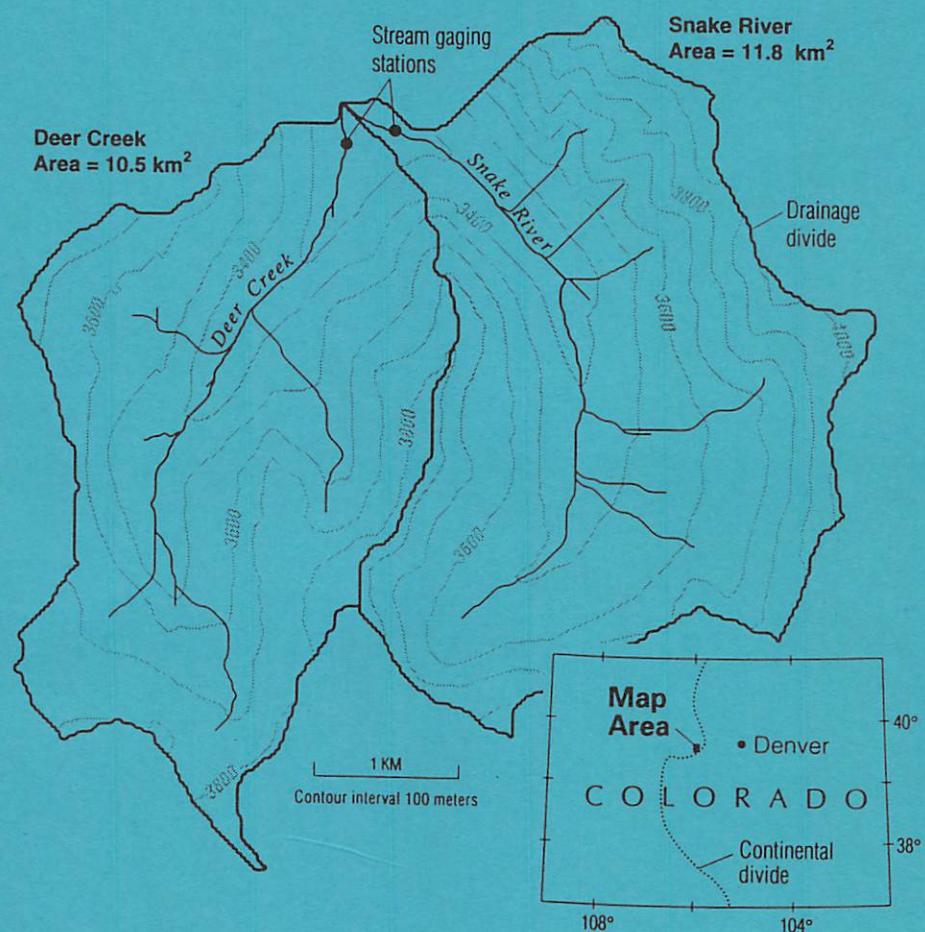


# Streamflow and Water Quality Characteristics for the Upper Snake River and Deer Creek Catchments in Summit County, Colorado: Water Years 1980 to 1990

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1999

Institute of Arctic and Alpine Research • University of Colorado

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## **ACKNOWLEDGMENTS**

Support for this work was provided by the U.S. Geological Survey, Water Resources Division, and by the NSF Hydrological Sciences Program.

## **DISCLAIMER**

These data were collected over the years by graduate students, observers, and USGS scientists. We have taken reasonable precautions to assure quality control over these data. However, we cannot guarantee data accuracy. An up-to-date copy of the data files (including additions or corrections to the data tables after publication of this report) will be available by an e-mail request to: [ewb7@cornell.edu](mailto:ewb7@cornell.edu).

## **ABSTRACT**

The issues of development of alpine areas and the possible influences of climate change in the Rocky Mountain region have both increased the focus of understanding processes controlling the water quality of mountain streams. This report presents 10 years of water quality and stream flow data from two headwater basins in Summit County, Colorado. The upper reach of the Snake River is acidic and metal-enriched from the natural and anthropogenic weathering of pyrite in the watershed, whereas the water quality of Deer Creek is pristine with a circumneutral pH. The Snake River and Deer Creek watersheds have been sites of extensive research for the past 15 years, and the data in this report have been used in these interpretative studies. The data sets are one of the longest water quality records for streams in the upper Colorado Rivers basin and provide a description of how water quality has varied with differences between years in snowpack and other climatic parameters.

## **PREFACE**

It is not unusual for citizens to consider arctic or alpine terrains as pristine. Unfortunately that is often not the case, as polar and mountain regions are near the threshold of life support. Even small perturbations can have long-lasting effects.

The Institute of Arctic and Alpine Research (INSTAAR) has a long history in ecoscience surveys of remote environments. INSTAAR's Mountain Research Station near Ward, Colorado, has engaged in continuous ecological surveys since 1952, with continuous environmental records dating from 1922. Long-term ecological research is a wonderful gift to humanity, providing a thermometer to our earth's ecosystem health. Through studies that explore ecological phenomena over long temporal and broad spatial scales, these surveys have substantially increased our understanding of how physical processes affect nutrient supply, population dynamics, and patterns of primary production.

This study adds to this effort by providing one of the longest data sets on water quality for a headwater catchment in the Colorado Rocky Mountains. I congratulate Elizabeth Boyer (Cornell University) and her team of INSTAAR and U.S. Geological Survey scientists for this splendid report on streamflow and water quality characteristics in Summit County, Colorado. It provides 10 years of data (1980 to 1990) of the upper Snake River and Deer Creek catchments. Acid mine drainage remains a significant water quality concern throughout the Rocky Mountains and this report directly tackles this issue.

James P. Syvitski

Director, INSTAAR

## INTRODUCTION

Acid mine drainage in mountainous areas has direct effects on the surrounding ecosystem and on runoff that contaminates lakes and streams at lower elevations. The legacy of mining in the Colorado Rocky Mountains began in the 1880s. Long before mining operations began, however, weathering of pyrite was a natural source of acid conditions in some streams. Acidity in natural waters results from both lithogenic, natural processes (e.g., bedrock weathering) and anthropogenic, human-induced processes (e.g., acid mine drainage). Water quality in many streams and lakes of the Colorado Rocky Mountains is impaired due to acidity, with concentrations of metals often in excess of water quality standard levels.

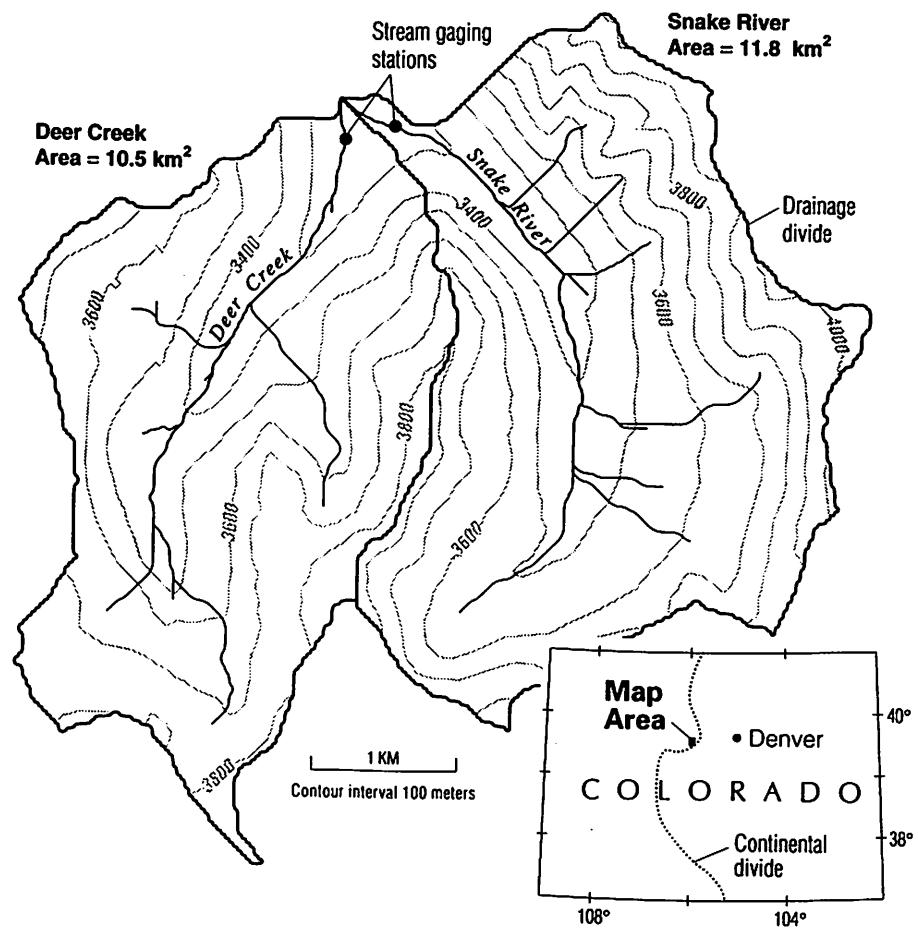
This report focuses on the Snake River and Deer Creek catchments, located in Summit County, Colorado. Snake River is naturally acidic, while Deer Creek is circumneutral. These headwater catchments have been the focus of numerous experimental studies of solute transport processes, ecology, and biogeochemistry (see annotated bibliography, *Appendix 2*). We present hydrochemical monitoring data collected for these studies, from water years 1980 to 1990.

## SITE DESCRIPTION

The adjacent catchments of Snake River and Deer Creek are located in the Rocky Mountains of Summit County, Colorado (*Figure 1*). The catchments range in altitude from about 3200 to 4000 m, and are bounded by the Continental Divide to the south and the east and by Glacier Mountain to the west. Teller Mountain separates the two basins until Deer Creek flows into Snake River at a confluence just south of Montezuma. After the two streams merge, the Snake River continues to flow downstream, joins with several major tributaries (Peru Creek the North Fork of the Snake River), and eventually flows into Dillon Reservoir, which is a major water supply to the city of Denver, Colorado.

Both streams flow through steep terrain and have rocky streambeds. The geochemistry of these streams was first studied by Theobald et al. (1963). Influenced by weathering of pyrite, the Snake River valley is naturally acidic. In contrast, the neighboring catchment of Deer Creek is circumneutral. These characteristics can be attributed to the geology of the region. The predominant bedrock of both basins is metamorphic rock of Precambrian age, but the basins are underlain by different rock formations, which all influence the geochemistry of the streams.

**Figure 1. Location map of the Deer Creek and Snake River catchments.** Deer Creek and Snake River are located in the Rocky Mountains of Summit County, Colorado, 2.5 km south of Montezuma. The headwater basins are bounded by the Continental Divide to the south and east and by Glacier Mountain to the west.



The Deer Creek catchment encompasses a drainage area of 10.5 km<sup>2</sup>. The basin is underlain primarily by Swandyke Hornblende Gneiss, which is rich in calcium, magnesium, and iron (Theobald et al., 1963). Abandoned mines dot the landscape, but there has been little mining activity in recent decades (Moran and Wentz, 1974). Weathering of exposed mine materials has had no significant effect on water quality; the chemistry of the stream is typical of a pristine Rocky Mountain stream with neutral pH and low metal concentrations (Bencala et al., 1987). In Deer Creek, rocks are coated with a hard, black, iron manganese deposit (Theobald et al., 1963).

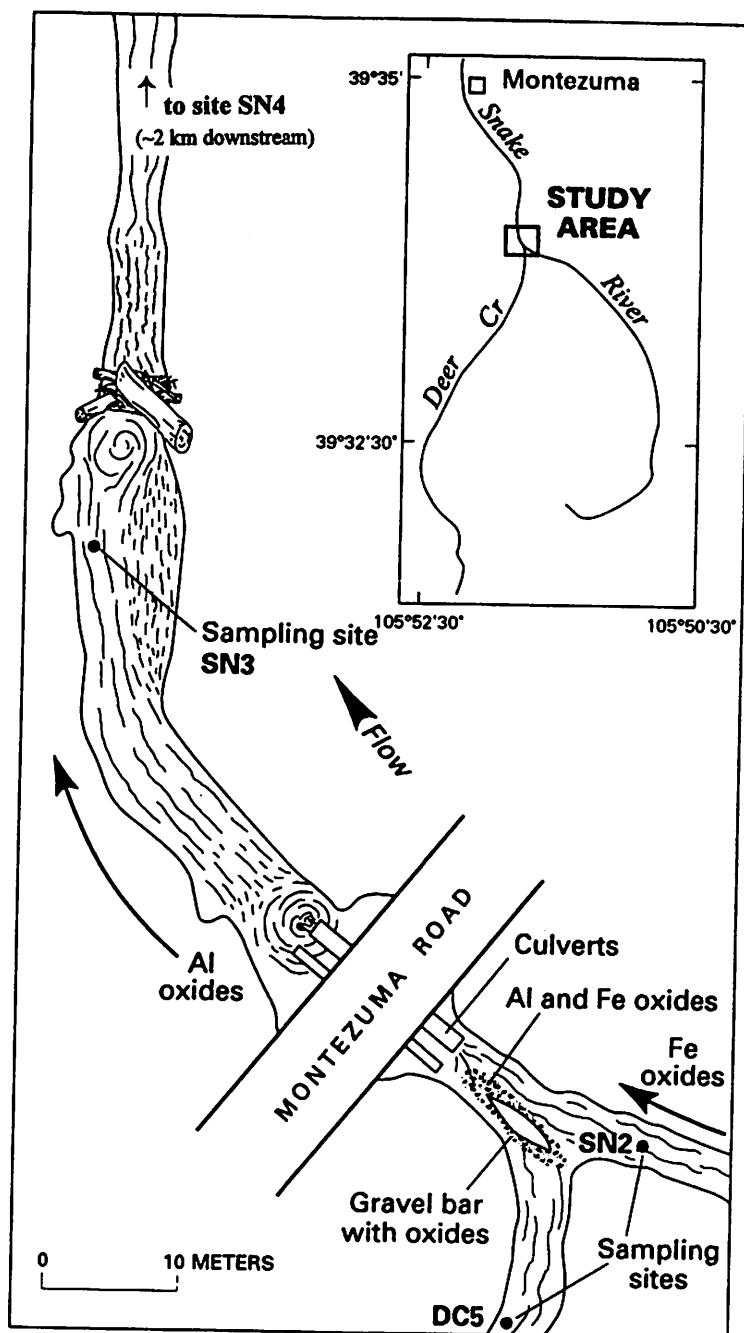
Above its confluence with Deer Creek, the Snake River catchment drains an area of 11.8 km<sup>2</sup>. The basin is underlain predominantly by granitic rocks of the Idaho Springs formation, rich in silica and aluminum (Theobald et al., 1963). Snake River is naturally acidic (annual pH range is 3.2 to 4.5) due to weathering of disseminated pyrite present in the rock on the eastern side of the drainage basin and has elevated concentrations of dissolved Al, Fe, Mn, and Zn from resultant weathering reactions. Rocks in the streambed are covered with a hard, reddish-brown iron oxide coating (Theobald et al., 1963). Periphyton in Snake River are typical of those in acid mine drainage streams and are much less abundant than in Deer Creek (McKnight and Feder, 1984).

The chemistry of the Snake River changes dramatically below its confluence with Deer Creek, due to pH changes that result from conservative mixing of the two streams. Precipitation of hydrous aluminum and iron oxides occur in the mixing zone. At the confluence the oxides are red-brown near the banks of the Snake River and are beige near the center of the stream. Downstream, the precipitate covering the rocks is lighter in color because of the higher Al content (McKnight et al., 1992a).

Both the Snake River and Deer Creek catchments are seasonally snow covered, and the streams are typically covered with snow and ice from December through April. Discharge is comparable in the two streams, flowing under base flow conditions at approximately 3 to 15 cfs, and peaking during snowmelt runoff at values up to 70 cfs.

Water quality data are presented from four stream sampling sites identified as DC5, SN2, SN3, and SN4 in *Figure 2*. The Deer Creek and Snake River stream channels were sampled just upstream of their confluence at sites DC5 and SN2, respectively. The streams become well mixed as they flow through a culvert underneath Montezuma Road; site SN3 is about 20 m downstream from their confluence. Site SN4 is located approximately 2 km downstream from this confluence in Montezuma, just upstream of where Saints John Creek flows into Snake River.

**Figure 2. Location of four sampling sites, DC5, SN2, SN3, and SN4, in Deer Creek and in Snake River near Montezuma, Colorado.**



## METHODS

From 1980 to 1990, water quality measurements were taken approximately once a week in the spring, summer, and fall, and once a month during ice cover in the winter. Samples were collected by one person on each day at sites DC5, SN2, SN3, and SN4, with varying time elapsed between collection at each site (McKnight et al., 1992a).

Samples for inorganic analyses were collected in acid-washed plastic bottles (rinsed three times with stream water) and filtered on site through 0.4- $\mu\text{m}$  Nucleopore filters using an Antlia pneumatic hand pump. Within several hours, samples for cation and metal analyses were acidified using 0.5 ml Ultrex nitric acid. pH was measured at the field site using a Beckman Model 21 pH meter. Inorganic anions were measured using a Dionex system 14 or a model 2000i Ion Chromatograph. Cations and metals were measured a Jarrel Ash Model 975 Inductively Coupled Plasma (ICP) spectrometer.

Dissolved organic carbon (DOC) samples were collected in amber colored, glass bottles which had been cleaned and baked in the laboratory prior to sampling, and were stored at 4°C until analysis. DOC samples for the field seasons of 1980-1986 were filtered through 0.45- $\mu\text{m}$  Selas silver membrane filters using vacuum filtration with a glass Millipore filtration unit. Subsequently DOC samples were filtered through pre-combusted glass fiber filters (GF/C) in a Gelman stainless steel filtration unit. DOC was analyzed with either a Technicon Autoanalyzer II (1980-1983) or a Dohrmann Carbon Analyzer (1984-1990) using the persulfate oxidation method.

Discharge measurements were made periodically at the four sampling sites with a pygmy current meter, using the mid-section velocity-area method. The USGS operates a continuous stream gaging station at the Snake River near Montezuma, a site along the lower Snake River about 10 km below the confluence of Snake River with Deer Creek (station number 09047500). Daily discharge values for this station were retrieved from USGS records using the NWIS-W server, which is accessible on the Internet: (<http://waterdata.usgs.gov/nwis-w/US/>). Peak flow data for this station were retrieved from the USGS National Water Data Storage and Retrieval System (WATSTORE).

## **WATER QUALITY CHARACTERISTICS**

Water quality characteristics in the Snake River and Deer Creek are dependent upon flow conditions, which vary seasonally with snowmelt. Long term data provide information regarding the nature of the relationship between hydrological regime and water quality of these mountain streams. It is critical to have records of both discharge and of stream chemistry variations to interpret the results in the context of seasonal variations. We present data for water years 1980 to 1990. Sample data are reported from four stream sampling sites: DC5, SN2, SN3, and SN4 (see *Figure 2*). Data tables follow this section in *Appendix 1*. A summary of the data tables included in this report is provided in *Table 1*. A list of symbols/abbreviations for the reported water quality characteristics is provided in *Table 2*.

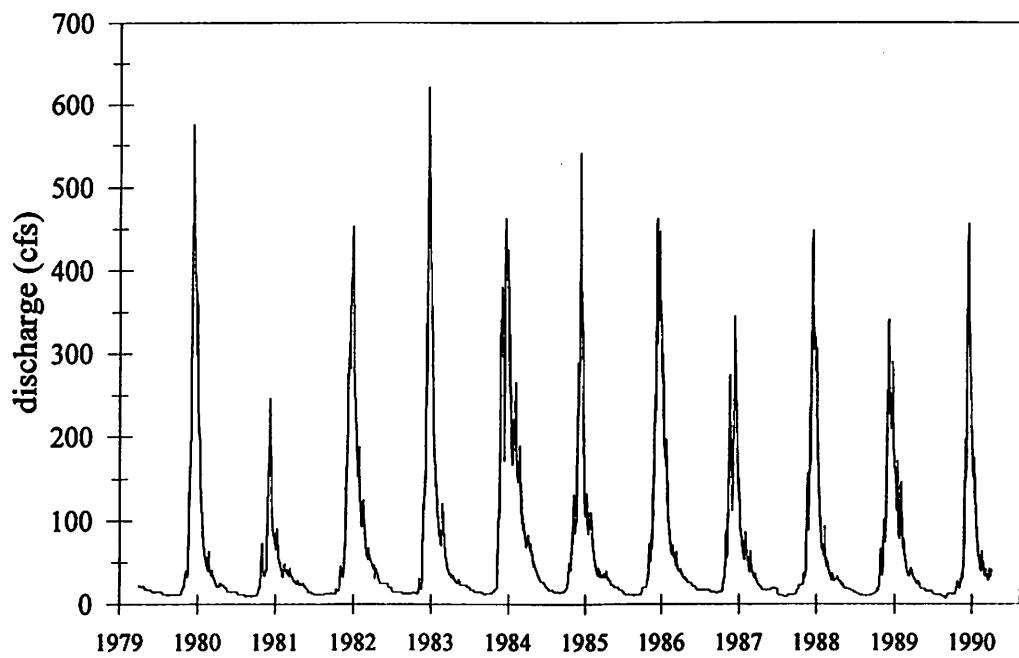
### **Streamflow**

Streamflow discharge was measured occasionally at stream sampling sites DC5 and SN2. (*Table 3*). In addition, daily values of discharge (*Table 4*) were obtained from the USGS gaging station “Snake River near Montezuma,” located about 10 km downstream of the confluence of Deer Creek with Snake River (39°36'20"N; 105°56'33"W). At this elevation (2841 m) the Snake River drains an area of 49.44 km<sup>2</sup> and includes input from many tributaries, including major inflows from Peru Creek and from the North Fork Snake River. The annual hydrograph is dominated by the spring snowmelt runoff event (*Figure 3*). For each water year, dates and magnitudes of the annual peak flow values are shown in *Table 5*.

### **Water Quality Data**

*Tables 6 - 9* include water quality data for the four stream sampling sites (DC5, SN2 SN3, and SN4, respectively). Measurements for pH, dissolved organic carbon, major cations and anions, trace metals, and nutrients are presented. We did not measure all constituents on every water sample (see the tables); analyses varied from site to site and from year to year. During high flow periods, many stream solutes decrease in concentration due to dilution by snowmelt runoff (e.g. dilution of sulfate; *Figure 4*). Other constituents increase in concentration during high flows, and a final group of solutes show no clear trend in concentration with discharge. Under all flow conditions, short-term hourly variations in water quality occur as a result of biogeochemical and photochemical processes (McKnight et al., 1992a).

**Figure 3. Discharge record for Snake River near Montezuma.** The annual hydrograph is dominated by the snowmelt runoff event.

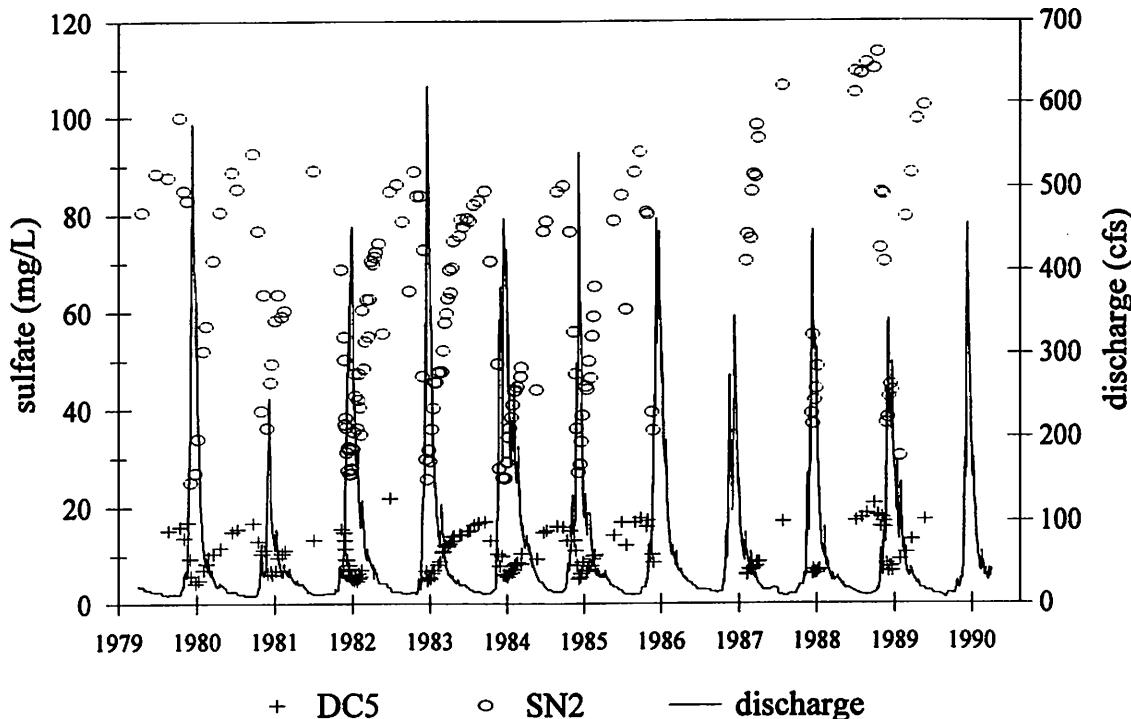


For the Snake River sites, the trace metals aluminum, zinc, and manganese follow the pattern of discharge-dilution observed at all sites for the major cations and anions. The similarity in responses between these trace metals and major solutes is shown by the linear relationship for manganese and zinc with sulfate at the Snake River sites (*Figure 5*).

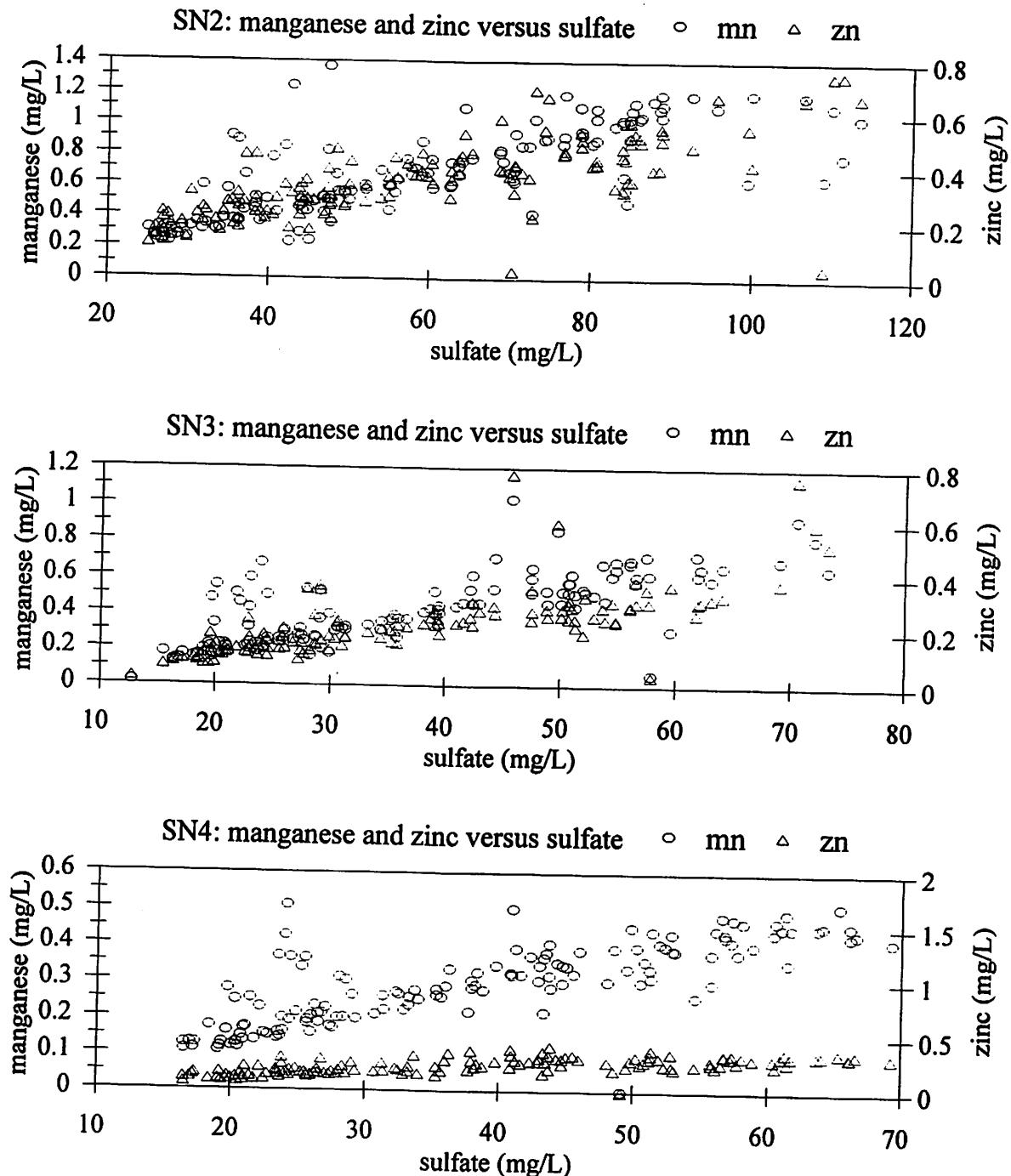
Streamflow concentrations of other constituents increase during high flow periods associated with spring snowmelt. The most significant pattern of increasing concentration during snowmelt is shown by dissolved organic carbon (DOC) (*Figure 6*). This pattern is observed at all four sites and is caused by the flushing of DOC-rich water from the upper soil horizons of the landscape into the streams (Boyer et al., 1997). DOC concentrations in Deer Creek are consistently about two times higher than in the upper Snake River. Although concentrations of trace metals in Deer Creek are generally low, and the possibility of some effect of sample contamination cannot be ruled out, it is notable that the concentrations of zinc (Zn) and lead (Pb) are generally higher during snowmelt than other periods of the year. The higher DOC concentrations in Deer Creek and the neutral pH would favor formation of complexes between Zn and Pb with dissolved humic substances. This mechanism could explain greater snowmelt concentrations of these metals (McKnight et al., 1992b).

Iron, potassium, and chloride show no pattern with discharge. The control of photoreduction of iron oxides on the streambed by sunlight intensity explains the lack of dependence of Fe concentrations on discharge. For potassium (which is likely biologically controlled) and chloride (which is likely mostly atmospheric), the reasons for lack of relation to discharge have not been clearly established.

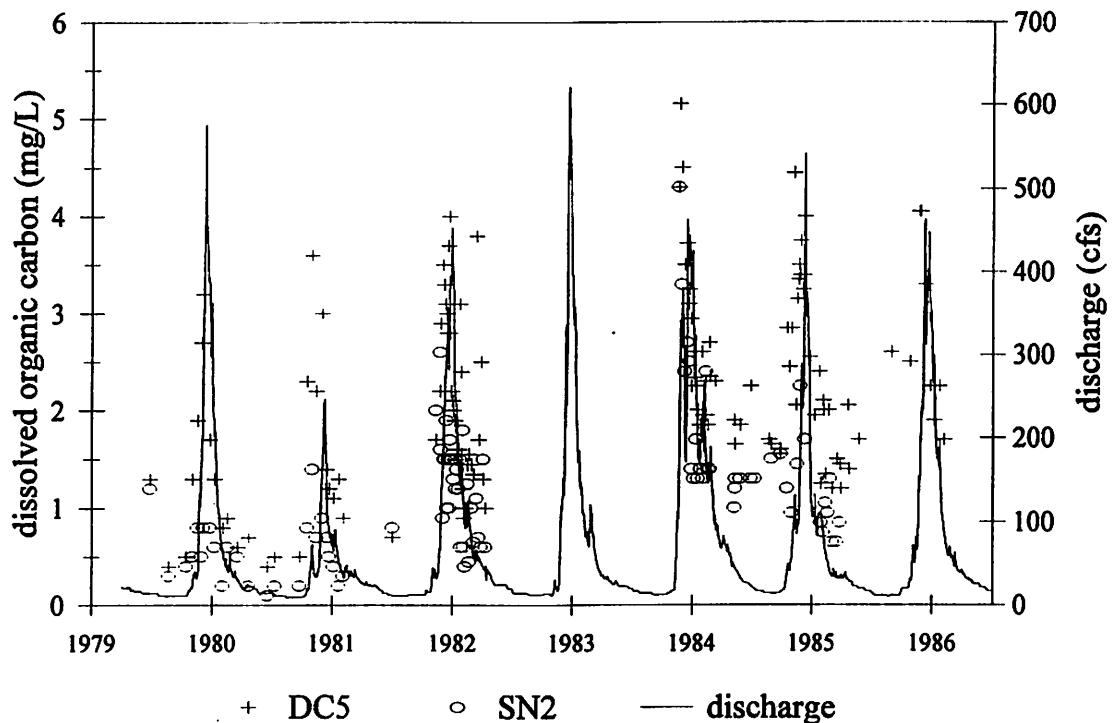
**Figure 4. Sulfate concentrations in Snake River and Deer Creek.** Sulfate ( $\text{SO}_4^{2-}$ ) concentrations decrease in streamflow during spring snowmelt runoff, caused by the dilution of stream water with contributions of snowmelt water.



**Figure 5. Response of trace metals in Snake River.** Trace metals in streamflow such as manganese (Mn) and zinc (Zn) are diluted during snowmelt, as was the major anion sulfate ( $\text{SO}_4^{2-}$ ). The similarity in the responses is evidenced by the consistent, linear relationship for Mn and Zn with  $\text{SO}_4^{2-}$  at the Snake River sites.



**Figure 6. DOC response in Deer Creek and Snake River.** Each year during spring snowmelt, in-stream dissolved organic carbon (DOC) concentrations increase on the rising limb of the hydrograph, reaching maximum values prior to peak discharge.



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## APPENDIX 1: DATA TABLES

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**Table 1. Data tables and associated filenames.**

*Data files are in ascii text format and are included on the accompanying diskette.  
Updates may be obtained by email request to [ewb7@cornell.edu](mailto:ewb7@cornell.edu).*

No.	Page	Title of data table	
1	13	Data tables and data file names	readme.txt
2	13	Symbols and abbreviations	readme.txt
3	14	Discharge measurements at sampling sites	measq.txt
4	15	Daily discharge values at Snake River stream gage	dailyq.txt
5	27	Peak discharge values at Snake River stream gage	peakq.txt
6	28	Deer Creek at DC5 water quality data	dc5wq.txt
7	40	Snake River at SN2 water quality data	sn2wq.txt
8	52	Snake River at SN3 water quality data	sn3wq.txt
9	64	Snake River at SN4 water quality data	sn4wq.txt

**Table 2. Symbols and abbreviations for water quality constituents**

Q	discharge	NO <sub>3</sub>	nitrate
pH	-log (hydrogen ion concentration)	PO <sub>4</sub>	phosphate
DOC	dissolved organic carbon	Al	aluminum
Na	sodium	Ba	barium
Ca	calcium	Fe	iron
Mg	magnesium	Mn	manganese
Sr	strontium	Cd	cadmium
Cl	chloride	Co	cobalt
Br	bromide	Cu	copper
F	fluoride	Ni	nickel
SO <sub>4</sub>	sulfate	Pb	lead
Si	silica	Zn	zinc

**Table 3. Discharge (Q) measurements at sampling sites.**

Date	discharge at DC5 (cfs)	discharge at SN2 (cfs)
23-Sep-79	2.47	3.43
23-Jun-81	7.49	5.86
09-Jul-81	4.91	4.56
15-Jul-81	4.66	5.33
22-Jul-81	3.39	3.92
06-Aug-81	1.13	3.21
24-Aug-81	2.40	3.67
26-Jul-82	20.38	19.88
02-Aug-82	14.20	16.24
12-Aug-82	11.16	9.96
20-Aug-82	13.95	13.31
27-Aug-82	9.64	11.72
14-Sep-82	8.40	9.39
23-Oct-82	4.48	6.29
04-Jun-84	31.01	0.00
28-Jun-84	30.79	30.02
09-Jul-84	25.99	22.50
15-Aug-84	11.51	10.91
06-Sep-84	7.38	9.92

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q								
01-Oct-79	22	27-Nov-79	17	23-Jan-80	12	20-Mar-80	12	16-May-80	32	12-Jul-80	208
02-Oct-79	23	28-Nov-79	17	24-Jan-80	12	21-Mar-80	12	17-May-80	33	13-Jul-80	193
03-Oct-79	22	29-Nov-79	17	25-Jan-80	12	22-Mar-80	12	18-May-80	33	14-Jul-80	175
04-Oct-79	22	30-Nov-79	17	26-Jan-80	12	23-Mar-80	12	19-May-80	37	15-Jul-80	162
05-Oct-79	22	01-Dec-79	16	27-Jan-80	12	24-Mar-80	12	20-May-80	43	16-Jul-80	152
06-Oct-79	22	02-Dec-79	15	28-Jan-80	12	25-Mar-80	12	21-May-80	60	17-Jul-80	142
07-Oct-79	21	03-Dec-79	15	29-Jan-80	12	26-Mar-80	12	22-May-80	86	18-Jul-80	135
08-Oct-79	21	04-Dec-79	15	30-Jan-80	12	27-Mar-80	12	23-May-80	115	19-Jul-80	130
09-Oct-79	21	05-Dec-79	15	31-Jan-80	12	28-Mar-80	12	24-May-80	135	20-Jul-80	122
10-Oct-79	21	06-Dec-79	15	01-Feb-80	12	29-Mar-80	12	25-May-80	134	21-Jul-80	116
11-Oct-79	21	07-Dec-79	15	02-Feb-80	12	30-Mar-80	12	26-May-80	118	22-Jul-80	110
12-Oct-79	21	08-Dec-79	15	03-Feb-80	12	31-Mar-80	12	27-May-80	129	23-Jul-80	111
13-Oct-79	21	09-Dec-79	15	04-Feb-80	12	01-Apr-80	12	28-May-80	160	24-Jul-80	109
14-Oct-79	21	10-Dec-79	15	05-Feb-80	12	02-Apr-80	12	29-May-80	167	25-Jul-80	102
15-Oct-79	21	11-Dec-79	15	06-Feb-80	12	03-Apr-80	12	30-May-80	165	26-Jul-80	94
16-Oct-79	22	12-Dec-79	15	07-Feb-80	12	04-Apr-80	12	31-May-80	185	27-Jul-80	89
17-Oct-79	21	13-Dec-79	15	08-Feb-80	12	05-Apr-80	12	01-Jun-80	191	28-Jul-80	83
18-Oct-79	22	14-Dec-79	15	09-Feb-80	12	06-Apr-80	12	02-Jun-80	200	29-Jul-80	77
19-Oct-79	21	15-Dec-79	15	10-Feb-80	12	07-Apr-80	12	03-Jun-80	231	30-Jul-80	77
20-Oct-79	21	16-Dec-79	15	11-Feb-80	12	08-Apr-80	12	04-Jun-80	277	31-Jul-80	76
21-Oct-79	22	17-Dec-79	15	12-Feb-80	12	09-Apr-80	12	05-Jun-80	329	01-Aug-80	72
22-Oct-79	22	18-Dec-79	15	13-Feb-80	11	10-Apr-80	12	06-Jun-80	357	02-Aug-80	69
23-Oct-79	22	19-Dec-79	15	14-Feb-80	11	11-Apr-80	12	07-Jun-80	352	03-Aug-80	65
24-Oct-79	22	20-Dec-79	15	15-Feb-80	11	12-Apr-80	12	08-Jun-80	367	04-Aug-80	64
25-Oct-79	22	21-Dec-79	15	16-Feb-80	11	13-Apr-80	12	09-Jun-80	425	05-Aug-80	60
26-Oct-79	22	22-Dec-79	15	17-Feb-80	11	14-Apr-80	12	10-Jun-80	484	06-Aug-80	58
27-Oct-79	22	23-Dec-79	15	18-Feb-80	11	15-Apr-80	12	11-Jun-80	554	07-Aug-80	55
28-Oct-79	19	24-Dec-79	15	19-Feb-80	11	16-Apr-80	12	12-Jun-80	576	08-Aug-80	57
29-Oct-79	20	25-Dec-79	15	20-Feb-80	11	17-Apr-80	12	13-Jun-80	548	09-Aug-80	55
30-Oct-79	17	26-Dec-79	15	21-Feb-80	12	18-Apr-80	13	14-Jun-80	522	10-Aug-80	52
31-Oct-79	17	27-Dec-79	15	22-Feb-80	12	19-Apr-80	14	15-Jun-80	482	11-Aug-80	50
01-Nov-79	18	28-Dec-79	15	23-Feb-80	12	20-Apr-80	15	16-Jun-80	453	12-Aug-80	47
02-Nov-79	18	29-Dec-79	15	24-Feb-80	12	21-Apr-80	17	17-Jun-80	442	13-Aug-80	46
03-Nov-79	19	30-Dec-79	15	25-Feb-80	12	22-Apr-80	19	18-Jun-80	436	14-Aug-80	48
04-Nov-79	19	31-Dec-79	15	26-Feb-80	12	23-Apr-80	18	19-Jun-80	424	15-Aug-80	57
05-Nov-79	19	01-Jan-80	15	27-Feb-80	12	24-Apr-80	18	20-Jun-80	404	16-Aug-80	50
06-Nov-79	19	02-Jan-80	15	28-Feb-80	12	25-Apr-80	17	21-Jun-80	394	17-Aug-80	46
07-Nov-79	19	03-Jan-80	15	29-Feb-80	12	26-Apr-80	17	22-Jun-80	389	18-Aug-80	43
08-Nov-79	17	04-Jan-80	15	01-Mar-80	12	27-Apr-80	19	23-Jun-80	388	19-Aug-80	43
09-Nov-79	17	05-Jan-80	15	02-Mar-80	12	28-Apr-80	20	24-Jun-80	394	20-Aug-80	42
10-Nov-79	17	06-Jan-80	15	03-Mar-80	12	29-Apr-80	22	25-Jun-80	383	21-Aug-80	40
11-Nov-79	17	07-Jan-80	15	04-Mar-80	12	30-Apr-80	23	26-Jun-80	372	22-Aug-80	39
12-Nov-79	17	08-Jan-80	15	05-Mar-80	12	01-May-80	21	27-Jun-80	360	23-Aug-80	42
13-Nov-79	17	09-Jan-80	15	06-Mar-80	12	02-May-80	20	28-Jun-80	326	24-Aug-80	52
14-Nov-79	17	10-Jan-80	15	07-Mar-80	12	03-May-80	23	29-Jun-80	298	25-Aug-80	64
15-Nov-79	17	11-Jan-80	15	08-Mar-80	12	04-May-80	26	30-Jun-80	312	26-Aug-80	63
16-Nov-79	17	12-Jan-80	15	09-Mar-80	12	05-May-80	32	01-Jul-80	364	27-Aug-80	49
17-Nov-79	17	13-Jan-80	15	10-Mar-80	12	06-May-80	35	02-Jul-80	360	28-Aug-80	45
18-Nov-79	17	14-Jan-80	15	11-Mar-80	12	07-May-80	38	03-Jul-80	306	29-Aug-80	43
19-Nov-79	17	15-Jan-80	15	12-Mar-80	12	08-May-80	38	04-Jul-80	275	30-Aug-80	42
20-Nov-79	17	16-Jan-80	15	13-Mar-80	12	09-May-80	35	05-Jul-80	250	31-Aug-80	42
21-Nov-79	17	17-Jan-80	15	14-Mar-80	12	10-May-80	37	06-Jul-80	231	01-Sep-80	39
22-Nov-79	17	18-Jan-80	15	15-Mar-80	12	11-May-80	40	07-Jul-80	227	02-Sep-80	37
23-Nov-79	17	19-Jan-80	15	16-Mar-80	12	12-May-80	41	08-Jul-80	222	03-Sep-80	36
24-Nov-79	17	20-Jan-80	15	17-Mar-80	12	13-May-80	35	09-Jul-80	205	04-Sep-80	35
25-Nov-79	17	21-Jan-80	13	18-Mar-80	12	14-May-80	33	10-Jul-80	202	05-Sep-80	34
26-Nov-79	17	22-Jan-80	12	19-Mar-80	12	15-May-80	33	11-Jul-80	211	06-Sep-80	34

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**  
*Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).*

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
07-Sep-80	34	03-Nov-80	23	30-Dec-80	15	25-Feb-81	10	23-Apr-81	21	19-Jun-81	98
08-Sep-80	35	04-Nov-80	21	31-Dec-80	15	26-Feb-81	10	24-Apr-81	27	20-Jun-81	98
09-Sep-80	40	05-Nov-80	21	01-Jan-81	15	27-Feb-81	10	25-Apr-81	32	21-Jun-81	96
10-Sep-80	42	06-Nov-80	21	02-Jan-81	15	28-Feb-81	10	26-Apr-81	38	22-Jun-81	92
11-Sep-80	42	07-Nov-80	21	03-Jan-81	15	01-Mar-81	10	27-Apr-81	40	23-Jun-81	88
12-Sep-80	37	08-Nov-80	20	04-Jan-81	15	02-Mar-81	10	28-Apr-81	43	24-Jun-81	85
13-Sep-80	35	09-Nov-80	20	05-Jan-81	15	03-Mar-81	10	29-Apr-81	50	25-Jun-81	81
14-Sep-80	33	10-Nov-80	20	06-Jan-81	15	04-Mar-81	10	30-Apr-81	54	26-Jun-81	81
15-Sep-80	32	11-Nov-80	20	07-Jan-81	15	05-Mar-81	10	01-May-81	62	27-Jun-81	84
16-Sep-80	34	12-Nov-80	20	08-Jan-81	14	06-Mar-81	10	02-May-81	66	28-Jun-81	81
17-Sep-80	32	13-Nov-80	20	09-Jan-81	14	07-Mar-81	10	03-May-81	74	29-Jun-81	76
18-Sep-80	30	14-Nov-80	20	10-Jan-81	13	08-Mar-81	10	04-May-81	63	30-Jun-81	73
19-Sep-80	29	15-Nov-80	20	11-Jan-81	12	09-Mar-81	10	05-May-81	57	01-Jul-81	72
20-Sep-80	32	16-Nov-80	19	12-Jan-81	12	10-Mar-81	10	06-May-81	51	02-Jul-81	84
21-Sep-80	30	17-Nov-80	18	13-Jan-81	12	11-Mar-81	10	07-May-81	45	03-Jul-81	86
22-Sep-80	29	18-Nov-80	18	14-Jan-81	12	12-Mar-81	10	08-May-81	39	04-Jul-81	72
23-Sep-80	27	19-Nov-80	17	15-Jan-81	12	13-Mar-81	10	09-May-81	38	05-Jul-81	69
24-Sep-80	27	20-Nov-80	16	16-Jan-81	12	14-Mar-81	10	10-May-81	38	06-Jul-81	65
25-Sep-80	26	21-Nov-80	15	17-Jan-81	12	15-Mar-81	10	11-May-81	37	07-Jul-81	66
26-Sep-80	26	22-Nov-80	15	18-Jan-81	12	16-Mar-81	10	12-May-81	34	08-Jul-81	76
27-Sep-80	25	23-Nov-80	15	19-Jan-81	12	17-Mar-81	10	13-May-81	34	09-Jul-81	78
28-Sep-80	24	24-Nov-80	15	20-Jan-81	12	18-Mar-81	10	14-May-81	36	10-Jul-81	91
29-Sep-80	24	25-Nov-80	15	21-Jan-81	12	19-Mar-81	10	15-May-81	38	11-Jul-81	76
30-Sep-80	23	26-Nov-80	15	22-Jan-81	12	20-Mar-81	10	16-May-81	35	12-Jul-81	91
01-Oct-80	22	27-Nov-80	15	23-Jan-81	12	21-Mar-81	10	17-May-81	35	13-Jul-81	89
02-Oct-80	22	28-Nov-80	15	24-Jan-81	12	22-Mar-81	10	18-May-81	34	14-Jul-81	75
03-Oct-80	22	29-Nov-80	15	25-Jan-81	12	23-Mar-81	10	19-May-81	38	15-Jul-81	69
04-Oct-80	21	30-Nov-80	15	26-Jan-81	12	24-Mar-81	10	20-May-81	42	16-Jul-81	72
05-Oct-80	20	01-Dec-80	15	27-Jan-81	12	25-Mar-81	10	21-May-81	41	17-Jul-81	70
06-Oct-80	20	02-Dec-80	15	28-Jan-81	12	26-Mar-81	10	22-May-81	39	18-Jul-81	66
07-Oct-80	21	03-Dec-80	15	29-Jan-81	12	27-Mar-81	10	23-May-81	42	19-Jul-81	61
08-Oct-80	22	04-Dec-80	15	30-Jan-81	12	28-Mar-81	10	24-May-81	47	20-Jul-81	55
09-Oct-80	21	05-Dec-80	15	31-Jan-81	12	29-Mar-81	10	25-May-81	53	21-Jul-81	52
10-Oct-80	21	06-Dec-80	15	01-Feb-81	12	30-Mar-81	10	26-May-81	67	22-Jul-81	51
11-Oct-80	21	07-Dec-80	15	02-Feb-81	12	31-Mar-81	10	27-May-81	83	23-Jul-81	49
12-Oct-80	21	08-Dec-80	15	03-Feb-81	12	01-Apr-81	10	28-May-81	110	24-Jul-81	50
13-Oct-80	22	09-Dec-80	15	04-Feb-81	12	02-Apr-81	10	29-May-81	129	25-Jul-81	49
14-Oct-80	22	10-Dec-80	15	05-Feb-81	12	03-Apr-81	10	30-May-81	130	26-Jul-81	50
15-Oct-80	25	11-Dec-80	15	06-Feb-81	12	04-Apr-81	10	31-May-81	149	27-Jul-81	50
16-Oct-80	22	12-Dec-80	15	07-Feb-81	12	05-Apr-81	10	01-Jun-81	154	28-Jul-81	46
17-Oct-80	23	13-Dec-80	15	08-Feb-81	12	06-Apr-81	10	02-Jun-81	164	29-Jul-81	43
18-Oct-80	23	14-Dec-80	15	09-Feb-81	12	07-Apr-81	10	03-Jun-81	170	30-Jul-81	41
19-Oct-80	25	15-Dec-80	15	10-Feb-81	12	08-Apr-81	11	04-Jun-81	181	31-Jul-81	42
20-Oct-80	26	16-Dec-80	15	11-Feb-81	12	09-Apr-81	11	05-Jun-81	193	01-Aug-81	41
21-Oct-80	23	17-Dec-80	15	12-Feb-81	11	10-Apr-81	12	06-Jun-81	220	02-Aug-81	39
22-Oct-80	23	18-Dec-80	15	13-Feb-81	10	11-Apr-81	12	07-Jun-81	243	03-Aug-81	38
23-Oct-80	23	19-Dec-80	15	14-Feb-81	9	12-Apr-81	12	08-Jun-81	243	04-Aug-81	37
24-Oct-80	23	20-Dec-80	15	15-Feb-81	9	13-Apr-81	13	09-Jun-81	247	05-Aug-81	35
25-Oct-80	23	21-Dec-80	15	16-Feb-81	9	14-Apr-81	13	10-Jun-81	225	06-Aug-81	34
26-Oct-80	23	22-Dec-80	15	17-Feb-81	9	15-Apr-81	14	11-Jun-81	210	07-Aug-81	33
27-Oct-80	23	23-Dec-80	15	18-Feb-81	9	16-Apr-81	15	12-Jun-81	192	08-Aug-81	32
28-Oct-80	24	24-Dec-80	15	19-Feb-81	9.5	17-Apr-81	18	13-Jun-81	170	09-Aug-81	33
29-Oct-80	23	25-Dec-80	15	20-Feb-81	10	18-Apr-81	21	14-Jun-81	147	10-Aug-81	38
30-Oct-80	23	26-Dec-80	15	21-Feb-81	10	19-Apr-81	20	15-Jun-81	127	11-Aug-81	41
31-Oct-80	23	27-Dec-80	15	22-Feb-81	10	20-Apr-81	19	16-Jun-81	113	12-Aug-81	47
01-Nov-80	23	28-Dec-80	15	23-Feb-81	10	21-Apr-81	19	17-Jun-81	106	13-Aug-81	46
02-Nov-80	23	29-Dec-80	15	24-Feb-81	10	22-Apr-81	18	18-Jun-81	101	14-Aug-81	40

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge ( $Q$ ) values in cubic feet per second (cfs).

Date	Q										
15-Aug-81	43	11-Oct-81	24	07-Dec-81	15	02-Feb-82	12	31-Mar-82	13	27-May-82	77
16-Aug-81	47	12-Oct-81	25	08-Dec-81	15	03-Feb-82	12	01-Apr-82	13	28-May-82	101
17-Aug-81	49	13-Oct-81	25	09-Dec-81	15	04-Feb-82	12	02-Apr-82	13	29-May-82	133
18-Aug-81	43	14-Oct-81	25	10-Dec-81	15	05-Feb-82	12	03-Apr-82	13	30-May-82	140
19-Aug-81	40	15-Oct-81	26	11-Dec-81	15	06-Feb-82	12	04-Apr-82	13	31-May-82	143
20-Aug-81	40	16-Oct-81	29	12-Dec-81	15	07-Feb-82	12	05-Apr-82	13	01-Jun-82	164
21-Aug-81	41	17-Oct-81	27	13-Dec-81	15	08-Feb-82	12	06-Apr-82	13	02-Jun-82	172
22-Aug-81	41	18-Oct-81	27	14-Dec-81	15	09-Feb-82	12	07-Apr-82	13	03-Jun-82	167
23-Aug-81	39	19-Oct-81	25	15-Dec-81	15	10-Feb-82	12	08-Apr-82	13	04-Jun-82	165
24-Aug-81	38	20-Oct-81	25	16-Dec-81	15	11-Feb-82	12	09-Apr-82	13	05-Jun-82	207
25-Aug-81	37	21-Oct-81	25	17-Dec-81	15	12-Feb-82	12	10-Apr-82	13	06-Jun-82	227
26-Aug-81	39	22-Oct-81	24	18-Dec-81	15	13-Feb-82	12	11-Apr-82	13	07-Jun-82	232
27-Aug-81	42	23-Oct-81	23	19-Dec-81	13	14-Feb-82	12	12-Apr-82	13	08-Jun-82	268
28-Aug-81	38	24-Oct-81	24	20-Dec-81	13	15-Feb-82	12	13-Apr-82	15	09-Jun-82	274
29-Aug-81	37	25-Oct-81	24	21-Dec-81	13	16-Feb-82	12	14-Apr-82	17	10-Jun-82	278
30-Aug-81	35	26-Oct-81	24	22-Dec-81	13	17-Feb-82	12	15-Apr-82	19	11-Jun-82	273
31-Aug-81	38	27-Oct-81	25	23-Dec-81	13	18-Feb-82	12	16-Apr-82	16	12-Jun-82	294
01-Sep-81	42	28-Oct-81	24	24-Dec-81	13	19-Feb-82	12	17-Apr-82	17	13-Jun-82	310
02-Sep-81	37	29-Oct-81	25	25-Dec-81	13	20-Feb-82	12	18-Apr-82	16	14-Jun-82	314
03-Sep-81	36	30-Oct-81	24	26-Dec-81	13	21-Feb-82	13	19-Apr-82	16	15-Jun-82	303
04-Sep-81	35	31-Oct-81	23	27-Dec-81	13	22-Feb-82	13	20-Apr-82	16	16-Jun-82	316
05-Sep-81	36	01-Nov-81	24	28-Dec-81	13	23-Feb-82	13	21-Apr-82	16	17-Jun-82	358
06-Sep-81	35	02-Nov-81	24	29-Dec-81	13	24-Feb-82	13	22-Apr-82	16	18-Jun-82	352
07-Sep-81	34	03-Nov-81	24	30-Dec-81	13	25-Feb-82	13	23-Apr-82	16	19-Jun-82	284
08-Sep-81	33	04-Nov-81	23	31-Dec-81	12	26-Feb-82	13	24-Apr-82	16	20-Jun-82	282
09-Sep-81	36	05-Nov-81	23	01-Jan-82	12	27-Feb-82	13	25-Apr-82	16	21-Jun-82	320
10-Sep-81	38	06-Nov-81	23	02-Jan-82	12	28-Feb-82	13	26-Apr-82	16	22-Jun-82	359
11-Sep-81	44	07-Nov-81	24	03-Jan-82	12	01-Mar-82	13	27-Apr-82	16	23-Jun-82	379
12-Sep-81	39	08-Nov-81	24	04-Jan-82	12	02-Mar-82	13	28-Apr-82	17	24-Jun-82	394
13-Sep-81	38	09-Nov-81	24	05-Jan-82	12	03-Mar-82	13	29-Apr-82	17	25-Jun-82	396
14-Sep-81	37	10-Nov-81	25	06-Jan-82	12	04-Mar-82	13	30-Apr-82	22	26-Jun-82	385
15-Sep-81	37	11-Nov-81	25	07-Jan-82	12	05-Mar-82	13	01-May-82	28	27-Jun-82	399
16-Sep-81	34	12-Nov-81	25	08-Jan-82	12	06-Mar-82	13	02-May-82	33	28-Jun-82	440
17-Sep-81	34	13-Nov-81	24	09-Jan-82	12	07-Mar-82	13	03-May-82	39	29-Jun-82	454
18-Sep-81	33	14-Nov-81	23	10-Jan-82	12	08-Mar-82	13	04-May-82	46	30-Jun-82	444
19-Sep-81	33	15-Nov-81	23	11-Jan-82	12	09-Mar-82	13	05-May-82	45	01-Jul-82	438
20-Sep-81	32	16-Nov-81	21	12-Jan-82	12	10-Mar-82	13	06-May-82	40	02-Jul-82	419
21-Sep-81	33	17-Nov-81	23	13-Jan-82	12	11-Mar-82	13	07-May-82	36	03-Jul-82	394
22-Sep-81	32	18-Nov-81	22	14-Jan-82	12	12-Mar-82	13	08-May-82	33	04-Jul-82	376
23-Sep-81	31	19-Nov-81	23	15-Jan-82	12	13-Mar-82	13	09-May-82	36	05-Jul-82	340
24-Sep-81	30	20-Nov-81	22	16-Jan-82	12	14-Mar-82	13	10-May-82	43	06-Jul-82	312
25-Sep-81	30	21-Nov-81	20	17-Jan-82	12	15-Mar-82	13	11-May-82	44	07-Jul-82	277
26-Sep-81	29	22-Nov-81	20	18-Jan-82	12	16-Mar-82	13	12-May-82	41	08-Jul-82	261
27-Sep-81	28	23-Nov-81	20	19-Jan-82	12	17-Mar-82	13	13-May-82	37	09-Jul-82	257
28-Sep-81	28	24-Nov-81	19	20-Jan-82	12	18-Mar-82	13	14-May-82	34	10-Jul-82	242
29-Sep-81	28	25-Nov-81	19	21-Jan-82	12	19-Mar-82	13	15-May-82	32	11-Jul-82	242
30-Sep-81	27	26-Nov-81	18	22-Jan-82	12	20-Mar-82	13	16-May-82	32	12-Jul-82	242
01-Oct-81	27	27-Nov-81	19	23-Jan-82	12	21-Mar-82	13	17-May-82	33	13-Jul-82	236
02-Oct-81	26	28-Nov-81	18	24-Jan-82	12	22-Mar-82	13	18-May-82	36	14-Jul-82	230
03-Oct-81	28	29-Nov-81	18	25-Jan-82	12	23-Mar-82	13	19-May-82	38	15-Jul-82	223
04-Oct-81	28	30-Nov-81	18	26-Jan-82	12	24-Mar-82	13	20-May-82	37	16-Jul-82	206
05-Oct-81	28	01-Dec-81	18	27-Jan-82	12	25-Mar-82	13	21-May-82	41	17-Jul-82	199
06-Oct-81	26	02-Dec-81	18	28-Jan-82	12	26-Mar-82	13	22-May-82	52	18-Jul-82	191
07-Oct-81	25	03-Dec-81	18	29-Jan-82	12	27-Mar-82	13	23-May-82	61	19-Jul-82	181
08-Oct-81	25	04-Dec-81	16	30-Jan-82	12	28-Mar-82	13	24-May-82	69	20-Jul-82	173
09-Oct-81	26	05-Dec-81	14	31-Jan-82	12	29-Mar-82	13	25-May-82	68	21-Jul-82	163
10-Oct-81	25	06-Dec-81	15	01-Feb-82	12	30-Mar-82	13	26-May-82	66	22-Jul-82	157

**Table 4.** Daily discharge values at Snake River near Montezuma, Colorado

Water years 1980 to 1990. USGS station number 09047500; discharge ( $Q$ ) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
23-Jul-82	154	18-Sep-82	54	14-Nov-82	25	10-Jan-83	15	08-Mar-83	13	04-May-83	14
24-Jul-82	152	19-Sep-82	56	15-Nov-82	25	11-Jan-83	15	09-Mar-83	13	05-May-83	15
25-Jul-82	152	20-Sep-82	59	16-Nov-82	25	12-Jan-83	15	10-Mar-83	13	06-May-83	15
26-Jul-82	155	21-Sep-82	55	17-Nov-82	25	13-Jan-83	15	11-Mar-83	13	07-May-83	14
27-Jul-82	158	22-Sep-82	53	18-Nov-82	25	14-Jan-83	15	12-Mar-83	13	08-May-83	18
28-Jul-82	182	23-Sep-82	55	19-Nov-82	25	15-Jan-83	15	13-Mar-83	13	09-May-83	22
29-Jul-82	189	24-Sep-82	53	20-Nov-82	25	16-Jan-83	15	14-Mar-83	13	10-May-83	28
30-Jul-82	173	25-Sep-82	52	21-Nov-82	25	17-Jan-83	15	15-Mar-83	13	11-May-83	32
31-Jul-82	148	26-Sep-82	52	22-Nov-82	25	18-Jan-83	15	16-Mar-83	13	12-May-83	29
01-Aug-82	135	27-Sep-82	51	23-Nov-82	25	19-Jan-83	15	17-Mar-83	13	13-May-83	26
02-Aug-82	129	28-Sep-82	50	24-Nov-82	25	20-Jan-83	15	18-Mar-83	13	14-May-83	25
03-Aug-82	124	29-Sep-82	49	25-Nov-82	25	21-Jan-83	15	19-Mar-83	13	15-May-83	21
04-Aug-82	122	30-Sep-82	48	26-Nov-82	25	22-Jan-83	15	20-Mar-83	13	16-May-83	20
05-Aug-82	116	01-Oct-82	48	27-Nov-82	25	23-Jan-83	15	21-Mar-83	13	17-May-83	21
06-Aug-82	108	02-Oct-82	47	28-Nov-82	25	24-Jan-83	15	22-Mar-83	13	18-May-83	19
07-Aug-82	101	03-Oct-82	46	29-Nov-82	25	25-Jan-83	15	23-Mar-83	13	19-May-83	18
08-Aug-82	96	04-Oct-82	45	30-Nov-82	25	26-Jan-83	15	24-Mar-83	13	20-May-83	17
09-Aug-82	93	05-Oct-82	44	01-Dec-82	25	27-Jan-83	15	25-Mar-83	13	21-May-83	18
10-Aug-82	93	06-Oct-82	45	02-Dec-82	25	28-Jan-83	15	26-Mar-83	13	22-May-83	22
11-Aug-82	94	07-Oct-82	44	03-Dec-82	25	29-Jan-83	15	27-Mar-83	13	23-May-83	27
12-Aug-82	103	08-Oct-82	43	04-Dec-82	25	30-Jan-83	15	28-Mar-83	13	24-May-83	39
13-Aug-82	123	09-Oct-82	42	05-Dec-82	25	31-Jan-83	15	29-Mar-83	13	25-May-83	50
14-Aug-82	116	10-Oct-82	46	06-Dec-82	25	01-Feb-83	15	30-Mar-83	13	26-May-83	58
15-Aug-82	100	11-Oct-82	47	07-Dec-82	25	02-Feb-83	15	31-Mar-83	13	27-May-83	77
16-Aug-82	94	12-Oct-82	48	08-Dec-82	25	03-Feb-83	15	01-Apr-83	13	28-May-83	94
17-Aug-82	114	13-Oct-82	37	09-Dec-82	25	04-Feb-83	15	02-Apr-83	13	29-May-83	109
18-Aug-82	126	14-Oct-82	30	10-Dec-82	25	05-Feb-83	15	03-Apr-83	13	30-May-83	121
19-Aug-82	119	15-Oct-82	41	11-Dec-82	25	06-Feb-83	15	04-Apr-83	13	31-May-83	114
20-Aug-82	118	16-Oct-82	44	12-Dec-82	25	07-Feb-83	15	05-Apr-83	13	01-Jun-83	119
21-Aug-82	114	17-Oct-82	44	13-Dec-82	25	08-Feb-83	15	06-Apr-83	14	02-Jun-83	127
22-Aug-82	109	18-Oct-82	43	14-Dec-82	25	09-Feb-83	15	07-Apr-83	14	03-Jun-83	130
23-Aug-82	99	19-Oct-82	41	15-Dec-82	24	10-Feb-83	15	08-Apr-83	14	04-Jun-83	153
24-Aug-82	93	20-Oct-82	39	16-Dec-82	23	11-Feb-83	15	09-Apr-83	14	05-Jun-83	153
25-Aug-82	91	21-Oct-82	41	17-Dec-82	21	12-Feb-83	15	10-Apr-83	14	06-Jun-83	132
26-Aug-82	87	22-Oct-82	40	18-Dec-82	20	13-Feb-83	15	11-Apr-83	14	07-Jun-83	136
27-Aug-82	80	23-Oct-82	38	19-Dec-82	20	14-Feb-83	15	12-Apr-83	14	08-Jun-83	156
28-Aug-82	77	24-Oct-82	37	20-Dec-82	20	15-Feb-83	15	13-Apr-83	14	09-Jun-83	179
29-Aug-82	73	25-Oct-82	38	21-Dec-82	20	16-Feb-83	15	14-Apr-83	14	10-Jun-83	222
30-Aug-82	69	26-Oct-82	38	22-Dec-82	20	17-Feb-83	15	15-Apr-83	14	11-Jun-83	298
31-Aug-82	67	27-Oct-82	38	23-Dec-82	20	18-Feb-83	15	16-Apr-83	14	12-Jun-83	337
01-Sep-82	63	28-Oct-82	34	24-Dec-82	20	19-Feb-83	15	17-Apr-83	14	13-Jun-83	286
02-Sep-82	60	29-Oct-82	33	25-Dec-82	20	20-Feb-83	14	18-Apr-83	14	14-Jun-83	239
03-Sep-82	58	30-Oct-82	32	26-Dec-82	20	21-Feb-83	13	19-Apr-83	14	15-Jun-83	258
04-Sep-82	57	31-Oct-82	31	27-Dec-82	20	22-Feb-83	13	20-Apr-83	14	16-Jun-83	284
05-Sep-82	66	01-Nov-82	30	28-Dec-82	20	23-Feb-83	13	21-Apr-83	14	17-Jun-83	314
06-Sep-82	62	02-Nov-82	29	29-Dec-82	20	24-Feb-83	13	22-Apr-83	14	18-Jun-83	444
07-Sep-82	57	03-Nov-82	29	30-Dec-82	20	25-Feb-83	13	23-Apr-83	14	19-Jun-83	567
08-Sep-82	57	04-Nov-82	28	31-Dec-82	20	26-Feb-83	13	24-Apr-83	14	20-Jun-83	622
09-Sep-82	57	05-Nov-82	27	01-Jan-83	19	27-Feb-83	13	25-Apr-83	14	21-Jun-83	622
10-Sep-82	53	06-Nov-82	27	02-Jan-83	17	28-Feb-83	13	26-Apr-83	14	22-Jun-83	567
11-Sep-82	62	07-Nov-82	26	03-Jan-83	16	01-Mar-83	13	27-Apr-83	14	23-Jun-83	523
12-Sep-82	68	08-Nov-82	25	04-Jan-83	15	02-Mar-83	13	28-Apr-83	14	24-Jun-83	543
13-Sep-82	64	09-Nov-82	25	05-Jan-83	15	03-Mar-83	13	29-Apr-83	14	25-Jun-83	563
14-Sep-82	64	10-Nov-82	25	06-Jan-83	15	04-Mar-83	13	30-Apr-83	12	26-Jun-83	515
15-Sep-82	62	11-Nov-82	25	07-Jan-83	15	05-Mar-83	13	01-May-83	13	27-Jun-83	499
16-Sep-82	59	12-Nov-82	25	08-Jan-83	15	06-Mar-83	13	02-May-83	12	28-Jun-83	481
17-Sep-82	55	13-Nov-82	25	09-Jan-83	15	07-Mar-83	13	03-May-83	12	29-Jun-83	439

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
30-Jun-83	422	26-Aug-83	121	22-Oct-83	30	18-Dec-83	23	13-Feb-84	15	10-Apr-84	13
01-Jul-83	413	27-Aug-83	100	23-Oct-83	29	19-Dec-83	23	14-Feb-84	15	11-Apr-84	13
02-Jul-83	398	28-Aug-83	91	24-Oct-83	29	20-Dec-83	23	15-Feb-84	15	12-Apr-84	13
03-Jul-83	393	29-Aug-83	87	25-Oct-83	28	21-Dec-83	22	16-Feb-84	15	13-Apr-84	13
04-Jul-83	358	30-Aug-83	99	26-Oct-83	29	22-Dec-83	21	17-Feb-84	15	14-Apr-84	13
05-Jul-83	345	31-Aug-83	111	27-Oct-83	29	23-Dec-83	20	18-Feb-84	15	15-Apr-84	13
06-Jul-83	339	01-Sep-83	94	28-Oct-83	28	24-Dec-83	20	19-Feb-84	15	16-Apr-84	13
07-Jul-83	336	02-Sep-83	87	29-Oct-83	27	25-Dec-83	20	20-Feb-84	15	17-Apr-84	14
08-Jul-83	358	03-Sep-83	81	30-Oct-83	27	26-Dec-83	20	21-Feb-84	15	18-Apr-84	15
09-Jul-83	342	04-Sep-83	86	31-Oct-83	26	27-Dec-83	20	22-Feb-84	15	19-Apr-84	15
10-Jul-83	340	05-Sep-83	78	01-Nov-83	26	28-Dec-83	20	23-Feb-84	15	20-Apr-84	15
11-Jul-83	322	06-Sep-83	70	02-Nov-83	25	29-Dec-83	20	24-Feb-84	15	21-Apr-84	15
12-Jul-83	278	07-Sep-83	69	03-Nov-83	26	30-Dec-83	20	25-Feb-84	15	22-Apr-84	15
13-Jul-83	254	08-Sep-83	66	04-Nov-83	26	31-Dec-83	20	26-Feb-84	15	23-Apr-84	15
14-Jul-83	239	09-Sep-83	64	05-Nov-83	26	01-Jan-84	20	27-Feb-84	15	24-Apr-84	15
15-Jul-83	217	10-Sep-83	62	06-Nov-83	26	02-Jan-84	20	28-Feb-84	15	25-Apr-84	15
16-Jul-83	202	11-Sep-83	59	07-Nov-83	25	03-Jan-84	19	29-Feb-84	15	26-Apr-84	17
17-Jul-83	190	12-Sep-83	56	08-Nov-83	26	04-Jan-84	18	01-Mar-84	15	27-Apr-84	16
18-Jul-83	180	13-Sep-83	55	09-Nov-83	27	05-Jan-84	18	02-Mar-84	14	28-Apr-84	16
19-Jul-83	171	14-Sep-83	52	10-Nov-83	28	06-Jan-84	17	03-Mar-84	13	29-Apr-84	17
20-Jul-83	173	15-Sep-83	54	11-Nov-83	29	07-Jan-84	17	04-Mar-84	13	30-Apr-84	17
21-Jul-83	177	16-Sep-83	49	12-Nov-83	30	08-Jan-84	17	05-Mar-84	13	01-May-84	17
22-Jul-83	186	17-Sep-83	47	13-Nov-83	28	09-Jan-84	17	06-Mar-84	13	02-May-84	18
23-Jul-83	170	18-Sep-83	45	14-Nov-83	27	10-Jan-84	17	07-Mar-84	13	03-May-84	18
24-Jul-83	153	19-Sep-83	44	15-Nov-83	28	11-Jan-84	17	08-Mar-84	13	04-May-84	18
25-Jul-83	140	20-Sep-83	45	16-Nov-83	27	12-Jan-84	17	09-Mar-84	13	05-May-84	18
26-Jul-83	140	21-Sep-83	42	17-Nov-83	26	13-Jan-84	17	10-Mar-84	13	06-May-84	18
27-Jul-83	142	22-Sep-83	42	18-Nov-83	24	14-Jan-84	17	11-Mar-84	13	07-May-84	18
28-Jul-83	148	23-Sep-83	40	19-Nov-83	23	15-Jan-84	17	12-Mar-84	12	08-May-84	18
29-Jul-83	133	24-Sep-83	41	20-Nov-83	23	16-Jan-84	17	13-Mar-84	12	09-May-84	19
30-Jul-83	142	25-Sep-83	40	21-Nov-83	23	17-Jan-84	17	14-Mar-84	12	10-May-84	19
31-Jul-83	133	26-Sep-83	39	22-Nov-83	23	18-Jan-84	17	15-Mar-84	12	11-May-84	29
01-Aug-83	126	27-Sep-83	37	23-Nov-83	23	19-Jan-84	17	16-Mar-84	12	12-May-84	49
02-Aug-83	113	28-Sep-83	35	24-Nov-83	23	20-Jan-84	17	17-Mar-84	12	13-May-84	61
03-Aug-83	109	29-Sep-83	35	25-Nov-83	23	21-Jan-84	17	18-Mar-84	13	14-May-84	74
04-Aug-83	110	30-Sep-83	35	26-Nov-83	23	22-Jan-84	16	19-Mar-84	13	15-May-84	91
05-Aug-83	111	01-Oct-83	36	27-Nov-83	23	23-Jan-84	15	20-Mar-84	13	16-May-84	100
06-Aug-83	107	02-Oct-83	35	28-Nov-83	23	24-Jan-84	15	21-Mar-84	13	17-May-84	107
07-Aug-83	100	03-Oct-83	36	29-Nov-83	23	25-Jan-84	15	22-Mar-84	13	18-May-84	114
08-Aug-83	102	04-Oct-83	37	30-Nov-83	23	26-Jan-84	15	23-Mar-84	13	19-May-84	103
09-Aug-83	94	05-Oct-83	36	01-Dec-83	23	27-Jan-84	15	24-Mar-84	13	20-May-84	126
10-Aug-83	86	06-Oct-83	34	02-Dec-83	23	28-Jan-84	15	25-Mar-84	13	21-May-84	160
11-Aug-83	82	07-Oct-83	32	03-Dec-83	23	29-Jan-84	15	26-Mar-84	13	22-May-84	185
12-Aug-83	85	08-Oct-83	32	04-Dec-83	23	30-Jan-84	15	27-Mar-84	13	23-May-84	235
13-Aug-83	87	09-Oct-83	32	05-Dec-83	23	31-Jan-84	15	28-Mar-84	13	24-May-84	310
14-Aug-83	88	10-Oct-83	32	06-Dec-83	23	01-Feb-84	15	29-Mar-84	13	25-May-84	342
15-Aug-83	89	11-Oct-83	33	07-Dec-83	23	02-Feb-84	15	30-Mar-84	13	26-May-84	304
16-Aug-83	80	12-Oct-83	33	08-Dec-83	23	03-Feb-84	15	31-Mar-84	13	27-May-84	314
17-Aug-83	79	13-Oct-83	33	09-Dec-83	23	04-Feb-84	15	01-Apr-84	13	28-May-84	312
18-Aug-83	77	14-Oct-83	35	10-Dec-83	23	05-Feb-84	15	02-Apr-84	13	29-May-84	319
19-Aug-83	73	15-Oct-83	33	11-Dec-83	23	06-Feb-84	15	03-Apr-84	13	30-May-84	352
20-Aug-83	81	16-Oct-83	31	12-Dec-83	23	07-Feb-84	15	04-Apr-84	13	31-May-84	372
21-Aug-83	70	17-Oct-83	33	13-Dec-83	23	08-Feb-84	15	05-Apr-84	13	01-Jun-84	381
22-Aug-83	73	18-Oct-83	35	14-Dec-83	23	09-Feb-84	15	06-Apr-84	13	02-Jun-84	354
23-Aug-83	92	19-Oct-83	33	15-Dec-83	23	10-Feb-84	15	07-Apr-84	13	03-Jun-84	338
24-Aug-83	90	20-Oct-83	31	16-Dec-83	23	11-Feb-84	15	08-Apr-84	13	04-Jun-84	320
25-Aug-83	87	21-Oct-83	30	17-Dec-83	23	12-Feb-84	15	09-Apr-84	13	05-Jun-84	293

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
06-Jun-84	255	02-Aug-84	244	28-Sep-84	73	24-Nov-84	33	20-Jan-85	17	18-Mar-85	15
07-Jun-84	238	03-Aug-84	208	29-Sep-84	71	25-Nov-84	33	21-Jan-85	17	19-Mar-85	15
08-Jun-84	206	04-Aug-84	187	30-Sep-84	72	26-Nov-84	32	22-Jan-85	17	20-Mar-85	15
09-Jun-84	185	05-Aug-84	183	01-Oct-84	74	27-Nov-84	32	23-Jan-85	17	21-Mar-85	15
10-Jun-84	171	06-Aug-84	266	02-Oct-84	76	28-Nov-84	31	24-Jan-85	17	22-Mar-85	15
11-Jun-84	190	07-Aug-84	243	03-Oct-84	78	29-Nov-84	30	25-Jan-85	17	23-Mar-85	15
12-Jun-84	217	08-Aug-84	209	04-Oct-84	84	30-Nov-84	30	26-Jan-85	17	24-Mar-85	15
13-Jun-84	267	09-Aug-84	193	05-Oct-84	83	01-Dec-84	29	27-Jan-85	17	25-Mar-85	15
14-Jun-84	394	10-Aug-84	176	06-Oct-84	80	02-Dec-84	29	28-Jan-85	17	26-Mar-85	15
15-Jun-84	463	11-Aug-84	166	07-Oct-84	77	03-Dec-84	28	29-Jan-85	17	27-Mar-85	16
16-Jun-84	449	12-Aug-84	162	08-Oct-84	74	04-Dec-84	28	30-Jan-85	17	28-Mar-85	16
17-Jun-84	415	13-Aug-84	160	09-Oct-84	74	05-Dec-84	27	31-Jan-85	17	29-Mar-85	16
18-Jun-84	406	14-Aug-84	150	10-Oct-84	72	06-Dec-84	27	01-Feb-85	17	30-Mar-85	17
19-Jun-84	430	15-Aug-84	155	11-Oct-84	70	07-Dec-84	27	02-Feb-85	17	31-Mar-85	17
20-Jun-84	433	16-Aug-84	156	12-Oct-84	69	08-Dec-84	27	03-Feb-85	16	01-Apr-85	17
21-Jun-84	439	17-Aug-84	146	13-Oct-84	72	09-Dec-84	27	04-Feb-85	16	02-Apr-85	17
22-Jun-84	444	18-Aug-84	171	14-Oct-84	70	10-Dec-84	27	05-Feb-85	15	03-Apr-85	18
23-Jun-84	427	19-Aug-84	162	15-Oct-84	64	11-Dec-84	27	06-Feb-85	15	04-Apr-85	18
24-Jun-84	419	20-Aug-84	157	16-Oct-84	66	12-Dec-84	27	07-Feb-85	15	05-Apr-85	18
25-Jun-84	399	21-Aug-84	162	17-Oct-84	74	13-Dec-84	27	08-Feb-85	15	06-Apr-85	18
26-Jun-84	381	22-Aug-84	165	18-Oct-84	68	14-Dec-84	27	09-Feb-85	15	07-Apr-85	19
27-Jun-84	387	23-Aug-84	149	19-Oct-84	68	15-Dec-84	27	10-Feb-85	15	08-Apr-85	19
28-Jun-84	385	24-Aug-84	187	20-Oct-84	65	16-Dec-84	27	11-Feb-85	15	09-Apr-85	20
29-Jun-84	379	25-Aug-84	190	21-Oct-84	63	17-Dec-84	27	12-Feb-85	15	10-Apr-85	21
30-Jun-84	384	26-Aug-84	185	22-Oct-84	60	18-Dec-84	27	13-Feb-85	15	11-Apr-85	23
01-Jul-84	426	27-Aug-84	167	23-Oct-84	59	19-Dec-84	26	14-Feb-85	15	12-Apr-85	26
02-Jul-84	384	28-Aug-84	157	24-Oct-84	63	20-Dec-84	26	15-Feb-85	15	13-Apr-85	28
03-Jul-84	362	29-Aug-84	146	25-Oct-84	62	21-Dec-84	25	16-Feb-85	15	14-Apr-85	32
04-Jul-84	337	30-Aug-84	136	26-Oct-84	58	22-Dec-84	25	17-Feb-85	15	15-Apr-85	35
05-Jul-84	314	31-Aug-84	130	27-Oct-84	57	23-Dec-84	25	18-Feb-85	15	16-Apr-85	38
06-Jul-84	294	01-Sep-84	139	28-Oct-84	54	24-Dec-84	24	19-Feb-85	15	17-Apr-85	42
07-Jul-84	278	02-Sep-84	126	29-Oct-84	49	25-Dec-84	24	20-Feb-85	15	18-Apr-85	47
08-Jul-84	261	03-Sep-84	116	30-Oct-84	45	26-Dec-84	24	21-Feb-85	15	19-Apr-85	50
09-Jul-84	280	04-Sep-84	109	31-Oct-84	47	27-Dec-84	23	22-Feb-85	15	20-Apr-85	48
10-Jul-84	324	05-Sep-84	103	01-Nov-84	49	28-Dec-84	23	23-Feb-85	15	21-Apr-85	47
11-Jul-84	271	06-Sep-84	97	02-Nov-84	52	29-Dec-84	22	24-Feb-85	15	22-Apr-85	44
12-Jul-84	247	07-Sep-84	104	03-Nov-84	49	30-Dec-84	22	25-Feb-85	15	23-Apr-85	43
13-Jul-84	238	08-Sep-84	108	04-Nov-84	49	31-Dec-84	22	26-Feb-85	15	24-Apr-85	41
14-Jul-84	239	09-Sep-84	100	05-Nov-84	48	01-Jan-85	21	27-Feb-85	15	25-Apr-85	40
15-Jul-84	222	10-Sep-84	92	06-Nov-84	46	02-Jan-85	21	28-Feb-85	15	26-Apr-85	45
16-Jul-84	204	11-Sep-84	89	07-Nov-84	45	03-Jan-85	21	01-Mar-85	14	27-Apr-85	50
17-Jul-84	191	12-Sep-84	95	08-Nov-84	44	04-Jan-85	20	02-Mar-85	14	28-Apr-85	53
18-Jul-84	177	13-Sep-84	98	09-Nov-84	44	05-Jan-85	20	03-Mar-85	14	29-Apr-85	56
19-Jul-84	174	14-Sep-84	94	10-Nov-84	43	06-Jan-85	20	04-Mar-85	14	30-Apr-85	60
20-Jul-84	178	15-Sep-84	94	11-Nov-84	42	07-Jan-85	19	05-Mar-85	14	01-May-85	66
21-Jul-84	177	16-Sep-84	96	12-Nov-84	41	08-Jan-85	19	06-Mar-85	14	02-May-85	70
22-Jul-84	167	17-Sep-84	89	13-Nov-84	41	09-Jan-85	19	07-Mar-85	14	03-May-85	76
23-Jul-84	175	18-Sep-84	84	14-Nov-84	40	10-Jan-85	18	08-Mar-85	14	04-May-85	84
24-Jul-84	176	19-Sep-84	81	15-Nov-84	40	11-Jan-85	18	09-Mar-85	14	05-May-85	90
25-Jul-84	186	20-Sep-84	80	16-Nov-84	39	12-Jan-85	18	10-Mar-85	14	06-May-85	95
26-Jul-84	221	21-Sep-84	79	17-Nov-84	38	13-Jan-85	18	11-Mar-85	15	07-May-85	97
27-Jul-84	194	22-Sep-84	78	18-Nov-84	37	14-Jan-85	17	12-Mar-85	15	08-May-85	116
28-Jul-84	194	23-Sep-84	73	19-Nov-84	37	15-Jan-85	17	13-Mar-85	15	09-May-85	125
29-Jul-84	207	24-Sep-84	70	20-Nov-84	36	16-Jan-85	17	14-Mar-85	15	10-May-85	132
30-Jul-84	225	25-Sep-84	72	21-Nov-84	35	17-Jan-85	17	15-Mar-85	15	11-May-85	127
31-Jul-84	208	26-Sep-84	70	22-Nov-84	35	18-Jan-85	17	16-Mar-85	15	12-May-85	105
01-Aug-84	209	27-Sep-84	68	23-Nov-84	34	19-Jan-85	17	17-Mar-85	15	13-May-85	94

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
14-May-85	89	10-Jul-85	119	05-Sep-85	37	01-Nov-85	25	28-Dec-85	16	23-Feb-86	11
15-May-85	86	11-Jul-85	105	06-Sep-85	35	02-Nov-85	23	29-Dec-85	15	24-Feb-86	12
16-May-85	85	12-Jul-85	98	07-Sep-85	35	03-Nov-85	23	30-Dec-85	15	25-Feb-86	12
17-May-85	90	13-Jul-85	97	08-Sep-85	36	04-Nov-85	23	31-Dec-85	15	26-Feb-86	12
18-May-85	99	14-Jul-85	96	09-Sep-85	33	05-Nov-85	23	01-Jan-86	14	27-Feb-86	12
19-May-85	102	15-Jul-85	88	10-Sep-85	33	06-Nov-85	23	02-Jan-86	14	28-Feb-86	12
20-May-85	95	16-Jul-85	84	11-Sep-85	36	07-Nov-85	23	03-Jan-86	14	01-Mar-86	12
21-May-85	98	17-Jul-85	84	12-Sep-85	40	08-Nov-85	23	04-Jan-86	13	02-Mar-86	12
22-May-85	98	18-Jul-85	85	13-Sep-85	34	09-Nov-85	23	05-Jan-86	13	03-Mar-86	12
23-May-85	116	19-Jul-85	105	14-Sep-85	33	10-Nov-85	23	06-Jan-86	13	04-Mar-86	12
24-May-85	156	20-Jul-85	110	15-Sep-85	36	11-Nov-85	23	07-Jan-86	12	05-Mar-86	12
25-May-85	186	21-Jul-85	110	16-Sep-85	35	12-Nov-85	23	08-Jan-86	12	06-Mar-86	12
26-May-85	188	22-Jul-85	110	17-Sep-85	32	13-Nov-85	23	09-Jan-86	12	07-Mar-86	12
27-May-85	203	23-Jul-85	110	18-Sep-85	32	14-Nov-85	23	10-Jan-86	12	08-Mar-86	12
28-May-85	246	24-Jul-85	110	19-Sep-85	33	15-Nov-85	23	11-Jan-86	12	09-Mar-86	12
29-May-85	290	25-Jul-85	110	20-Sep-85	32	16-Nov-85	22	12-Jan-86	12	10-Mar-86	12
30-May-85	285	26-Jul-85	110	21-Sep-85	32	17-Nov-85	22	13-Jan-86	12	11-Mar-86	12
31-May-85	245	27-Jul-85	110	22-Sep-85	35	18-Nov-85	21	14-Jan-86	12	12-Mar-86	12
01-Jun-85	235	28-Jul-85	110	23-Sep-85	33	19-Nov-85	20	15-Jan-86	12	13-Mar-86	12
02-Jun-85	251	29-Jul-85	110	24-Sep-85	33	20-Nov-85	20	16-Jan-86	12	14-Mar-86	12
03-Jun-85	253	30-Jul-85	97	25-Sep-85	33	21-Nov-85	20	17-Jan-86	12	15-Mar-86	12
04-Jun-85	250	31-Jul-85	90	26-Sep-85	32	22-Nov-85	20	18-Jan-86	12	16-Mar-86	12
05-Jun-85	280	01-Aug-85	99	27-Sep-85	35	23-Nov-85	20	19-Jan-86	12	17-Mar-86	12
06-Jun-85	338	02-Aug-85	101	28-Sep-85	37	24-Nov-85	20	20-Jan-86	12	18-Mar-86	12
07-Jun-85	450	03-Aug-85	88	29-Sep-85	35	25-Nov-85	20	21-Jan-86	12	19-Mar-86	12
08-Jun-85	542	04-Aug-85	83	30-Sep-85	32	26-Nov-85	20	22-Jan-86	12	20-Mar-86	12
09-Jun-85	493	05-Aug-85	81	01-Oct-85	32	27-Nov-85	20	23-Jan-86	12	21-Mar-86	12
10-Jun-85	424	06-Aug-85	77	02-Oct-85	33	28-Nov-85	20	24-Jan-86	12	22-Mar-86	12
11-Jun-85	365	07-Aug-85	73	03-Oct-85	34	29-Nov-85	20	25-Jan-86	12	23-Mar-86	12
12-Jun-85	346	08-Aug-85	70	04-Oct-85	34	30-Nov-85	20	26-Jan-86	12	24-Mar-86	12
13-Jun-85	355	09-Aug-85	68	05-Oct-85	32	01-Dec-85	20	27-Jan-86	12	25-Mar-86	12
14-Jun-85	376	10-Aug-85	65	06-Oct-85	32	02-Dec-85	20	28-Jan-86	12	26-Mar-86	13
15-Jun-85	361	11-Aug-85	63	07-Oct-85	37	03-Dec-85	20	29-Jan-86	12	27-Mar-86	14
16-Jun-85	362	12-Aug-85	64	08-Oct-85	37	04-Dec-85	20	30-Jan-86	12	28-Mar-86	15
17-Jun-85	346	13-Aug-85	60	09-Oct-85	35	05-Dec-85	20	31-Jan-86	12	29-Mar-86	16
18-Jun-85	323	14-Aug-85	59	10-Oct-85	36	06-Dec-85	20	01-Feb-86	12	30-Mar-86	17
19-Jun-85	303	15-Aug-85	55	11-Oct-85	40	07-Dec-85	20	02-Feb-86	12	31-Mar-86	19
20-Jun-85	296	16-Aug-85	54	12-Oct-85	37	08-Dec-85	19	03-Feb-86	12	01-Apr-86	20
21-Jun-85	292	17-Aug-85	53	13-Oct-85	36	09-Dec-85	18	04-Feb-86	12	02-Apr-86	20
22-Jun-85	275	18-Aug-85	53	14-Oct-85	34	10-Dec-85	17	05-Feb-86	12	03-Apr-86	20
23-Jun-85	229	19-Aug-85	51	15-Oct-85	31	11-Dec-85	17	06-Feb-86	12	04-Apr-86	20
24-Jun-85	184	20-Aug-85	48	16-Oct-85	32	12-Dec-85	17	07-Feb-86	12	05-Apr-86	20
25-Jun-85	179	21-Aug-85	46	17-Oct-85	32	13-Dec-85	17	08-Feb-86	12	06-Apr-86	20
26-Jun-85	164	22-Aug-85	44	18-Oct-85	32	14-Dec-85	17	09-Feb-86	12	07-Apr-86	20
27-Jun-85	138	23-Aug-85	41	19-Oct-85	30	15-Dec-85	17	10-Feb-86	12	08-Apr-86	20
28-Jun-85	123	24-Aug-85	40	20-Oct-85	30	16-Dec-85	17	11-Feb-86	12	09-Apr-86	20
29-Jun-85	120	25-Aug-85	39	21-Oct-85	30	17-Dec-85	17	12-Feb-86	12	10-Apr-86	20
30-Jun-85	114	26-Aug-85	38	22-Oct-85	29	18-Dec-85	17	13-Feb-86	12	11-Apr-86	20
01-Jul-85	108	27-Aug-85	36	23-Oct-85	28	19-Dec-85	17	14-Feb-86	12	12-Apr-86	20
02-Jul-85	106	28-Aug-85	37	24-Oct-85	29	20-Dec-85	17	15-Feb-86	11	13-Apr-86	20
03-Jul-85	105	29-Aug-85	36	25-Oct-85	29	21-Dec-85	17	16-Feb-86	11	14-Apr-86	20
04-Jul-85	110	30-Aug-85	34	26-Oct-85	29	22-Dec-85	17	17-Feb-86	11	15-Apr-86	20
05-Jul-85	109	31-Aug-85	34	27-Oct-85	28	23-Dec-85	17	18-Feb-86	11	16-Apr-86	20
06-Jul-85	107	01-Sep-85	34	28-Oct-85	28	24-Dec-85	17	19-Feb-86	11	17-Apr-86	20
07-Jul-85	108	02-Sep-85	35	29-Oct-85	28	25-Dec-85	17	20-Feb-86	11	18-Apr-86	20
08-Jul-85	120	03-Sep-85	38	30-Oct-85	28	26-Dec-85	17	21-Feb-86	11	19-Apr-86	20
09-Jul-85	134	04-Sep-85	44	31-Oct-85	28	27-Dec-85	16	22-Feb-86	11	20-Apr-86	20

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
21-Apr-86	20	17-Jun-86	408	13-Aug-86	74	09-Oct-86	34	05-Dec-86	22	31-Jan-87	17
22-Apr-86	27	18-Jun-86	407	14-Aug-86	68	10-Oct-86	33	06-Dec-86	22	01-Feb-87	17
23-Apr-86	25	19-Jun-86	448	15-Aug-86	64	11-Oct-86	33	07-Dec-86	21	02-Feb-87	17
24-Apr-86	28	20-Jun-86	445	16-Aug-86	62	12-Oct-86	32	08-Dec-86	21	03-Feb-87	17
25-Apr-86	30	21-Jun-86	402	17-Aug-86	61	13-Oct-86	32	09-Dec-86	20	04-Feb-87	17
26-Apr-86	33	22-Jun-86	374	18-Aug-86	59	14-Oct-86	33	10-Dec-86	20	05-Feb-87	17
27-Apr-86	32	23-Jun-86	362	19-Aug-86	59	15-Oct-86	33	11-Dec-86	19	06-Feb-87	17
28-Apr-86	31	24-Jun-86	364	20-Aug-86	61	16-Oct-86	32	12-Dec-86	19	07-Feb-87	17
29-Apr-86	30	25-Jun-86	339	21-Aug-86	65	17-Oct-86	32	13-Dec-86	18	08-Feb-87	17
30-Apr-86	29	26-Jun-86	355	22-Aug-86	66	18-Oct-86	30	14-Dec-86	18	09-Feb-87	17
01-May-86	44	27-Jun-86	346	23-Aug-86	71	19-Oct-86	31	15-Dec-86	18	10-Feb-87	17
02-May-86	50	28-Jun-86	335	24-Aug-86	66	20-Oct-86	33	16-Dec-86	17	11-Feb-87	17
03-May-86	56	29-Jun-86	323	25-Aug-86	63	21-Oct-86	31	17-Dec-86	17	12-Feb-87	17
04-May-86	66	30-Jun-86	305	26-Aug-86	63	22-Oct-86	31	18-Dec-86	17	13-Feb-87	17
05-May-86	73	01-Jul-86	284	27-Aug-86	58	23-Oct-86	30	19-Dec-86	17	14-Feb-87	17
06-May-86	66	02-Jul-86	270	28-Aug-86	56	24-Oct-86	30	20-Dec-86	17	15-Feb-87	16
07-May-86	62	03-Jul-86	265	29-Aug-86	61	25-Oct-86	29	21-Dec-86	17	16-Feb-87	15
08-May-86	59	04-Jul-86	285	30-Aug-86	57	26-Oct-86	28	22-Dec-86	17	17-Feb-87	15
09-May-86	52	05-Jul-86	300	31-Aug-86	58	27-Oct-86	28	23-Dec-86	17	18-Feb-87	15
10-May-86	50	06-Jul-86	280	01-Sep-86	58	28-Oct-86	31	24-Dec-86	17	19-Feb-87	15
11-May-86	57	07-Jul-86	273	02-Sep-86	55	29-Oct-86	27	25-Dec-86	17	20-Feb-87	15
12-May-86	66	08-Jul-86	241	03-Sep-86	52	30-Oct-86	28	26-Dec-86	17	21-Feb-87	15
13-May-86	71	09-Jul-86	224	04-Sep-86	50	31-Oct-86	28	27-Dec-86	17	22-Feb-87	15
14-May-86	83	10-Jul-86	218	05-Sep-86	49	01-Nov-86	26	28-Dec-86	17	23-Feb-87	15
15-May-86	73	11-Jul-86	199	06-Sep-86	46	02-Nov-86	27	29-Dec-86	17	24-Feb-87	15
16-May-86	71	12-Jul-86	190	07-Sep-86	50	03-Nov-86	26	30-Dec-86	17	25-Feb-87	15
17-May-86	66	13-Jul-86	186	08-Sep-86	64	04-Nov-86	26	31-Dec-86	17	26-Feb-87	15
18-May-86	70	14-Jul-86	182	09-Sep-86	52	05-Nov-86	26	01-Jan-87	17	27-Feb-87	15
19-May-86	85	15-Jul-86	179	10-Sep-86	55	06-Nov-86	26	02-Jan-87	17	28-Feb-87	15
20-May-86	104	16-Jul-86	174	11-Sep-86	53	07-Nov-86	26	03-Jan-87	17	01-Mar-87	15
21-May-86	128	17-Jul-86	175	12-Sep-86	49	08-Nov-86	26	04-Jan-87	17	02-Mar-87	15
22-May-86	145	18-Jul-86	188	13-Sep-86	47	09-Nov-86	26	05-Jan-87	17	03-Mar-87	15
23-May-86	154	19-Jul-86	179	14-Sep-86	45	10-Nov-86	26	06-Jan-87	17	04-Mar-87	15
24-May-86	148	20-Jul-86	169	15-Sep-86	44	11-Nov-86	26	07-Jan-87	17	05-Mar-87	15
25-May-86	160	21-Jul-86	168	16-Sep-86	43	12-Nov-86	26	08-Jan-87	17	06-Mar-87	15
26-May-86	192	22-Jul-86	165	17-Sep-86	41	13-Nov-86	26	09-Jan-87	17	07-Mar-87	15
27-May-86	207	23-Jul-86	198	18-Sep-86	41	14-Nov-86	26	10-Jan-87	17	08-Mar-87	15
28-May-86	225	24-Jul-86	167	19-Sep-86	41	15-Nov-86	26	11-Jan-87	17	09-Mar-87	15
29-May-86	237	25-Jul-86	154	20-Sep-86	40	16-Nov-86	26	12-Jan-87	17	10-Mar-87	15
30-May-86	224	26-Jul-86	144	21-Sep-86	39	17-Nov-86	26	13-Jan-87	17	11-Mar-87	15
31-May-86	235	27-Jul-86	135	22-Sep-86	39	18-Nov-86	26	14-Jan-87	17	12-Mar-87	15
01-Jun-86	252	28-Jul-86	125	23-Sep-86	39	19-Nov-86	26	15-Jan-87	17	13-Mar-87	15
02-Jun-86	232	29-Jul-86	118	24-Sep-86	41	20-Nov-86	25	16-Jan-87	17	14-Mar-87	15
03-Jun-86	258	30-Jul-86	112	25-Sep-86	41	21-Nov-86	24	17-Jan-87	17	15-Mar-87	14
04-Jun-86	316	31-Jul-86	108	26-Sep-86	42	22-Nov-86	23	18-Jan-87	17	16-Mar-87	13
05-Jun-86	363	01-Aug-86	104	27-Sep-86	40	23-Nov-86	22	19-Jan-87	17	17-Mar-87	13
06-Jun-86	415	02-Aug-86	101	28-Sep-86	41	24-Nov-86	22	20-Jan-87	17	18-Mar-87	13
07-Jun-86	461	03-Aug-86	99	29-Sep-86	43	25-Nov-86	22	21-Jan-87	17	19-Mar-87	13
08-Jun-86	463	04-Aug-86	98	30-Sep-86	42	26-Nov-86	22	22-Jan-87	17	20-Mar-87	13
09-Jun-86	422	05-Aug-86	92	01-Oct-86	38	27-Nov-86	22	23-Jan-87	17	21-Mar-87	13
10-Jun-86	355	06-Aug-86	89	02-Oct-86	36	28-Nov-86	22	24-Jan-87	17	22-Mar-87	13
11-Jun-86	312	07-Aug-86	85	03-Oct-86	39	29-Nov-86	22	25-Jan-87	17	23-Mar-87	14
12-Jun-86	327	08-Aug-86	83	04-Oct-86	38	30-Nov-86	22	26-Jan-87	17	24-Mar-87	15
13-Jun-86	349	09-Aug-86	81	05-Oct-86	37	01-Dec-86	22	27-Jan-87	17	25-Mar-87	15
14-Jun-86	350	10-Aug-86	78	06-Oct-86	37	02-Dec-86	22	28-Jan-87	17	26-Mar-87	15
15-Jun-86	376	11-Aug-86	73	07-Oct-86	37	03-Dec-86	22	29-Jan-87	17	27-Mar-87	15
16-Jun-86	399	12-Aug-86	73	08-Oct-86	35	04-Dec-86	22	30-Jan-87	17	28-Mar-87	15

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
29-Mar-87	15	25-May-87	145	21-Jul-87	59	16-Sep-87	35	12-Nov-87	17	08-Jan-88	11
30-Mar-87	15	26-May-87	136	22-Jul-87	58	17-Sep-87	37	13-Nov-87	17	09-Jan-88	11
31-Mar-87	15	27-May-87	124	23-Jul-87	57	18-Sep-87	33	14-Nov-87	17	10-Jan-88	11
01-Apr-87	15	28-May-87	116	24-Jul-87	54	19-Sep-87	31	15-Nov-87	17	11-Jan-88	11
02-Apr-87	15	29-May-87	114	25-Jul-87	53	20-Sep-87	30	16-Nov-87	17	12-Jan-88	11
03-Apr-87	15	30-May-87	112	26-Jul-87	54	21-Sep-87	29	17-Nov-87	17	13-Jan-88	11
04-Apr-87	15	31-May-87	132	27-Jul-87	54	22-Sep-87	28	18-Nov-87	17	14-Jan-88	11
05-Apr-87	15	01-Jun-87	169	28-Jul-87	78	23-Sep-87	27	19-Nov-87	17	15-Jan-88	11
06-Apr-87	15	02-Jun-87	187	29-Jul-87	69	24-Sep-87	27	20-Nov-87	17	16-Jan-88	11
07-Apr-87	15	03-Jun-87	200	30-Jul-87	69	25-Sep-87	27	21-Nov-87	17	17-Jan-88	11
08-Apr-87	15	04-Jun-87	227	31-Jul-87	87	26-Sep-87	26	22-Nov-87	17	18-Jan-88	11
09-Apr-87	15	05-Jun-87	247	01-Aug-87	68	27-Sep-87	26	23-Nov-87	17	19-Jan-88	11
10-Apr-87	15	06-Jun-87	256	02-Aug-87	66	28-Sep-87	25	24-Nov-87	17	20-Jan-88	11
11-Apr-87	15	07-Jun-87	272	03-Aug-87	65	29-Sep-87	24	25-Nov-87	17	21-Jan-88	11
12-Apr-87	15	08-Jun-87	290	04-Aug-87	66	30-Sep-87	24	26-Nov-87	17	22-Jan-88	11
13-Apr-87	15	09-Jun-87	346	05-Aug-87	62	01-Oct-87	24	27-Nov-87	18	23-Jan-88	11
14-Apr-87	17	10-Jun-87	319	06-Aug-87	61	02-Oct-87	23	28-Nov-87	19	24-Jan-88	11
15-Apr-87	18	11-Jun-87	296	07-Aug-87	64	03-Oct-87	23	29-Nov-87	19	25-Jan-88	11
16-Apr-87	20	12-Jun-87	287	08-Aug-87	60	04-Oct-87	23	30-Nov-87	19	26-Jan-88	11
17-Apr-87	23	13-Jun-87	286	09-Aug-87	56	05-Oct-87	23	01-Dec-87	19	27-Jan-88	10
18-Apr-87	26	14-Jun-87	270	10-Aug-87	56	06-Oct-87	22	02-Dec-87	19	28-Jan-88	9.5
19-Apr-87	29	15-Jun-87	254	11-Aug-87	52	07-Oct-87	22	03-Dec-87	19	29-Jan-88	9
20-Apr-87	27	16-Jun-87	238	12-Aug-87	51	08-Oct-87	22	04-Dec-87	19	30-Jan-88	9
21-Apr-87	25	17-Jun-87	223	13-Aug-87	54	09-Oct-87	22	05-Dec-87	19	31-Jan-88	9
22-Apr-87	29	18-Jun-87	210	14-Aug-87	52	10-Oct-87	21	06-Dec-87	19	01-Feb-88	9
23-Apr-87	32	19-Jun-87	201	15-Aug-87	46	11-Oct-87	21	07-Dec-87	19	02-Feb-88	9
24-Apr-87	35	20-Jun-87	191	16-Aug-87	45	12-Oct-87	20	08-Dec-87	19	03-Feb-88	9
25-Apr-87	40	21-Jun-87	178	17-Aug-87	42	13-Oct-87	21	09-Dec-87	19	04-Feb-88	9
26-Apr-87	45	22-Jun-87	170	18-Aug-87	41	14-Oct-87	20	10-Dec-87	19	05-Feb-88	9
27-Apr-87	50	23-Jun-87	168	19-Aug-87	39	15-Oct-87	20	11-Dec-87	19	06-Feb-88	9
28-Apr-87	54	24-Jun-87	159	20-Aug-87	38	16-Oct-87	19	12-Dec-87	19	07-Feb-88	9
29-Apr-87	60	25-Jun-87	150	21-Aug-87	40	17-Oct-87	18	13-Dec-87	19	08-Feb-88	9
30-Apr-87	82	26-Jun-87	144	22-Aug-87	53	18-Oct-87	17	14-Dec-87	19	09-Feb-88	9
01-May-87	89	27-Jun-87	139	23-Aug-87	59	19-Oct-87	17	15-Dec-87	19	10-Feb-88	9
02-May-87	84	28-Jun-87	134	24-Aug-87	64	20-Oct-87	17	16-Dec-87	19	11-Feb-88	9
03-May-87	65	29-Jun-87	151	25-Aug-87	55	21-Oct-87	17	17-Dec-87	19	12-Feb-88	9
04-May-87	58	30-Jun-87	141	26-Aug-87	51	22-Oct-87	17	18-Dec-87	19	13-Feb-88	9
05-May-87	55	01-Jul-87	129	27-Aug-87	48	23-Oct-87	17	19-Dec-87	19	14-Feb-88	9
06-May-87	59	02-Jul-87	121	28-Aug-87	47	24-Oct-87	17	20-Dec-87	19	15-Feb-88	9
07-May-87	70	03-Jul-87	115	29-Aug-87	46	25-Oct-87	17	21-Dec-87	19	16-Feb-88	10
08-May-87	88	04-Jul-87	109	30-Aug-87	43	26-Oct-87	17	22-Dec-87	19	17-Feb-88	11
09-May-87	113	05-Jul-87	103	31-Aug-87	41	27-Oct-87	17	23-Dec-87	19	18-Feb-88	12
10-May-87	134	06-Jul-87	98	01-Sep-87	39	28-Oct-87	17	24-Dec-87	19	19-Feb-88	12
11-May-87	144	07-Jul-87	92	02-Sep-87	39	29-Oct-87	17	25-Dec-87	19	20-Feb-88	12
12-May-87	146	08-Jul-87	88	03-Sep-87	37	30-Oct-87	17	26-Dec-87	19	21-Feb-88	12
13-May-87	173	09-Jul-87	85	04-Sep-87	38	31-Oct-87	17	27-Dec-87	19	22-Feb-88	12
14-May-87	196	10-Jul-87	82	05-Sep-87	36	01-Nov-87	17	28-Dec-87	18	23-Feb-88	12
15-May-87	220	11-Jul-87	80	06-Sep-87	35	02-Nov-87	17	29-Dec-87	17	24-Feb-88	12
16-May-87	273	12-Jul-87	83	07-Sep-87	35	03-Nov-87	17	30-Dec-87	14	25-Feb-88	12
17-May-87	275	13-Jul-87	80	08-Sep-87	34	04-Nov-87	17	31-Dec-87	13	26-Feb-88	12
18-May-87	249	14-Jul-87	73	09-Sep-87	34	05-Nov-87	17	01-Jan-88	12	27-Feb-88	12
19-May-87	226	15-Jul-87	70	10-Sep-87	32	06-Nov-87	17	02-Jan-88	11	28-Feb-88	12
20-May-87	211	16-Jul-87	68	11-Sep-87	32	07-Nov-87	17	03-Jan-88	11	29-Feb-88	12
21-May-87	188	17-Jul-87	76	12-Sep-87	32	08-Nov-87	17	04-Jan-88	11	01-Mar-88	12
22-May-87	165	18-Jul-87	73	13-Sep-87	31	09-Nov-87	17	05-Jan-88	11	02-Mar-88	12
23-May-87	159	19-Jul-87	64	14-Sep-87	32	10-Nov-87	17	06-Jan-88	11	03-Mar-88	12
24-May-87	159	20-Jul-87	61	15-Sep-87	35	11-Nov-87	17	07-Jan-88	11	04-Mar-88	12

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**

Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
05-Mar-88	12	01-May-88	37	27-Jun-88	302	23-Aug-88	44	19-Oct-88	27	15-Dec-88	16
06-Mar-88	12	02-May-88	31	28-Jun-88	299	24-Aug-88	42	20-Oct-88	28	16-Dec-88	16
07-Mar-88	12	03-May-88	30	29-Jun-88	307	25-Aug-88	41	21-Oct-88	27	17-Dec-88	16
08-Mar-88	12	04-May-88	31	30-Jun-88	249	26-Aug-88	40	22-Oct-88	26	18-Dec-88	16
09-Mar-88	12	05-May-88	36	01-Jul-88	226	27-Aug-88	41	23-Oct-88	25	19-Dec-88	16
10-Mar-88	12	06-May-88	38	02-Jul-88	210	28-Aug-88	41	24-Oct-88	25	20-Dec-88	16
11-Mar-88	12	07-May-88	35	03-Jul-88	195	29-Aug-88	39	25-Oct-88	24	21-Dec-88	16
12-Mar-88	12	08-May-88	33	04-Jul-88	195	30-Aug-88	37	26-Oct-88	24	22-Dec-88	16
13-Mar-88	12	09-May-88	33	05-Jul-88	183	31-Aug-88	35	27-Oct-88	24	23-Dec-88	15
14-Mar-88	12	10-May-88	34	06-Jul-88	171	01-Sep-88	35	28-Oct-88	23	24-Dec-88	15
15-Mar-88	12	11-May-88	37	07-Jul-88	162	02-Sep-88	35	29-Oct-88	23	25-Dec-88	15
16-Mar-88	12	12-May-88	52	08-Jul-88	154	03-Sep-88	33	30-Oct-88	25	26-Dec-88	15
17-Mar-88	12	13-May-88	76	09-Jul-88	144	04-Sep-88	32	31-Oct-88	24	27-Dec-88	15
18-Mar-88	12	14-May-88	99	10-Jul-88	138	05-Sep-88	31	01-Nov-88	25	28-Dec-88	15
19-Mar-88	12	15-May-88	121	11-Jul-88	129	06-Sep-88	31	02-Nov-88	23	29-Dec-88	15
20-Mar-88	12	16-May-88	137	12-Jul-88	120	07-Sep-88	30	03-Nov-88	24	30-Dec-88	14
21-Mar-88	12	17-May-88	148	13-Jul-88	113	08-Sep-88	29	04-Nov-88	21	31-Dec-88	14
22-Mar-88	12	18-May-88	157	14-Jul-88	110	09-Sep-88	28	05-Nov-88	20	01-Jan-89	14
23-Mar-88	12	19-May-88	151	15-Jul-88	104	10-Sep-88	29	06-Nov-88	20	02-Jan-89	14
24-Mar-88	12	20-May-88	121	16-Jul-88	100	11-Sep-88	32	07-Nov-88	20	03-Jan-89	14
25-Mar-88	12	21-May-88	104	17-Jul-88	95	12-Sep-88	37	08-Nov-88	20	04-Jan-89	14
26-Mar-88	13	22-May-88	91	18-Jul-88	91	13-Sep-88	35	09-Nov-88	20	05-Jan-89	14
27-Mar-88	14	23-May-88	88	19-Jul-88	89	14-Sep-88	36	10-Nov-88	20	06-Jan-89	13
28-Mar-88	15	24-May-88	106	20-Jul-88	84	15-Sep-88	33	11-Nov-88	20	07-Jan-89	13
29-Mar-88	16	25-May-88	129	21-Jul-88	79	16-Sep-88	31	12-Nov-88	20	08-Jan-89	13
30-Mar-88	17	26-May-88	148	22-Jul-88	74	17-Sep-88	30	13-Nov-88	18	09-Jan-89	13
31-Mar-88	17	27-May-88	171	23-Jul-88	71	18-Sep-88	29	14-Nov-88	19	10-Jan-89	13
01-Apr-88	17	28-May-88	199	24-Jul-88	68	19-Sep-88	28	15-Nov-88	19	11-Jan-89	13
02-Apr-88	17	29-May-88	234	25-Jul-88	66	20-Sep-88	28	16-Nov-88	19	12-Jan-89	13
03-Apr-88	17	30-May-88	238	26-Jul-88	66	21-Sep-88	28	17-Nov-88	19	13-Jan-89	13
04-Apr-88	17	31-May-88	189	27-Jul-88	64	22-Sep-88	28	18-Nov-88	19	14-Jan-89	13
05-Apr-88	17	01-Jun-88	166	28-Jul-88	67	23-Sep-88	29	19-Nov-88	19	15-Jan-89	13
06-Apr-88	18	02-Jun-88	194	29-Jul-88	67	24-Sep-88	30	20-Nov-88	19	16-Jan-89	12
07-Apr-88	19	03-Jun-88	265	30-Jul-88	65	25-Sep-88	30	21-Nov-88	19	17-Jan-89	12
08-Apr-88	21	04-Jun-88	334	31-Jul-88	68	26-Sep-88	30	22-Nov-88	19	18-Jan-89	12
09-Apr-88	22	05-Jun-88	335	01-Aug-88	69	27-Sep-88	30	23-Nov-88	19	19-Jan-89	12
10-Apr-88	23	06-Jun-88	367	02-Aug-88	60	28-Sep-88	31	24-Nov-88	19	20-Jan-89	12
11-Apr-88	23	07-Jun-88	389	03-Aug-88	63	29-Sep-88	30	25-Nov-88	19	21-Jan-89	12
12-Apr-88	23	08-Jun-88	387	04-Aug-88	57	30-Sep-88	31	26-Nov-88	19	22-Jan-89	12
13-Apr-88	23	09-Jun-88	434	05-Aug-88	58	01-Oct-88	30	27-Nov-88	19	23-Jan-89	12
14-Apr-88	23	10-Jun-88	449	06-Aug-88	94	02-Oct-88	30	28-Nov-88	19	24-Jan-89	12
15-Apr-88	23	11-Jun-88	402	07-Aug-88	70	03-Oct-88	30	29-Nov-88	19	25-Jan-89	12
16-Apr-88	23	12-Jun-88	361	08-Aug-88	64	04-Oct-88	30	30-Nov-88	19	26-Jan-89	12
17-Apr-88	23	13-Jun-88	329	09-Aug-88	59	05-Oct-88	34	01-Dec-88	19	27-Jan-89	11
18-Apr-88	23	14-Jun-88	304	10-Aug-88	55	06-Oct-88	33	02-Dec-88	18	28-Jan-89	11
19-Apr-88	23	15-Jun-88	317	11-Aug-88	53	07-Oct-88	32	03-Dec-88	18	29-Jan-89	11
20-Apr-88	23	16-Jun-88	332	12-Aug-88	54	08-Oct-88	32	04-Dec-88	18	30-Jan-89	11
21-Apr-88	23	17-Jun-88	329	13-Aug-88	50	09-Oct-88	31	05-Dec-88	18	31-Jan-89	11
22-Apr-88	23	18-Jun-88	315	14-Aug-88	47	10-Oct-88	30	06-Dec-88	18	01-Feb-89	11
23-Apr-88	23	19-Jun-88	324	15-Aug-88	45	11-Oct-88	29	07-Dec-88	18	02-Feb-89	11
24-Apr-88	23	20-Jun-88	313	16-Aug-88	48	12-Oct-88	29	08-Dec-88	17	03-Feb-89	11
25-Apr-88	23	21-Jun-88	312	17-Aug-88	55	13-Oct-88	28	09-Dec-88	17	04-Feb-89	11
26-Apr-88	23	22-Jun-88	320	18-Aug-88	52	14-Oct-88	28	10-Dec-88	17	05-Feb-89	11
27-Apr-88	23	23-Jun-88	295	19-Aug-88	47	15-Oct-88	27	11-Dec-88	17	06-Feb-89	11
28-Apr-88	23	24-Jun-88	289	20-Aug-88	46	16-Oct-88	27	12-Dec-88	17	07-Feb-89	11
29-Apr-88	25	25-Jun-88	279	21-Aug-88	49	17-Oct-88	27	13-Dec-88	17	08-Feb-89	11
30-Apr-88	34	26-Jun-88	305	22-Aug-88	51	18-Oct-88	27	14-Dec-88	16	09-Feb-89	11

**Table 4.** Daily discharge values at Snake River near Montezuma, Colorado

Water years 1980 to 1990. USGS station number 09047500; discharge ( $Q$ ) values in cubic feet per second (cfs).

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
10-Feb-89	11	08-Apr-89	16	04-Jun-89	239	31-Jul-89	123	26-Sep-89	33	22-Nov-89	18
11-Feb-89	11	09-Apr-89	17	05-Jun-89	229	01-Aug-89	111	27-Sep-89	33	23-Nov-89	17
12-Feb-89	11	10-Apr-89	19	06-Jun-89	231	02-Aug-89	111	28-Sep-89	32	24-Nov-89	16
13-Feb-89	11	11-Apr-89	18	07-Jun-89	218	03-Aug-89	97	29-Sep-89	31	25-Nov-89	16
14-Feb-89	11	12-Apr-89	17	08-Jun-89	229	04-Aug-89	89	30-Sep-89	30	26-Nov-89	16
15-Feb-89	11	13-Apr-89	16	09-Jun-89	221	05-Aug-89	83	01-Oct-89	30	27-Nov-89	16
16-Feb-89	11	14-Apr-89	16	10-Jun-89	209	06-Aug-89	78	02-Oct-89	30	28-Nov-89	16
17-Feb-89	10	15-Apr-89	17	11-Jun-89	223	07-Aug-89	73	03-Oct-89	29	29-Nov-89	16
18-Feb-89	10	16-Apr-89	18	12-Jun-89	252	08-Aug-89	68	04-Oct-89	30	30-Nov-89	16
19-Feb-89	10	17-Apr-89	19	13-Jun-89	225	09-Aug-89	66	05-Oct-89	29	01-Dec-89	16
20-Feb-89	10	18-Apr-89	20	14-Jun-89	218	10-Aug-89	66	06-Oct-89	28	02-Dec-89	16
21-Feb-89	10	19-Apr-89	22	15-Jun-89	234	11-Aug-89	78	07-Oct-89	28	03-Dec-89	16
22-Feb-89	10	20-Apr-89	26	16-Jun-89	276	12-Aug-89	78	08-Oct-89	27	04-Dec-89	16
23-Feb-89	10	21-Apr-89	32	17-Jun-89	291	13-Aug-89	74	09-Oct-89	27	05-Dec-89	16
24-Feb-89	10	22-Apr-89	38	18-Jun-89	268	14-Aug-89	67	10-Oct-89	26	06-Dec-89	16
25-Feb-89	11	23-Apr-89	47	19-Jun-89	282	15-Aug-89	62	11-Oct-89	26	07-Dec-89	16
26-Feb-89	11	24-Apr-89	56	20-Jun-89	268	16-Aug-89	60	12-Oct-89	25	08-Dec-89	16
27-Feb-89	11	25-Apr-89	67	21-Jun-89	253	17-Aug-89	58	13-Oct-89	25	09-Dec-89	16
28-Feb-89	11	26-Apr-89	66	22-Jun-89	216	18-Aug-89	56	14-Oct-89	24	10-Dec-89	16
01-Mar-89	11	27-Apr-89	59	23-Jun-89	194	19-Aug-89	55	15-Oct-89	25	11-Dec-89	16
02-Mar-89	11	28-Apr-89	50	24-Jun-89	179	20-Aug-89	55	16-Oct-89	27	12-Dec-89	16
03-Mar-89	11	29-Apr-89	44	25-Jun-89	178	21-Aug-89	51	17-Oct-89	26	13-Dec-89	16
04-Mar-89	11	30-Apr-89	41	26-Jun-89	176	22-Aug-89	49	18-Oct-89	24	14-Dec-89	16
05-Mar-89	11	01-May-89	41	27-Jun-89	164	23-Aug-89	47	19-Oct-89	28	15-Dec-89	16
06-Mar-89	11	02-May-89	38	28-Jun-89	163	24-Aug-89	45	20-Oct-89	25	16-Dec-89	16
07-Mar-89	11	03-May-89	36	29-Jun-89	164	25-Aug-89	44	21-Oct-89	26	17-Dec-89	16
08-Mar-89	11	04-May-89	34	30-Jun-89	162	26-Aug-89	42	22-Oct-89	27	18-Dec-89	16
09-Mar-89	11	05-May-89	35	01-Jul-89	160	27-Aug-89	40	23-Oct-89	25	19-Dec-89	16
10-Mar-89	11	06-May-89	43	02-Jul-89	154	28-Aug-89	39	24-Oct-89	25	20-Dec-89	16
11-Mar-89	11	07-May-89	55	03-Jul-89	148	29-Aug-89	38	25-Oct-89	24	21-Dec-89	16
12-Mar-89	11	08-May-89	72	04-Jul-89	140	30-Aug-89	39	26-Oct-89	25	22-Dec-89	16
13-Mar-89	11	09-May-89	84	05-Jul-89	138	31-Aug-89	38	27-Oct-89	24	23-Dec-89	16
14-Mar-89	11	10-May-89	98	06-Jul-89	139	01-Sep-89	36	28-Oct-89	22	24-Dec-89	16
15-Mar-89	12	11-May-89	102	07-Jul-89	129	02-Sep-89	35	29-Oct-89	19	25-Dec-89	16
16-Mar-89	12	12-May-89	103	08-Jul-89	122	03-Sep-89	34	30-Oct-89	19	26-Dec-89	16
17-Mar-89	12	13-May-89	99	09-Jul-89	113	04-Sep-89	34	31-Oct-89	19	27-Dec-89	13
18-Mar-89	12	14-May-89	90	10-Jul-89	111	05-Sep-89	34	01-Nov-89	19	28-Dec-89	13
19-Mar-89	12	15-May-89	81	11-Jul-89	114	06-Sep-89	34	02-Nov-89	19	29-Dec-89	13
20-Mar-89	12	16-May-89	78	12-Jul-89	172	07-Sep-89	33	03-Nov-89	19	30-Dec-89	13
21-Mar-89	12	17-May-89	74	13-Jul-89	155	08-Sep-89	37	04-Nov-89	19	31-Dec-89	13
22-Mar-89	12	18-May-89	81	14-Jul-89	125	09-Sep-89	37	05-Nov-89	19	01-Jan-90	13
23-Mar-89	12	19-May-89	106	15-Jul-89	112	10-Sep-89	36	06-Nov-89	19	02-Jan-90	13
24-Mar-89	13	20-May-89	134	16-Jul-89	102	11-Sep-89	36	07-Nov-89	19	03-Jan-90	13
25-Mar-89	13	21-May-89	161	17-Jul-89	95	12-Sep-89	40	08-Nov-89	19	04-Jan-90	12
26-Mar-89	13	22-May-89	177	18-Jul-89	89	13-Sep-89	44	09-Nov-89	19	05-Jan-90	12
27-Mar-89	13	23-May-89	232	19-Jul-89	85	14-Sep-89	43	10-Nov-89	19	06-Jan-90	12
28-Mar-89	13	24-May-89	256	20-Jul-89	81	15-Sep-89	43	11-Nov-89	19	07-Jan-90	12
29-Mar-89	13	25-May-89	246	21-Jul-89	79	16-Sep-89	40	12-Nov-89	19	08-Jan-90	12
30-Mar-89	13	26-May-89	208	22-Jul-89	78	17-Sep-89	38	13-Nov-89	19	09-Jan-90	12
31-Mar-89	13	27-May-89	227	23-Jul-89	93	18-Sep-89	37	14-Nov-89	19	10-Jan-90	12
01-Apr-89	14	28-May-89	277	24-Jul-89	95	19-Sep-89	36	15-Nov-89	19	11-Jan-90	12
02-Apr-89	14	29-May-89	330	25-Jul-89	139	20-Sep-89	41	16-Nov-89	19	12-Jan-90	12
03-Apr-89	14	30-May-89	342	26-Jul-89	145	21-Sep-89	39	17-Nov-89	19	13-Jan-90	12
04-Apr-89	14	31-May-89	321	27-Jul-89	111	22-Sep-89	37	18-Nov-89	19	14-Jan-90	12
05-Apr-89	14	01-Jun-89	312	28-Jul-89	105	23-Sep-89	35	19-Nov-89	19	15-Jan-90	12
06-Apr-89	15	02-Jun-89	301	29-Jul-89	128	24-Sep-89	34	20-Nov-89	19	16-Jan-90	12
07-Apr-89	15	03-Jun-89	279	30-Jul-89	147	25-Sep-89	34	21-Nov-89	19	17-Jan-90	12

**Table 4. Daily discharge values at Snake River near Montezuma, Colorado**  
*Water years 1980 to 1990. USGS station number 09047500; discharge (Q) values in cubic feet per second (cfs).*

Date	Q	Date	Q	Date	Q	Date	Q	Date	Q
18-Jan-90	12	16-Mar-90	13	12-May-90	28	08-Jul-90	176	03-Sep-90	39
19-Jan-90	12	17-Mar-90	13	13-May-90	28	09-Jul-90	168	04-Sep-90	34
20-Jan-90	12	18-Mar-90	13	14-May-90	33	10-Jul-90	151	05-Sep-90	35
21-Jan-90	12	19-Mar-90	13	15-May-90	38	11-Jul-90	140	06-Sep-90	37
22-Jan-90	12	20-Mar-90	13	16-May-90	32	12-Jul-90	129	07-Sep-90	35
23-Jan-90	12	21-Mar-90	13	17-May-90	30	13-Jul-90	120	08-Sep-90	35
24-Jan-90	12	22-Mar-90	13	18-May-90	36	14-Jul-90	124	09-Sep-90	33
25-Jan-90	12	23-Mar-90	13	19-May-90	39	15-Jul-90	117	10-Sep-90	33
26-Jan-90	12	24-Mar-90	13	20-May-90	44	16-Jul-90	112	11-Sep-90	31
27-Jan-90	12	25-Mar-90	13	21-May-90	51	17-Jul-90	104	12-Sep-90	30
28-Jan-90	12	26-Mar-90	13	22-May-90	68	18-Jul-90	99	13-Sep-90	29
29-Jan-90	12	27-Mar-90	13	23-May-90	88	19-Jul-90	94	14-Sep-90	28
30-Jan-90	12	28-Mar-90	13	24-May-90	121	20-Jul-90	91	15-Sep-90	28
31-Jan-90	12	29-Mar-90	13	25-May-90	143	21-Jul-90	93	16-Sep-90	30
01-Feb-90	12	30-Mar-90	13	26-May-90	149	22-Jul-90	85	17-Sep-90	40
02-Feb-90	12	31-Mar-90	13	27-May-90	146	23-Jul-90	80	18-Sep-90	36
03-Feb-90	11	01-Apr-90	13	28-May-90	179	24-Jul-90	75	19-Sep-90	43
04-Feb-90	11	02-Apr-90	13	29-May-90	198	25-Jul-90	77	20-Sep-90	36
05-Feb-90	11	03-Apr-90	12	30-May-90	150	26-Jul-90	69	21-Sep-90	34
06-Feb-90	11	04-Apr-90	12	31-May-90	168	27-Jul-90	65	22-Sep-90	33
07-Feb-90	11	05-Apr-90	12	01-Jun-90	176	28-Jul-90	62	23-Sep-90	32
08-Feb-90	11	06-Apr-90	12	02-Jun-90	161	29-Jul-90	60	24-Sep-90	32
09-Feb-90	11	07-Apr-90	12	03-Jun-90	184	30-Jul-90	59	25-Sep-90	33
10-Feb-90	10	08-Apr-90	12	04-Jun-90	278	31-Jul-90	57	26-Sep-90	41
11-Feb-90	10	09-Apr-90	12	05-Jun-90	364	01-Aug-90	57	27-Sep-90	34
12-Feb-90	10	10-Apr-90	12	06-Jun-90	396	02-Aug-90	57	28-Sep-90	42
13-Feb-90	10	11-Apr-90	12	07-Jun-90	425	03-Aug-90	54	29-Sep-90	42
14-Feb-90	10	12-Apr-90	12	08-Jun-90	443	04-Aug-90	52	30-Sep-90	38
15-Feb-90	10	13-Apr-90	12	09-Jun-90	426	05-Aug-90	49		
16-Feb-90	10	14-Apr-90	13	10-Jun-90	432	06-Aug-90	47		
17-Feb-90	9.4	15-Apr-90	17	11-Jun-90	457	07-Aug-90	44		
18-Feb-90	9	16-Apr-90	17	12-Jun-90	401	08-Aug-90	42		
19-Feb-90	9	17-Apr-90	18	13-Jun-90	358	09-Aug-90	41		
20-Feb-90	9	18-Apr-90	19	14-Jun-90	367	10-Aug-90	40		
21-Feb-90	9	19-Apr-90	20	15-Jun-90	344	11-Aug-90	39		
22-Feb-90	9	20-Apr-90	20	16-Jun-90	321	12-Aug-90	41		
23-Feb-90	8.8	21-Apr-90	23	17-Jun-90	296	13-Aug-90	40		
24-Feb-90	8.4	22-Apr-90	25	18-Jun-90	297	14-Aug-90	42		
25-Feb-90	8	23-Apr-90	28	19-Jun-90	292	15-Aug-90	57		
26-Feb-90	7.8	24-Apr-90	27	20-Jun-90	280	16-Aug-90	64		
27-Feb-90	6.4	25-Apr-90	24	21-Jun-90	266	17-Aug-90	52		
28-Feb-90	8	26-Apr-90	21	22-Jun-90	254	18-Aug-90	52		
01-Mar-90	8.4	27-Apr-90	22	23-Jun-90	251	19-Aug-90	53		
02-Mar-90	8.4	28-Apr-90	19	24-Jun-90	241	20-Aug-90	48		
03-Mar-90	8.4	29-Apr-90	20	25-Jun-90	227	21-Aug-90	47		
04-Mar-90	8.4	30-Apr-90	20	26-Jun-90	211	22-Aug-90	51		
05-Mar-90	8.8	01-May-90	20	27-Jun-90	202	23-Aug-90	46		
06-Mar-90	9.4	02-May-90	19	28-Jun-90	194	24-Aug-90	44		
07-Mar-90	10	03-May-90	19	29-Jun-90	183	25-Aug-90	41		
08-Mar-90	11	04-May-90	19	30-Jun-90	170	26-Aug-90	39		
09-Mar-90	12	05-May-90	19	01-Jul-90	160	27-Aug-90	37		
10-Mar-90	13	06-May-90	24	02-Jul-90	152	28-Aug-90	36		
11-Mar-90	13	07-May-90	31	03-Jul-90	154	29-Aug-90	34		
12-Mar-90	13	08-May-90	30	04-Jul-90	166	30-Aug-90	33		
13-Mar-90	13	09-May-90	27	05-Jul-90	170	31-Aug-90	34		
14-Mar-90	13	10-May-90	28	06-Jul-90	153	01-Sep-90	36		
15-Mar-90	13	11-May-90	31	07-Jul-90	150	02-Sep-90	43		

**Table 5. Peak discharge values at Snake River near Montezuma, CO***USGS station number 09047500; discharge values in cubic feet per second (cfs).**\* annual maximum value from USGS daily average streamflow values, which are tabulated in Table 3.**\*\* annual maximum instantaneous streamflow value.*

Year	peak (daily average)*		peak (instantaneous)**	
	date	discharge	date	discharge
1980	12-Jun	576	11-Jun	680
1981	09-Jun	247	07-Jun	326
1982	29-Jun	454	28-Jun	515
1983	20-Jun	622	21-Jun	760
1984	15-Jun	444	15-Jun	543
1985	08-Jun	542	08-Jun	700
1986	08-Jun	463	19-Jun	607
1987	10-Jun	346	09-Jun	388
1988	10-Jun	449	09-Jun	555
1989	30-May	342	29-May	409
1990	11-Jun	443	08-Jun	572

**Table 6.** Deer Creek at DC5 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
23-Oct-79	22											
27-Dec-79	15		1.30		14.550	2.565	0.056					
21-Feb-80	12	6.93	0.40		11.930	2.034	0.043	0.720		0.280	15.290	
10-Apr-80	12											
14-Apr-80	12	7.60	0.50		14.310	2.556	0.055	0.200		0.100	16.000	
16-Apr-80	12	7.6						0.200		0.100		
04-May-80	26	6.90	1.30		12.500	2.538	0.053	0.900		0.120	13.750	
05-May-80	32											
19-May-80	37	6.70	1.90		7.123	1.140	0.025	0.300		0.100	17.000	
01-Jun-80	191		2.70		10.630	1.589	0.037	0.720		0.140	9.450	
06-Jun-80	357	6.50	3.20		12.700	2.377	0.049	0.480		0.170	5.850	
27-Jun-80	360	7.10	1.70		6.338	1.054	0.023	0.870		0.300	4.250	
10-Jul-80	202	7.10	1.30		6.269	1.125	0.023	0.380		0.140	4.900	
04-Aug-80	64	7.30	0.80		8.205	1.528	0.033	0.240		0.120	7.090	
18-Aug-80	43	7.45	0.90		9.650	1.610	0.035	0.400		0.110	8.370	
18-Sep-80	30	7.30	0.60		10.630	1.790	0.039	0.880		0.160	10.430	
21-Oct-80	23	7.43	0.70					0.337	0.006	0.050	11.706	
18-Dec-80	15	7.32	0.40					0.364	0.041	0.058	15.043	
10-Jan-81	13	7.10	0.50		13.310	2.650	0.055	0.329	0.020	0.052	15.535	
25-Mar-81	10	7.61	0.50		13.870	2.860	0.058	0.219	0.043	0.048	16.835	
17-Apr-81	18	7.70	2.30		13.790	2.750	0.057	0.403	0.120	0.163	13.153	
04-May-81	63	7.41	3.60		9.890	1.780	0.039	1.316	0.006	0.055	10.439	
15-May-81	38	7.53	2.20		10.970	2.070	0.045	0.272	0.006	0.037	11.184	
01-Jun-81	154	7.51	3.00		7.310	1.370	0.029	0.417	0.038	0.035	6.392	
17-Jun-81	106	7.45	1.40		7.470	1.640	0.031	0.229	0.048	0.040	6.889	
23-Jun-81	88	7.33	1.20		7.230	1.580	0.030	0.195	0.006	0.038	6.087	
07-Jul-81	66	7.60	1.10		8.150	1.710	0.034	0.181	0.033	0.053	6.870	
22-Jul-81	51	7.57	1.30					0.272	0.500	0.060	9.582	
06-Aug-81	34	8.00	0.90					0.242	0.025	0.061	10.505	
20-Aug-81	40							1.260	0.006	0.055	11.107	
02-Jan-82	12	7.36	0.70	1.719	15.040	2.206	0.053	0.238	0.008	0.000	13.400	
13-May-82	37	6.98	1.70	1.751	14.940	2.160	0.058	0.549	0.000	0.045	15.566	
25-May-82	68	7.24	2.20	1.600	12.340	1.837	0.052	0.270	0.000	0.046	14.884	
28-May-82	101		2.90	1.600	11.940	1.762	0.052	0.237	0.000	0.049	13.248	
01-Jun-82	164	7.68		1.133	10.710	1.570	0.043	0.654	0.413	0.069	11.509	
04-Jun-82	165	6.65	3.50	1.183	10.310	1.520	0.044	0.165	0.008	0.038	9.368	
07-Jun-82	232	6.95	3.30	1.123	9.327	1.418	0.038					
10-Jun-82	278	6.80	3.10	1.170	9.078	1.416	0.038	0.475	0.000	0.044	9.276	
13-Jun-82	310	7.10	3.00	1.144	7.807	1.231	0.032	0.457	0.021	0.039	6.910	
16-Jun-82	316	6.70	2.80	1.200	8.782	1.509	0.035	0.527	0.230	0.057	8.068	
19-Jun-82	284	6.45	3.70	0.975	8.053	1.283	0.032	0.238	0.035	0.036	7.270	
22-Jun-82	359	6.60	4.00	1.019	7.341	1.183	0.029	0.222	0.000	0.027	5.725	
25-Jun-82	396	6.45	2.80	1.015	7.234	1.198	0.027	0.320	0.000	0.067	6.210	
28-Jun-82	440	6.60	2.20	0.848	5.997	0.985	0.026	0.283	0.000	0.034	5.534	
01-Jul-82	438	6.25	2.10	0.883	6.339	1.051	0.026	0.396	0.061	0.037	6.100	
04-Jul-82	376	6.55	2.00	1.039	6.132	1.023	0.025	0.349	0.000	0.035	5.219	
08-Jul-82	261	6.20	1.90	0.977	7.010	1.172	0.029	0.315	0.000	0.037	5.876	
12-Jul-82	242	6.70	1.50	0.942	6.471	1.089	0.027	0.265	0.000	0.030	4.951	

**Table 6.** Deer Creek at DC5 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
23-Oct-79												
27-Dec-79			0.040	0.020	0.075	0.009	0.001		0.009			0.011
21-Feb-80	16.500		0.038	0.025	0.200	0.003	0.016		0.002			0.006
10-Apr-80												
14-Apr-80			0.080	0.027	0.055	0.008	0.001		0.007			0.030
16-Apr-80												
04-May-80	1.040		0.031	0.022	0.070	0.005	0.001		0.002			0.006
05-May-80												
19-May-80			0.058	0.011	0.048	0.008	0.000		0.004			0.014
01-Jun-80	0.036		0.049	0.014	0.055	0.010	0.001		0.003			0.008
06-Jun-80	1.530		0.052	0.024	0.105	0.014	0.005		0.016			0.019
27-Jun-80	0.420		0.044	0.011	0.028	0.003	0.001		0.003			0.010
10-Jul-80	0.030		0.033	0.011	0.033	0.004	0.000		0.002			0.006
04-Aug-80	0.190		0.038	0.013	0.037	0.005	0.000		0.000			0.003
18-Aug-80	0.130		0.033	0.013	0.051	0.005	0.000		0.002			0.006
18-Sep-80	0.010		0.037	0.014	0.064	0.005	0.000		0.002			0.007
21-Oct-80	0.718	0.000										
18-Dec-80	2.721	0.000										
10-Jan-81	1.454	0.000	0.026	0.018	0.061	0.019	0.000		0.001			0.021
25-Mar-81	0.000	0.053	0.021	0.017	0.063	0.012	0.000		0.000			0.011
17-Apr-81	0.000	0.000	0.035	0.020	0.110	0.017	0.001		0.002			0.013
04-May-81	2.128	0.010	0.086	0.017	0.212	0.032	0.000		0.006			0.011
15-May-81	0.000	0.000	0.070	0.015	0.136	0.019	0.000		0.003			0.016
01-Jun-81	0.000	0.000	0.107	0.014	0.194	0.026	0.000		0.001			0.014
17-Jun-81	0.356	0.000	0.069	0.013	0.113	0.011	0.000		0.002			0.006
23-Jun-81	0.000	0.000	0.065	0.013	0.093	0.008	0.000		0.001			0.006
07-Jul-81	0.000	0.000	0.064	0.014	0.105	0.016	0.000		0.003			0.009
22-Jul-81	0.000	0.097										
06-Aug-81	0.026	0.000										
20-Aug-81	1.228	0.000										
02-Jan-82	1.264	0.000	0.000	0.018	0.078	0.014	0.000		0.003			0.009
13-May-82	0.000	0.000	0.032	0.020	0.144	0.055	0.000		0.004			0.092
25-May-82	0.562	0.000	0.000	0.018	0.108	0.047	0.000		0.005			0.047
28-May-82	0.392	0.000	0.000	0.017	0.081	0.043	0.000		0.007			0.042
01-Jun-82	0.000	0.363	0.000	0.016	0.108	0.041	0.000		0.004			0.036
04-Jun-82	0.611	0.000	0.064	0.016	0.161	0.032	0.001		0.007			0.046
07-Jun-82			0.024	0.014	0.074	0.028	0.000		0.006			0.031
10-Jun-82	0.000	0.000	0.031	0.015	0.102	0.037	0.000		0.008			0.093
13-Jun-82	0.000	0.000	0.090	0.014	0.169	0.027	0.000		0.004			0.028
16-Jun-82	0.727	0.090	0.398	0.017		0.049	0.000		0.007			0.058
19-Jun-82	0.781	0.000	0.042	0.014	0.104	0.033	0.000		0.006			0.027
22-Jun-82	0.678	0.000	0.017	0.013	0.068	0.015	0.000		0.003			0.016
25-Jun-82	0.640	0.000	0.065	0.013	0.148	0.022	0.000		0.013			0.047
28-Jun-82	0.396	0.000	0.010	0.012	0.059	0.015	0.000		0.003			0.033
01-Jul-82	17.168	0.000	0.021	0.012	0.078	0.017	0.000		0.004			0.020
04-Jul-82	0.000	0.000	0.078	0.012	0.103	0.026	0.003		0.004			0.025
08-Jul-82	2.001	0.000	0.013	0.015	0.084	0.040	0.000		0.004			0.030
12-Jul-82	0.290	0.000	0.000	0.012	0.051	0.013	0.000		0.002			0.021

**Table 6.** Deer Creek at DC5 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
16-Jul-82	206	6.65	1.60	1.173	7.150	1.225	0.029	0.790	0.019	0.053	6.074	
20-Jul-82	173	6.95	1.60	1.306	7.068	2.340	0.029	0.802	0.122	0.055	5.288	
24-Jul-82	152	6.45	3.10	1.378	6.969	2.460	0.027	0.270	0.000	0.035	4.695	
28-Jul-82	182	6.60	2.40	1.381	7.070	1.193	0.028	0.196	0.000	0.033	5.396	
01-Aug-82	135	6.60	1.20	1.440	7.202	1.203	0.031	0.389	0.028	0.038	6.330	
05-Aug-82	116	6.75	0.90	1.467	7.364	1.231	0.033	0.185	0.000	0.042	5.402	
09-Aug-82	93	6.60	1.00	1.545	7.468	1.291	0.033	0.145	0.147	0.034	5.701	
15-Aug-82	100	6.80	1.45	1.538	7.680	1.273	0.038	0.509	0.374	0.063	7.055	
21-Aug-82	114	6.90	1.55	1.689	7.704	1.522	0.041	0.250		0.050		
28-Aug-82	77	6.95	1.45	1.831	8.661	1.708	0.040	0.320		0.060		
04-Sep-82	57	6.75	1.35	1.437	10.200	1.722	0.039	0.330		0.060		
12-Sep-82	68	7.40	3.80	1.300	10.440	1.707	0.040	1.540		0.090		
19-Sep-82	56	6.10	1.70	1.140	8.892	1.473	0.051	4.090		0.130		
26-Sep-82	52	6.90	2.50	1.251	9.286	1.556	0.038	0.540		0.070		
03-Oct-82	46	6.90	1.30	1.230	9.551	1.594	0.040	0.250		0.040		
10-Oct-82	46	6.80	1.00	1.220	9.362	1.570	0.043	0.380		0.050		
18-Oct-82	43	6.85		2.068	11.250	1.962	0.045	0.620		0.090		
25-Oct-82	38	6.75		2.208	11.210	1.958	0.047	0.520		0.070		
08-Nov-82	25	6.85		2.062	11.730	2.055	0.027	0.310		0.050		
27-Nov-82	25	6.55		2.457	11.390	1.999	0.025	0.590		0.050		
28-Dec-82	20	6.80		1.343	13.090	2.255	0.007	0.280		0.000	21.840	
31-Jan-83	15	6.40		2.146	13.420	2.289	0.009	0.380		0.060		
27-Feb-83	13	6.75		1.439	13.970	2.365	0.010	0.210		0.050		
31-Mar-83	13	6.50		1.524	14.690	2.508	0.013	0.390		0.060		
21-Apr-83	14	6.50		1.570	14.290	2.437	0.012					
06-May-83	15	6.35		1.579	15.050	2.393	0.013	0.630		0.050		
20-May-83	17	6.85		1.829	15.370	2.515	0.016	0.000		0.000		
01-Jun-83	119			1.161	9.843	1.570	0.000	0.500		0.030		
07-Jun-83	136			1.165	10.620	1.677	0.000	0.760		0.040		
16-Jun-83	284			1.326	5.553	0.934	0.000	2.470		0.000	6.900	
23-Jun-83	523	6.40						0.388		0.034	4.840	
30-Jun-83	422	6.55						0.222		0.035	5.510	
06-Jul-83	339	6.80						0.209		0.035	5.160	
13-Jul-83	254											
14-Jul-83	239	6.75						0.153		0.042	6.400	
21-Jul-83	177	6.95						0.148		0.039	7.020	
28-Jul-83	148	6.90										
04-Aug-83	110											
13-Aug-83	87	7.15		1.218	8.891	1.614	0.000	0.515		0.047	8.170	
20-Aug-83	81	7.20		1.015	9.281	1.568	0.000	0.432		0.047	8.790	
31-Aug-83	111	7.20		2.144	10.120	1.734	0.000	0.342		0.052	10.740	
07-Sep-83	69	7.20		1.423	10.380	1.772	0.000	0.157		0.052	10.980	
15-Sep-83	54	7.25		1.174	10.570	1.804	0.000	0.293		0.058	12.210	
22-Sep-83	42	7.30		1.791	10.650	1.835	0.000			0.056	11.940	
29-Sep-83	35							0.265		0.058	12.140	
05-Oct-83	36	8.20		1.259	10.720	1.833	0.000			0.058	12.530	
12-Oct-83	33	8.00		2.439	11.160	1.954	0.025	0.393		0.056	13.140	
19-Oct-83	33	7.50		2.663	11.280	2.032	0.026	0.251		0.060	14.020	

**Table 6.** Deer Creek at DC5 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
16-Jul-82	0.576	0.000	0.000	0.012	0.066	0.012	0.000		0.003			0.008
20-Jul-82	0.000	0.000	0.010	0.012	0.061	0.013	0.000		0.003			0.013
24-Jul-82	0.008	0.000	0.001	0.012	0.075	0.027	0.001		0.003			0.015
28-Jul-82	0.000	0.000	0.000	0.012	0.049	0.015	0.000		0.002			0.007
01-Aug-82	0.000	0.000	0.000	0.013	0.084	0.017	0.000		0.002			0.012
05-Aug-82	0.007	0.000	0.000	0.014	0.120	0.016	0.000		0.003			0.010
09-Aug-82	0.000	0.000	0.043	0.015	0.167	0.035	0.000		0.005			0.016
15-Aug-82	0.000	0.286	0.085	0.016	0.256	0.046	0.000		0.006			0.018
21-Aug-82	0.490		0.281	0.021	0.400		0.000		0.006			0.061
28-Aug-82	0.710		0.040	0.017	0.183		0.001		0.003			0.095
04-Sep-82	0.700		0.059	0.016	0.349	0.039	0.001		0.011			0.025
12-Sep-82	0.720		0.000	0.015	0.102	0.030	0.000		0.002			0.015
19-Sep-82	0.880		0.021	0.024			0.001		0.009			0.204
26-Sep-82	0.820		0.031	0.014	0.156	0.036	0.000		0.002			0.014
03-Oct-82	1.630		0.000	0.014	0.073	0.024	0.000		0.004			0.015
10-Oct-82	1.110		0.000	0.016	0.122	0.037	0.000		0.005			0.023
18-Oct-82	1.040		0.000	0.015	0.067	0.017	0.000		0.002			0.011
25-Oct-82	1.150		0.000	0.015	0.075	0.017	0.000		0.004			0.016
08-Nov-82	1.340		0.109	0.011	0.055	0.010	0.000		0.000	0.013		0.020
27-Nov-82	1.340		0.135	0.010	0.045	0.006	0.000		0.000	0.000		0.047
28-Dec-82	1.220		0.139	0.003	0.238	0.036	0.000		0.000	0.000		0.015
31-Jan-83	2.150		0.015	0.003	0.101	0.023	0.000		0.000	0.034		0.008
27-Feb-83	1.070		0.038	0.001	0.047	0.011	0.000		0.000	0.031		0.017
31-Mar-83	2.250		0.042	0.002	0.030	0.012	0.000		0.000	0.021		0.015
21-Apr-83			0.004	0.003	0.010	0.008	0.000		0.000	0.000		0.003
06-May-83	1.070		0.021	0.003	0.125	0.024	0.000		0.000	0.032		0.032
20-May-83	0.000		0.039	0.005	0.064	0.007	0.000		0.000	0.041		0.028
01-Jun-83	1.320		0.067	0.002	0.124	0.010	0.000		0.000	0.000		0.014
07-Jun-83	1.320		0.062	0.002	0.046	0.001	0.000		0.000	0.000		0.047
16-Jun-83	1.380		0.152	0.000	0.178	0.011	0.000		0.000	0.023		0.023
23-Jun-83												
30-Jun-83												
06-Jul-83												
13-Jul-83												
14-Jul-83												
21-Jul-83												
28-Jul-83												
04-Aug-83												
13-Aug-83			0.073	0.000	0.101	0.014	0.000		0.000	0.000		0.169
20-Aug-83			0.060	0.000	0.066	0.003	0.000		0.000	0.020		0.011
31-Aug-83			0.032	0.001	0.082	0.012	0.000		0.000	0.000		0.014
07-Sep-83			0.086	0.000	0.098	0.021	0.000		0.000	0.022		0.051
15-Sep-83			0.090	0.000	0.085	0.030	0.000		0.000	0.000		0.025
22-Sep-83			0.112	0.003	0.060	0.006	0.000		0.000	0.030		0.012
29-Sep-83												
05-Oct-83			0.076	0.000	0.020	0.004	0.000		0.000	0.029		0.005
12-Oct-83			0.152	0.013	0.049	0.002	0.000		0.000	0.000		0.013
19-Oct-83			0.254	0.010	0.057	0.020	0.000		0.000	0.000		0.021

**Table 6.** Deer Creek at DC5 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Oct-83	29	6.95		2.760	11.410	2.044	0.026	0.366		0.056	14.140	
21-Nov-83	23	6.90						0.321		0.064	14.460	
30-Nov-83	23	6.80						0.174		0.063	14.350	
10-Dec-83	23	6.90										
30-Dec-83	20	6.40						0.172		0.055	15.130	
08-Jan-84	17							0.228		0.053	15.300	
28-Jan-84	15	6.80						0.210		0.056	16.480	
18-Feb-84	15	7.10						0.244		0.061	16.820	
19-Mar-84	13	7.30						0.161		0.059	17.060	
16-Apr-84	13	6.90		1.667	14.820	2.457	0.051	0.409		0.052	13.230	
22-Apr-84	15			1.590	16.010	2.591	0.053					
07-May-84	18	7.15		1.407	12.530	2.053	0.042					
15-May-84	91			1.208	10.400	1.723	0.035					
21-May-84	160	6.80	4.30	1.162	9.892	1.581	0.032	0.579		0.037	10.390	
23-May-84	235		5.15									
29-May-84	319	6.80	4.50	0.954	8.177	1.253	0.026	0.229		0.031	7.910	
07-Jun-84	238	6.65	3.50	1.091	9.259	1.519	0.029	0.434		0.033	9.950	
14-Jun-84	394	6.45	3.73	0.928	6.762	1.129	0.022	0.516		0.033	6.080	
19-Jun-84	430		3.10									
21-Jun-84	439	7.10	3.25	1.027	7.059	1.204	0.022			0.040	5.990	
26-Jun-84	381		2.95									
28-Jun-84	385	6.55	2.25	0.898	6.735	1.136	0.021	0.188		0.036	5.960	
05-Jul-84	314	6.60	2.33	1.087	6.636	1.113	0.019	0.327		0.038	5.590	
11-Jul-84	271		2.60									
12-Jul-84	247	6.75	2.25	0.993	7.086	1.178	0.020	0.155		0.042	6.250	
17-Jul-84	191		2.00									
19-Jul-84	174	6.95		1.058	7.437	1.265	0.022			0.045	7.030	
24-Jul-84	176		1.85									
26-Jul-84	221	7.35		1.008	7.583	1.286	0.022	0.609		0.041	6.590	
30-Jul-84	225		2.60									
02-Aug-84	244	7.10	1.95	1.043	8.130	1.327	0.025	0.124		0.038	7.150	
09-Aug-84	193		2.30									
10-Aug-84	176		1.95	1.185	8.984	1.456	0.030			0.056	8.060	
16-Aug-84	156		1.85	1.206	9.450	1.542	0.031	0.176		0.042	8.290	
21-Aug-84	162		2.70									
23-Aug-84	149		2.35	1.186	9.147	1.484	0.030	0.168		0.047	8.610	
07-Sep-84	104		2.30	1.028	8.890	1.453	0.014	0.212		0.037	8.310	
09-Sep-84	100											
10-Sep-84	92	7.17		1.113	9.855	1.600	0.024	0.170		0.035	10.468	
07-Nov-84	45		1.90									
08-Nov-84	44		1.65									
09-Nov-84	44											
23-Nov-84	34		1.85	1.290	9.693	1.511	0.032			0.060	9.430	
25-Dec-84	24		2.25	1.542	13.110	2.079	0.044	0.259		0.054	14.880	
08-Jan-85	19	7.05		1.594	13.240	2.096	0.044				15.300	
20-Feb-85	15		1.70									
28-Feb-85	15	6.80	1.65	1.717	14.190	2.268	0.048	0.198		0.061	16.150	
16-Mar-85	15	7.10										

**Table 6.** Deer Creek at DC5 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Oct-83			0.226	0.010	0.118	0.011	0.000		0.000	0.000		0.017
21-Nov-83												
30-Nov-83												
10-Dec-83												
30-Dec-83												
08-Jan-84												
28-Jan-84												
18-Feb-84												
19-Mar-84												
16-Apr-84			0.000		0.035	0.006	0.002		0.000	0.000	0.045	0.007
22-Apr-84			0.000		0.031	0.003	0.002		0.000	0.007	0.036	0.004
07-May-84			0.000		0.085	0.014	0.001		0.000	0.008	0.009	0.011
15-May-84			0.000		0.081	0.020	0.002		0.000	0.009	0.003	0.023
21-May-84			0.000		0.096	0.020	0.001		0.001	0.018	0.008	0.022
23-May-84												
29-May-84			0.000		0.060	0.006	0.001		0.000	0.021	0.010	0.012
07-Jun-84			0.000		0.051	0.012	0.003		0.000	0.017	0.042	0.032
14-Jun-84			0.000		0.033	0.005	0.002		0.000	0.010	0.007	0.019
19-Jun-84												
21-Jun-84			0.000		0.039	0.008	0.002		0.000	0.018	0.009	0.025
26-Jun-84												
28-Jun-84			0.000		0.019	0.001	0.002		0.000	0.019	0.014	0.003
05-Jul-84			0.000		0.028	0.004	0.000		0.000	0.006	0.009	0.006
11-Jul-84												
12-Jul-84			0.000		0.041	0.004	0.000		0.000	0.013	0.003	0.004
17-Jul-84												
19-Jul-84			0.002		0.035	0.005	0.000		0.000	0.003	0.013	0.045
24-Jul-84												
26-Jul-84			0.000		0.042	0.008	0.000		0.000	0.007	0.021	0.004
30-Jul-84												
02-Aug-84			0.012		0.041	0.002	0.001		0.000	0.004	0.009	0.004
09-Aug-84												
10-Aug-84			0.026		0.056	0.008	0.001		0.001	0.001	0.006	0.009
16-Aug-84			0.012		0.070	0.008	0.000		0.001	0.003	0.000	0.010
21-Aug-84												
23-Aug-84			0.040		0.057	0.006	0.000		0.000	0.008	0.000	0.004
07-Sep-84			0.000		0.047	0.016	0.002		0.024	0.014	0.032	0.017
09-Sep-84												
10-Sep-84			0.023		0.096	0.023	0.001		0.028	0.006	0.008	0.006
07-Nov-84												
08-Nov-84												
09-Nov-84												
23-Nov-84			0.000		0.047	0.003	0.000		0.000	0.008	0.018	0.009
25-Dec-84			0.000		0.176	0.039	0.001		0.004	0.022	0.023	0.018
08-Jan-85			0.000		0.086	0.027	0.000		0.003	0.002	0.003	0.015
20-Feb-85			0.000		0.039	0.025	0.002		0.005	0.050	0.038	0.020
28-Feb-85												
16-Mar-85												

**Table 6.** Deer Creek at DC5 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Mar-85	15		1.55									
27-Mar-85	16	6.75	1.60	1.765	14.600	2.322	0.050	0.573		0.058	16.010	
16-Apr-85	38		2.85	1.365	12.360	1.907	0.042				13.230	
23-Apr-85	43		2.45									
29-Apr-85	56	7.80		1.676	14.260	2.211	0.048	0.309		0.053	15.230	
30-Apr-85	60		2.85									
07-May-85	97		4.45									
14-May-85	89		2.05									
18-May-85	99		3.15	1.369	11.910	1.747	0.041	0.463		0.047	13.290	
21-May-85	98		3.35									
23-May-85	116		3.50									
25-May-85	186	7.00	3.40	1.244	10.470	2.263	0.036	0.222		0.045	11.100	
28-May-85	246		3.75									
01-Jun-85	235	6.80		1.144	8.987	1.367	0.029	0.407		0.038	8.100	
04-Jun-85	250		3.25									
09-Jun-85	493	6.65	4.00	0.827	6.524	1.079	0.021	0.148		0.032	5.160	
11-Jun-85	365		3.40						0.188			
16-Jun-85	362	6.65								0.038	5.510	
19-Jun-85	303											
22-Jun-85	275	6.75						0.698		0.042	6.320	
25-Jun-85	179		2.55									
28-Jun-85	123	6.60		1.270	8.490	1.380	0.026	0.240		0.055	8.660	
09-Jul-85	134		1.95									
14-Jul-85	96	6.80		1.250	8.190	1.390	0.026	0.201		0.043	6.830	
20-Jul-85	110	6.85		1.030	8.390	1.400	0.027	0.142		0.046	7.150	
23-Jul-85	110		2.40									
27-Jul-85	110	6.95		1.220	8.950	1.490	0.028			0.047	7.920	
28-Jul-85	110		1.25									
03-Aug-85	88	7.10	2.10	0.990	9.210	1.500	0.030	0.095		0.044	8.010	
06-Aug-85	77		2.00									
11-Aug-85	63		1.35	1.180	10.250	1.680	0.031	0.121		0.046	9.390	
18-Aug-85	53	6.80		1.340	11.000	1.820	0.035	0.121		0.047	9.960	
20-Aug-85	48		2.00									
24-Aug-85	40	6.80		1.320	11.500	1.860	0.036	0.484		0.051	10.210	
31-Aug-85	34	7.00	1.20	1.340	11.600	1.880	0.037					
03-Sep-85	38											
14-Sep-85	33	7.10	1.50	1.440	12.200	1.960	0.040					
23-Sep-85	33		1.45									
26-Sep-85	32	6.50	1.20									
17-Oct-85	32	6.85	2.05	1.320	12.400	2.090	0.039					
22-Oct-85	29		1.40									
20-Nov-85	20	6.80	1.70	1.750	12.900	2.100	0.042	0.251		0.049	14.240	
28-Nov-85	20	7.60										
26-Dec-85	17	6.40		0.757	7.209	1.147	0.016	0.468		0.064	16.970	
16-Jan-86	12	6.60							0.213		0.051	12.220
25-Feb-86	12		2.60	1.647	15.110	2.423	0.044	0.173		0.062	16.950	
25-Mar-86	12								0.282		0.060	17.770
24-Apr-86	28		2.50	1.531	14.240	2.271	0.047			0.086	16.110	

**Table 6.** Deer Creek at DC5 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Mar-85												
27-Mar-85			0.000		0.037	0.032	0.003		0.001	0.000	0.011	0.019
16-Apr-85			0.000		0.088	0.031	0.000		0.006	0.019	0.023	0.023
23-Apr-85												
29-Apr-85			0.000		0.096	0.027	0.000		0.002	0.000	0.012	0.032
30-Apr-85												
07-May-85												
14-May-85												
18-May-85			0.000		0.160	0.042	0.001		0.000	0.000	0.006	0.028
21-May-85												
23-May-85												
25-May-85			0.000		0.063	0.027	0.001		0.005	0.018	0.012	0.023
28-May-85												
01-Jun-85			0.010		0.156	0.018	0.001		0.004	0.035	0.017	0.033
04-Jun-85												
09-Jun-85			0.056		0.196	0.024	0.002		0.004	0.009	0.005	0.095
11-Jun-85												
16-Jun-85						0.000						
19-Jun-85												
22-Jun-85						0.000						
25-Jun-85												
28-Jun-85			0.069		0.117	0.012	0.002		0.010	0.044	0.022	0.022
09-Jul-85												
14-Jul-85			0.052		0.144	0.011	0.000		0.006	0.000	0.012	0.037
20-Jul-85			0.052		0.148	0.023	0.000		0.005	0.031	0.007	0.047
23-Jul-85												
27-Jul-85			0.007		0.034	0.015	0.000		0.003	0.002	0.004	0.014
28-Jul-85												
03-Aug-85			0.000		0.054	0.010	0.000		0.003	0.000	0.000	0.016
06-Aug-85												
11-Aug-85			0.007		0.091	0.024	0.000		0.002	0.008	0.006	0.011
18-Aug-85			0.023		0.057	0.026	0.000		0.007	0.023	0.014	0.015
20-Aug-85												
24-Aug-85			0.000		0.078	0.016	0.000		0.001	0.000	0.005	0.008
31-Aug-85			0.000		0.067	0.012	0.000		0.000	0.000	0.003	0.010
03-Sep-85						0.000						
14-Sep-85			0.000		0.080	0.012	0.000		0.003	0.000	0.003	0.012
23-Sep-85												
26-Sep-85												
17-Oct-85			0.032		0.208	0.049	0.000		0.003	0.032	0.000	0.024
22-Oct-85												
20-Nov-85			0.000		0.059	0.018	0.000		0.011	0.000	0.013	0.042
28-Nov-85												
26-Dec-85			0.000	0.003	0.050	0.005	0.000		0.000	0.000	0.011	0.007
16-Jan-86												
25-Feb-86			0.000	0.017	0.038	0.032	0.000		0.001	0.000	0.000	0.050
25-Mar-86												
24-Apr-86			0.061	0.015	0.089	0.065	0.001		0.003	0.000	0.000	0.059

**Table 6.** Deer Creek at DC5 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
30-Apr-86	29	6.70		1.400	14.670	2.301	0.048			0.055	17.300	
11-May-86	57	8.07										
20-May-86	104	6.48		1.016	9.784	1.449	0.033	0.550		0.037	10.320	
22-May-86	145		4.05									
27-May-86	207	6.56	4.05	1.048	9.067	1.375	0.027	0.226		0.037	8.580	
03-Jun-86	258	6.62										
11-Jun-86	312	7.05	3.30									
17-Jun-86	408	7.10										
24-Jun-86	364	7.05	2.25									
07-Jul-86	273		1.90									
22-Jul-86	165		2.25									
05-Aug-86	92		1.70									
26-Jan-87	17			1.366		2.458	0.051				4.294	
19-Feb-87	15			4.210		2.006	0.051				4.450	
18-Mar-87	13			2.692		2.250	0.052				3.883	
23-Apr-87	32			6.311		1.321	0.048				4.075	
13-May-87	173			1.953	11.570	5.986	0.038				15.595	
26-May-87	136											
02-Jun-87	187			1.786	8.055	1.053	0.028				6.847	
09-Jun-87	346			2.951	6.810	0.691	0.022				6.538	
16-Jun-87	238			0.974	6.526	0.610	0.021				6.387	
23-Jun-87	168			1.882	10.631	1.393	0.028				6.713	
01-Jul-87	129			2.806	7.107	0.586	0.024				6.034	
07-Jul-87	92			1.251	8.515	1.155	0.029				7.864	
15-Jul-87	70			0.953	9.344	3.008	0.032				11.135	
22-Jul-87	58			1.207	9.582	3.321	0.033				12.945	
28-Jul-87	78			1.884	9.916	1.669	0.034				15.115	
04-Aug-87	66			2.406	10.744	1.718	0.036				5.991	
11-Aug-87	52				11.447		0.042				6.297	
18-Aug-87	41										7.286	
25-Aug-87	55			1.443		1.780	0.044				7.078	7.768
01-Sep-87	39			1.553	12.506	3.081	0.043				7.208	8.152
08-Sep-87	34			2.189	12.950	2.035	0.044				7.703	
16-Sep-87	35			2.510	13.561	2.084	0.044				7.855	
23-Sep-87	27			2.412	13.207	2.182	0.043				8.690	
30-Sep-87	24			1.775	13.651	4.278	0.047				8.808	8.855
10-Oct-87	21			2.744	13.586	6.039	0.049					11.045
20-Oct-87	17			3.264	13.493	7.129	0.049					12.070
11-Nov-87	17			3.456	14.155	7.664	0.050					11.290
28-Nov-87	19			3.976	16.189	2.511	0.051					10.505
27-Dec-87	19			2.971	14.220	2.453	0.051					
23-Jan-88	11			2.711	14.905	2.577	0.053				17.114	
21-Feb-88	12			2.898	15.125	2.584	0.053					
19-Mar-88	12			2.840	15.300	2.602	0.054					
10-Apr-88	23			1.506	14.560	2.497	0.051					
23-Apr-88	23			1.510	14.310	2.430	0.052					
03-May-88	30			1.488	14.840	2.459	0.054					
11-May-88	37			1.364	13.840	2.279	0.051					

**Table 6.** Deer Creek at DC5 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn	
30-Apr-86			0.147	0.017	0.109	0.068	0.000		0.006	0.010	0.000	0.049	
11-May-86													
20-May-86			0.000	0.004	0.168	0.047	0.000		0.002	0.021	0.000	0.029	
22-May-86													
27-May-86			0.043	0.011	0.064	0.030	0.000		0.005	0.024	0.000	0.020	
03-Jun-86													
11-Jun-86													
17-Jun-86													
24-Jun-86													
07-Jul-86													
22-Jul-86													
05-Aug-86													
26-Jan-87			0.073	0.017	0.046	0.036				0.065	0.024		
19-Feb-87			0.228	0.019	0.099	0.020				0.094	0.015		
18-Mar-87			0.125	0.016	0.041	0.009					0.014		
23-Apr-87			0.093	0.017	0.093	0.016				0.121	0.017		
13-May-87			0.987	0.015	0.113	0.022	0.013			0.088	0.019		
26-May-87													
02-Jun-87			0.121	0.013	0.035	0.005	0.004			0.094	0.009		
09-Jun-87			0.154		0.028	0.003	0.004				0.011		
16-Jun-87			0.154		0.026	0.004	0.005			0.056	0.005		
23-Jun-87			0.351	0.013	0.061	0.010	0.007			0.075	0.038		
01-Jul-87			0.318	0.011	0.028	0.006	0.005				0.007		
07-Jul-87			0.477	0.011	0.041	0.008	0.008			0.066	0.011		
15-Jul-87			0.596	0.012	0.033	0.007	0.009		0.048		0.010		
22-Jul-87			0.610	0.012	0.032	0.008	0.007				0.009		
28-Jul-87			0.669	0.012	0.052	0.021	0.010			0.083	0.035		
04-Aug-87					0.044	0.009				0.066	0.069	0.008	
11-Aug-87			0.097	0.018	0.058	0.014	0.005		0.015	0.025	0.011	0.010	
18-Aug-87													
25-Aug-87				0.018	0.068	0.020			0.012		0.065	0.022	
01-Sep-87			0.207	0.015	0.054	0.011	0.002			0.033		0.014	
08-Sep-87					0.015	0.069	0.009			0.116		0.013	
16-Sep-87					0.015	0.077	0.015	0.002				0.042	
23-Sep-87					0.012	0.047	0.010					0.008	
30-Sep-87				0.312	0.016	0.104	0.015	0.005		0.001		0.048	0.022
10-Oct-87				0.315	0.015	0.118	0.040	0.005		0.016	0.076	0.055	0.025
20-Oct-87				0.347	0.017	0.182	0.143			0.010	0.061		0.066
11-Nov-87				0.270	0.018	0.107	0.059	0.004		0.008	0.096	0.076	0.042
28-Nov-87				0.307	0.019	0.133	0.072	0.011			0.135	0.103	0.040
27-Dec-87					0.016	0.089	0.069			0.001		0.004	0.037
23-Jan-88					0.015		0.001	0.001		0.012	0.104	0.021	0.002
21-Feb-88				0.030	0.015		0.003	0.005		0.018	0.167	0.065	0.004
19-Mar-88					0.015		0.003			0.006	0.077		0.002
10-Apr-88				0.090	0.016	0.030	0.004			0.001	0.010		
23-Apr-88				0.053	0.018	0.155	0.060			0.002	0.007	0.008	0.032
03-May-88				0.054	0.018	0.121	0.056	0.007		0.002	0.009	0.035	0.026
11-May-88				0.081	0.017	0.218	0.097			0.002	0.006	0.033	0.039

**Table 6.** Deer Creek at DC5 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
18-May-88	157			0.941	9.576	1.557	0.035					
25-May-88	129			1.095	10.990	1.764	0.039					
01-Jun-88	166			0.964	9.357	1.514	0.033					
09-Jun-88	434										6.244	
13-Jun-88	329										7.204	
14-Jun-88	304										6.375	
21-Jun-88	312										6.413	
29-Jun-88	307										6.440	
06-Jul-88	171										6.867	
13-Jul-88	113										7.200	
27-Dec-88	15											
31-Dec-88	14										17.288	
27-Jan-89	11			1.359		2.257	0.045				17.806	6.844
20-Feb-89	10			1.322		2.293	0.047				18.736	6.575
28-Mar-89	13			1.293		2.282	0.045				20.769	6.594
12-Apr-89	17			1.351		2.399	0.049				18.333	6.939
27-Apr-89	59			0.873		1.630	0.035				15.954	5.091
02-May-89	38			1.210		2.111	0.045				17.839	6.495
09-May-89	84			1.516		2.482	0.056				17.100	6.710
16-May-89	78			1.427		2.132	0.047				15.872	6.803
24-May-89	256			1.091		1.470	0.031				8.337	5.011
31-May-89	321			1.080		1.385	0.029				6.679	5.941
06-Jun-89	231			0.984		1.463	0.030				7.658	5.394
14-Jun-89	218			1.040		1.516	0.029				7.838	5.705
20-Jun-89	268			1.398		1.550	0.032				6.842	5.131
24-Jun-89	179											
29-Jun-89	164			1.132		1.520	0.030					5.119
18-Jul-89	89			1.154		1.559	0.031					5.232
26-Jul-89	145											
27-Jul-89	111										9.268	
31-Jul-89	123			1.153		1.655	0.034					5.382
12-Aug-89	78			1.301		1.862	0.037					5.860
24-Aug-89	45			1.394		1.977	0.041				10.680	6.728
26-Aug-89	42			1.601		2.213	0.045					6.347
31-Aug-89	38											
10-Sep-89	36			1.862		2.536	0.050					7.206
19-Sep-89	36										13.397	
26-Sep-89	33			1.731		2.329	0.048					6.166
15-Oct-89	25			1.802		2.392	0.048					6.496
16-Oct-89	27			1.557		2.352	0.049					6.636
28-Oct-89	22			1.836		2.623	0.052					6.514
07-Nov-89	19											
20-Nov-89	19										17.460	
27-Nov-89	16											
29-Dec-89	13			1.940		2.488	0.049					7.206
31-Dec-89	13											

**Table 6.** Deer Creek at DC5 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
18-May-88			0.078	0.015	0.200	0.037			0.003	0.016	0.018	0.019
25-May-88			0.021	0.013	0.029							0.014
01-Jun-88			0.207	0.014	0.133	0.023			0.002	0.001		0.014
09-Jun-88												
13-Jun-88												
14-Jun-88												
21-Jun-88												
29-Jun-88												
06-Jul-88												
13-Jul-88												
27-Dec-88												
31-Dec-88												
27-Jan-89			0.036	0.014	0.033	0.012			0.000		0.000	0.000
20-Feb-89			0.000	0.014	0.022	0.001			0.000		0.000	0.013
28-Mar-89			0.688	0.014	0.087	0.011			0.000		0.000	0.037
12-Apr-89			0.031	0.014	0.037	0.013			0.000		0.000	0.016
27-Apr-89			0.000	0.012	0.040	0.005			0.000		0.000	0.010
02-May-89			0.012	0.014	0.050	0.009			0.000		0.000	0.006
09-May-89			0.080	0.017	0.043	0.006			0.000		0.000	0.016
16-May-89			0.091	0.015	0.057	0.009			0.003			0.014
24-May-89			0.141	0.013	0.122	0.012			0.001		0.000	0.022
31-May-89			0.240	0.014	0.306	0.019			0.003		0.000	0.041
06-Jun-89			0.098	0.012	0.094	0.008			0.002		0.000	0.008
14-Jun-89			0.090	0.014	0.048	0.010			0.004		0.000	0.003
20-Jun-89			0.097	0.014	0.070	0.007			0.006		0.000	0.039
24-Jun-89												
29-Jun-89			0.073	0.014	0.074	0.009			0.000		0.000	0.014
18-Jul-89			0.040	0.012	0.047	0.008			0.000		0.000	0.011
26-Jul-89												
27-Jul-89												
31-Jul-89			0.039	0.015	0.085	0.002			0.000		0.000	0.025
12-Aug-89			0.049	0.014	0.047	0.015			0.001		0.000	0.005
24-Aug-89			0.071	0.014	0.105	0.020			0.000		0.000	0.012
26-Aug-89			0.126	0.014	0.170	0.018			0.003		0.000	0.020
31-Aug-89												
10-Sep-89			0.201	0.016	0.106	0.047			0.003		0.000	0.024
19-Sep-89												
26-Sep-89			0.128	0.014	0.058	0.011			0.003		0.000	0.015
15-Oct-89			0.097	0.014	0.068	0.024			0.003		0.000	0.026
16-Oct-89			0.090	0.014	0.084	0.020			0.002		0.000	0.021
28-Oct-89			0.051	0.014	0.039	0.005			0.001		0.000	0.010
07-Nov-89												
20-Nov-89												
27-Nov-89												
29-Dec-89			0.036	0.014	0.037	0.002			0.000		0.000	0.014
31-Dec-89												

**Table 7.** Snake River at SN2 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
23-Oct-79	22			12.300	5.155	0.082	0.428	0.044	0.437		80.647	
27-Dec-79	15		1.20	10.160	5.498	0.088	0.381	0.090	0.470		88.550	
21-Feb-80	12	4.15	0.30	10.780	5.749	0.093	0.376	0.046	0.441		87.724	
10-Apr-80	12											
14-Apr-80	12		0.40	11.720	5.976	0.099	0.402	0.022	0.553		99.958	
16-Apr-80	12											
04-May-80	26	3.75	0.50	10.920	5.641	0.093	0.388	0.016	0.437		85.008	
05-May-80	32			4.476	12.060	5.875	0.068					
19-May-80	37	3.65	0.80	4.498	10.600	5.342	0.093	0.100		0.500	83.000	
01-Jun-80	191		0.50	2.791	6.663	2.508	0.046					
06-Jun-80	357	3.50	0.80	4.455	1.846	0.031	0.240	0.013	0.134		25.102	
27-Jun-80	360	4.20	0.80	4.009	1.681	0.031	0.166	0.008	0.126		27.000	
10-Jul-80	202	4.10	0.60	2.806	5.164	2.142	0.039	0.100		0.400	34.000	
04-Aug-80	64	4.00	0.20	3.455	6.830	3.276	0.056	0.100		0.400	52.000	
18-Aug-80	43	4.20	0.60	2.747	8.097	3.629	0.061	0.319	0.038	0.354	57.200	
18-Sep-80	30	3.75	0.50	3.235	8.721	4.348	0.071	0.345	0.011	0.386	70.651	
21-Oct-80	23	3.96	0.20	3.301	10.460	5.289	0.069	0.326	0.006	0.422	80.677	
18-Dec-80	15	3.94	0.10	3.631	15.400	5.343	0.091	0.321	0.006	0.432	88.752	
10-Jan-81	13	4.11	0.20	3.660	11.060	5.385	0.092	0.345	0.039	0.430	85.392	
25-Mar-81	10	4.17	0.20	3.941	11.220	5.452	0.094	0.365	0.098	0.461	92.571	
17-Apr-81	18	4.15	0.80	3.571	6.366	5.528	0.074	0.412	0.058	0.471	76.760	
04-May-81	63	4.19	1.40	1.908	7.597	2.496	0.043	0.429	0.006	0.237	39.777	
15-May-81	38	4.28	0.70	2.423	11.230	3.954	0.067	0.270	0.006	0.318	63.691	
01-Jun-81	154	4.22	0.90	1.635	6.386	2.196	0.037	0.224	0.021	0.202	36.283	
17-Jun-81	106	4.02	0.70	2.072	7.509	2.697	0.049	0.190	0.006	0.218	45.611	
23-Jun-81	88	3.91	0.50	2.230	6.512	1.902	0.038	0.333	0.006	0.248	49.459	
07-Jul-81	66	3.87	0.40	2.384	8.744	3.468	0.061	0.232	0.004	0.354	58.337	
22-Jul-81	51	3.80	0.20	2.491	9.105	3.665	0.066	0.320	0.027	0.314	63.615	
06-Aug-81	34	4.00	0.30	2.877	9.360	4.169	0.060	0.331	0.016	0.353	59.165	
20-Aug-81	40			2.761	10.540	3.954	0.064	0.535	0.057	0.342	60.346	
02-Jan-82	12	3.86	0.80					0.215	0.007	0.574	89.090	
13-May-82	37	3.89	2.00	3.210	10.530	4.434	0.086	0.286	0.003	0.335	68.752	
25-May-82	68	3.80	2.60	2.539	8.057	3.354	0.068	0.426	0.006	0.245	54.932	
28-May-82	101		1.60	2.474	7.605	3.125	0.075	0.272	0.000	0.254	50.193	
01-Jun-82	164	3.96		1.659	6.424	2.422	0.048	0.211	0.010	0.208	36.942	
04-Jun-82	165	4.35	0.90	1.695	6.409	2.466	0.036	0.401	0.036	0.220	38.339	
07-Jun-82	232	4.70	1.50					0.268	0.006	0.196	36.392	
10-Jun-82	278	4.30	1.50	1.548	5.273	2.050	0.038	0.203	0.000	0.170	31.178	
13-Jun-82	310	4.45	1.90	1.650	4.937	1.873	0.036	0.455	0.000	0.149	27.506	
16-Jun-82	316	4.30	1.00	1.591	5.321	2.089	0.042	0.270	0.000	0.161	32.257	
19-Jun-82	284	4.45	1.50	1.512	4.909	1.862	0.040	0.236	0.000	0.157	31.846	
22-Jun-82	359	4.35	1.00	1.468	4.653	1.738	0.039	0.242	0.018	0.128	26.873	
25-Jun-82	396	4.35	1.70	1.430	4.665	1.706	0.040	0.478	0.000	0.120	26.812	
28-Jun-82	440	4.35	1.50	1.335	4.197	1.559	0.034	0.389	0.040	0.141	26.772	
01-Jul-82	438	4.35	1.50	1.473	4.279	1.550	0.033	0.434	0.000	0.137	27.682	
04-Jul-82	376	4.40	1.30	1.328	4.563	1.666	0.036	0.295	0.000	0.142	27.880	
08-Jul-82	261	4.15	1.50	1.539	5.406	2.034	0.041	0.276	0.000	0.149	31.901	
12-Jul-82	242	4.00	1.20	1.709	5.678	2.135	0.040	0.339	0.000	0.163	35.477	

**Table 7.** Snake River at SN2 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
23-Oct-79	0.000	0.082	4.599	0.036	0.654	1.031	0.009		0.021	0.019		0.441
27-Dec-79	2.701	0.067	4.735	0.039	0.423	1.092	0.004		0.021	0.020		0.405
21-Feb-80	0.000	0.050	4.988	0.033	0.390	1.146	0.003		0.017	0.021		0.402
10-Apr-80												
14-Apr-80	6.702	0.009	5.357	0.037	0.348	1.190	0.002		0.017	0.020		0.421
16-Apr-80												
04-May-80	0.000	0.018	4.970	0.037	0.461	1.083	0.002		0.016	0.018		0.360
05-May-80			3.821	0.020	0.037	1.207	0.001		0.018	0.015		0.405
19-May-80			4.562	0.030	0.573	0.984	0.002		0.027	0.021		0.339
01-Jun-80			1.877	0.022	0.617	0.399	0.001		0.129	0.009		0.251
06-Jun-80	1.078	0.079	1.380	0.019	0.699	0.312	0.001		0.007	0.006		0.126
27-Jun-80	0.000	0.000	1.000	0.021	0.335	0.244	0.000		0.013	0.001		0.134
10-Jul-80			1.349	0.028	0.412	0.316	0.001		0.014	0.008		0.173
04-Aug-80			2.360	0.030	0.515	0.601	0.002		0.014	0.012		0.282
18-Aug-80	0.000	0.097	2.890	0.028	0.645	0.765	0.001		0.018	0.008		0.423
18-Sep-80	0.000	0.000	3.290	0.027	0.664	0.933	0.002		0.018	0.021		0.416
21-Oct-80	0.000	0.003	3.843	0.023	0.834	1.098	0.001		0.017	0.020		0.421
18-Dec-80	0.000	0.000	4.338	0.026	0.438	1.188	0.002		0.022	0.022		0.556
10-Jan-81	0.000	0.006	4.310	0.025	0.402	1.134	0.002		0.024	0.021		0.536
25-Mar-81	0.000	0.052	4.295	0.023	0.272	1.184	0.002		0.020	0.020		0.487
17-Apr-81	0.000	0.000	4.395	0.024	0.433	1.186	0.002		0.019	0.022		0.463
04-May-81	0.000	0.000	1.859	0.020	0.902	0.505	0.001		0.013	0.009		0.245
15-May-81	0.000	0.000	3.008	0.023	0.715	0.670	0.001		0.018	0.014		0.391
01-Jun-81	0.000	0.000	1.838	0.019	0.726	0.369	0.001		0.011	0.011		0.188
17-Jun-81	0.000	0.000	2.260	0.024	0.813	0.491	0.001		0.013	0.011		0.289
23-Jun-81	0.000	0.000	2.043	0.022	0.235	0.541	0.001		0.009	0.012		0.275
07-Jul-81	0.000	0.000	2.843	0.028	0.562	0.705	0.001		0.019	0.016		0.381
22-Jul-81	0.021	0.018	3.372	0.029	0.713	0.722	0.002		0.017	0.020		0.441
06-Aug-81	0.000	0.000	3.374	0.027	0.674	0.878	0.002		0.021	0.016		0.462
20-Aug-81	41.172	0.000	4.683	0.028	0.936	0.767	0.002		0.030	0.013		0.425
02-Jan-82	0.000	0.000										
13-May-82	0.000	0.000	4.254	0.029	0.854	0.827	0.002		0.023	0.024		0.586
25-May-82	0.000	0.000	2.961	0.024	0.787	0.598	0.001		0.019	0.014		0.375
28-May-82	0.000	0.000	3.225	0.027	0.883	0.558	0.001		0.020	0.012		0.430
01-Jun-82	0.000	0.000	1.978	0.022	0.689	0.433	0.001		0.021	0.007		0.282
04-Jun-82	0.000	0.000	1.758	0.017	0.490	0.442	0.001		0.011	0.001		0.242
07-Jun-82	0.000	0.000										
10-Jun-82	0.000	0.000	1.823	0.020	0.575	0.356	0.001		0.012	0.013		0.237
13-Jun-82	0.000	0.000	1.597	0.021	0.537	0.325	0.002		0.013			0.232
16-Jun-82	0.000	0.000	1.957	0.024	0.647	0.344	0.001		0.013	0.019		0.248
19-Jun-82	0.000	0.000	1.541	0.024	0.517	0.308	0.001		0.010	0.003		0.210
22-Jun-82	0.000	0.000	1.603	0.024	0.484	0.276	0.001		0.012	0.010		0.220
25-Jun-82	0.000	0.000	1.634	0.027	0.751	0.267	0.001		0.023	0.012		0.242
28-Jun-82	0.000	0.000	1.368	0.023	0.508	0.234	0.001		0.013	0.009		0.184
01-Jul-82	0.000	0.000	1.149	0.023	0.414	0.230	0.001		0.010	0.009		0.177
04-Jul-82	0.000	0.000	1.299	0.027	0.471	0.304	0.001		0.013	0.006		0.198
08-Jul-82	0.021	0.000	1.482	0.027	0.498	0.591	0.001		0.012	0.008		0.259
12-Jul-82	0.000	0.000	1.465	0.028	0.484	0.908	0.002		0.017	0.011		0.287

**Table 7.** Snake River at SN2 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	$Q^*$	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
16-Jul-82	206	5.25	1.40	1.924	6.700	2.694	0.046	0.280	0.000	0.135	47.470	
20-Jul-82	173	4.05	1.20	2.202	6.812	2.075	0.037	0.966	0.013	0.174	42.861	
24-Jul-82	152		1.50	2.164	6.854	2.655	0.047					
28-Jul-82	182	4.25	0.60	2.098	6.069	2.460	0.044	0.553	0.000	0.283	36.187	
01-Aug-82	135	4.10	1.80	2.235	6.067	2.505	0.046	0.219	0.000	0.188	42.051	
05-Aug-82	116	3.90	0.60	2.468	6.131	2.540	0.047	0.350	0.657	0.237	47.398	
09-Aug-82	93	3.75	0.40	2.305	6.239	2.623	0.032	0.287	0.010	0.196	40.517	
15-Aug-82	100		1.25	2.188	5.584	2.305	0.044	0.528	0.000	0.234	34.932	
21-Aug-82	114	3.85	0.45	2.526	6.406	2.929	0.056	0.210		0.150	60.460	
28-Aug-82	77	4.10	1.00	2.374	6.806	2.701	0.048	0.280		0.120	48.445	
04-Sep-82	57	3.90	0.65	1.808	6.336	2.647	0.042	0.380		0.130	54.010	
12-Sep-82	68	4.20	1.10	2.158	7.011	3.197	0.050	0.280		0.160	62.650	
19-Sep-82	56	4.10	0.70	1.590	6.131	2.277	0.050	0.230		0.170	54.960	
26-Sep-82	52	3.80	0.60	2.065	6.574	2.908	0.055	0.220		0.160	62.780	
03-Oct-82	46	4.10	1.50	2.272	6.854	3.277	0.057	0.280		0.160	70.570	
10-Oct-82	46	4.00	0.60	2.154	6.671	3.168	0.053	0.950		0.250	69.930	
18-Oct-82	43	3.90		3.358	8.450	4.163		0.370		0.170	71.390	
25-Oct-82	38	3.80		3.423	8.465	4.155		0.380		0.220	72.360	
08-Nov-82	25	3.55		3.132	8.901	4.490	0.054	0.320		0.210	74.230	
27-Nov-82	25	4.80		2.928	10.970	3.626	0.046	0.220		0.170	55.670	
28-Dec-82	20	3.50		2.875	10.010	5.093	0.045	0.350		0.240	84.810	
31-Jan-83	15	4.05		3.514	10.370	5.186	0.045	0.350		0.240	86.230	
27-Feb-83	13	3.75		3.494	10.960	5.450	0.050	0.520		0.380	78.670	
31-Mar-83	13	4.50		3.529	11.280	5.437	0.053	1.180		0.290	64.350	
21-Apr-83	14	3.75		3.297	11.240	5.490	0.051	0.340		0.190	88.870	
06-May-83	15	3.80		3.383	10.490	5.077	0.044	0.530		0.230	83.910	
20-May-83	17	4.00		3.081	10.730	5.153	0.048	0.330		0.210	83.910	
01-Jun-83	119			1.861	5.812	2.375	0.004	0.450		0.130	46.900	
07-Jun-83	136			1.584	6.048	2.444	0.005	1.050		0.160	72.840	
16-Jun-83	284			0.998	3.212	1.355	0.000	1.120		0.090	29.850	
23-Jun-83	523	4.75								0.115	25.680	
30-Jun-83	422	4.20						0.170		0.128	31.730	
06-Jul-83	339	4.10						0.210		0.120	29.430	
13-Jul-83	254				5.620	2.050	0.036					
14-Jul-83	239	4.00						0.140		0.138	36.000	
21-Jul-83	177	4.10						0.150		0.150	40.300	
28-Jul-83	148	3.90						0.150		0.170	45.600	
04-Aug-83	110	3.95						0.150		0.168	45.600	
13-Aug-83	87	3.80		1.597	6.464	2.752	0.006	0.670		0.187	47.600	
20-Aug-83	81	3.80		1.495	6.406	2.777	0.006	0.340		0.190	47.800	
31-Aug-83	111	4.00		1.342	7.787	2.409	0.004			0.182	47.800	
07-Sep-83	69	3.95		2.071	6.864	3.015	0.012	0.230		0.195	52.100	
15-Sep-83	54	4.05		2.596	7.455	3.417	0.019	0.270		0.244	57.800	
22-Sep-83	42	4.20		2.214	7.447	3.543	0.018	0.320		0.248	59.800	
29-Sep-83	35	4.10		2.437	7.884	3.851	0.020			0.279	62.800	
05-Oct-83	36	4.00		2.839	8.287	4.116	0.026	0.260		0.291	68.700	
12-Oct-83	33	4.00		3.221	7.768	3.845	0.046			0.273	64.000	
19-Oct-83	33	4.20		3.183	7.658	3.791	0.044			0.300	69.100	

**Table 7.** Snake River at SN2 water quality data (mg/L)

DATE	NO3	PO4	AI	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
16-Jul-82	0.000	0.000	1.790	0.029	0.584	1.368	0.001		0.020	0.013		0.402
20-Jul-82	0.000	0.000	1.404	0.024	0.406	1.241	0.002		0.016	0.009		0.313
24-Jul-82			1.777	0.031	0.546	1.188	0.001		0.017	0.002		0.368
28-Jul-82	0.000	0.000	1.783	0.028	0.607	0.887	0.002		0.018	0.014		0.312
01-Aug-82	0.000	0.000	2.105	0.031	0.756	0.846	0.001		0.022	0.013		0.344
05-Aug-82	0.000	0.000	1.870	0.031	0.513	0.820	0.001		0.019	0.010		0.332
09-Aug-82	0.000	0.011	1.367	0.020	0.401	0.775	0.001		0.016	0.010		0.232
15-Aug-82	0.000	0.000	2.176	0.036	1.636	0.569	0.001		0.014	0.007		0.281
21-Aug-82			2.579	0.029	1.001	0.582	0.012		0.014	0.010		0.353
28-Aug-82			2.103	0.029	0.573	0.668	0.002		0.017	0.012		0.476
04-Sep-82			1.757	0.027	0.179	0.694	0.002		0.016	0.017		0.296
12-Sep-82			2.343	0.026	0.870	0.595	0.001		0.012	0.011		0.299
19-Sep-82			1.891	0.022	0.565	0.439	0.001			0.011		0.303
26-Sep-82			2.735	0.028	1.011	0.605	0.001		0.015	0.006		0.366
03-Oct-82			3.113	0.026	0.912	0.701	0.002		0.016	0.014		0.422
10-Oct-82			2.878	0.025	0.798	0.685	0.001		0.016	0.013		0.378
18-Oct-82			3.092	0.024	0.517	0.855	0.001		0.016	0.017		0.394
25-Oct-82			3.024	0.023	0.492	0.854	0.001		0.016	0.013		0.375
08-Nov-82			3.800	0.025	0.153	0.896	0.000		0.016	0.039		0.549
27-Nov-82			1.275	0.019	0.188	0.554	0.000		0.008	0.000		0.446
28-Dec-82			4.317	0.016	0.833	1.033	0.000		0.000	0.052		0.503
31-Jan-83			4.354	0.011	0.509	1.046	0.000		0.000	0.044		0.505
27-Feb-83			4.765	0.014	0.331	1.106	0.000		0.001	0.000		0.540
31-Mar-83			4.737	0.015	0.112	1.097	0.000		0.009	0.096		0.532
21-Apr-83			4.770	0.013	0.079	1.118	0.000		0.000	0.015		0.541
06-May-83			4.328	0.013	0.601	1.006	0.000		0.000	0.015		0.449
20-May-83			4.349	0.011	0.589	1.022	0.000		0.000	0.000		0.481
01-Jun-83			1.709	0.007	0.572	0.423	0.000		0.000	0.082		0.235
07-Jun-83			1.735	0.004	0.286	0.420	0.000		0.000	0.000		0.227
16-Jun-83			1.058	0.005	1.512	0.259	0.000		0.010	0.000		0.145
23-Jun-83												
30-Jun-83												
06-Jul-83												
13-Jul-83			1.260	0.026	0.458	0.409	0.000	0.007	0.014	0.007	0.000	0.234
14-Jul-83												
21-Jul-83												
28-Jul-83												
04-Aug-83												
13-Aug-83			1.951	0.014	0.058	0.505	0.000		0.000	0.000		0.271
20-Aug-83			2.063	0.015	0.076	0.504	0.000		0.000	0.000		0.278
31-Aug-83			0.703	0.008	0.261	0.357	0.000		0.000	0.000		0.219
07-Sep-83			2.235	0.017	0.152	0.571	0.000		0.000	0.000		0.338
15-Sep-83			2.598	0.016	0.488	0.663	0.000		0.003	0.046		0.414
22-Sep-83			2.767	0.015	0.070	0.680	0.000		0.000	0.000		0.378
29-Sep-83			3.033	0.015	0.080	0.749	0.000		0.001	0.038		0.399
05-Oct-83			3.401	0.015	0.071	0.810	0.000		0.003	0.067		0.403
12-Oct-83			3.239	0.025	0.090	0.754	0.000		0.015	0.000		0.455
19-Oct-83			3.295	0.024	0.087	0.756	0.000		0.010	0.008		0.399

**Table 7.** Snake River at SN2 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Oct-83	29	4.20		3.687	9.138	4.489	0.056	0.230		0.317	74.600	
21-Nov-83	23	3.90						0.360		0.326	75.700	
30-Nov-83	23	4.10						0.320		0.355	79.100	
10-Dec-83	23	4.10						0.330		0.341	77.600	
30-Dec-83	20	4.10						0.210		0.360	79.300	
08-Jan-84	17							0.450		0.353	78.800	
28-Jan-84	15	4.00						0.210		0.374	82.100	
18-Feb-84	15	4.20						0.180		0.377	82.900	
19-Mar-84	13	4.20						0.200		0.392	84.900	
16-Apr-84	13	4.00		2.641	13.390	4.310	0.053	0.360		0.340	70.500	
22-Apr-84	15			3.391	11.790	5.640	0.068					
07-May-84	18	4.30										
15-May-84	91			2.255	8.295	3.750	0.038					
21-May-84	160	4.20	4.30	1.968	7.216	3.180	0.029	0.380		0.225	49.400	
23-May-84	235											
29-May-84	319	4.60	3.30	1.231	4.147	1.583	0.004	0.200		0.137	27.950	
07-Jun-84	238	4.55	2.40	1.600	5.544	2.180	0.017					
14-Jun-84	394	4.45	2.70	1.257	4.355	1.608	0.006	0.230		0.130	26.040	
19-Jun-84	430											
21-Jun-84	439	4.60	2.50	1.326	4.432	1.645	0.007	0.170		0.130	25.860	
26-Jun-84	381											
28-Jun-84	385	4.20	1.40	1.384	4.833	1.743	0.010	0.200		0.126	25.970	
05-Jul-84	314	4.25	1.30	1.434	5.167	1.856	0.011	0.190		0.135	29.250	
11-Jul-84	271											
12-Jul-84	247	4.20	1.70	1.777	5.637	2.018	0.014	0.470		0.144	34.400	
17-Jul-84	191		1.30									
19-Jul-84	174	4.20		1.628	6.229	2.313	0.028	0.270		0.163	36.300	
24-Jul-84	176											
26-Jul-84	221	4.60	1.40	1.611	6.244	2.376	0.026	0.150		0.168	38.400	
30-Jul-84	225											
02-Aug-84	244	4.30	1.30	1.609	6.234	2.383	0.027	0.180		0.156	41.000	
09-Aug-84	193											
10-Aug-84	176		2.40	1.754	6.495	2.565	0.032	0.200		0.181	43.800	
16-Aug-84	156			1.40	1.860	6.457	2.666	0.031	0.220		0.151	44.000
21-Aug-84	162									0.368		
23-Aug-84	149			1.40	1.771	6.273	2.611	0.029		0.403	44.700	
07-Sep-84	104				1.962	6.055	2.702	0.000	0.203		0.218	46.800
09-Sep-84	100											
10-Sep-84	92	4.20		2.066	6.443	2.886	0.000	0.208		0.230	48.700	
07-Nov-84	45			1.00								
08-Nov-84	44			1.20								
09-Nov-84	44			1.30								
23-Nov-84	34			1.30	1.776	6.212	2.582	0.043	0.250		0.116	44.100
25-Dec-84	24			1.30	2.855	9.658	4.705	0.071	0.210		0.368	76.700
08-Jan-85	19	4.25	1.30	2.986	9.929	4.833	0.073				78.800	
20-Feb-85	15											
28-Feb-85	15	4.35	1.50	3.144	10.290	5.177	0.080	0.450		0.403	84.800	
16-Mar-85	15	4.30										

**Table 7.** Snake River at SN2 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Oct-83			4.003	0.025	0.174	0.905	0.000		0.013	0.000		0.668
21-Nov-83												
30-Nov-83												
10-Dec-83												
30-Dec-83												
08-Jan-84												
28-Jan-84												
18-Feb-84												
19-Mar-84												
16-Apr-84		1.845		0.244	0.622	0.002		0.013	0.028	0.025	0.318	
22-Apr-84		4.823		0.309	1.060	0.000		0.021	0.068	0.015	0.530	
07-May-84												
15-May-84		2.958		0.422	0.705	0.000		0.010	0.048	0.000	0.313	
21-May-84		2.457		0.688	0.559	0.000		0.013	0.033	0.000	0.266	
23-May-84												
29-May-84		1.343		0.303	0.264	0.000		0.003	0.011	0.010	0.151	
07-Jun-84		1.837		0.578	0.360	0.000		0.010	0.018	0.000	0.227	
14-Jun-84		1.427		0.245	0.248	0.001		0.009	0.020	0.000	0.156	
19-Jun-84												
21-Jun-84		1.405		0.284	0.261	0.000		0.008	0.018	0.000	0.157	
26-Jun-84												
28-Jun-84		1.400		0.145	0.271	0.000		0.008	0.001	0.000	0.183	
05-Jul-84		1.410		0.100	0.324	0.000		0.009	0.036	0.000	0.205	
11-Jul-84												
12-Jul-84		1.393		0.079	0.379	0.000		0.011	0.030	0.016	0.241	
17-Jul-84												
19-Jul-84		1.452		0.073	0.470	0.000		0.011	0.011	0.003	0.264	
24-Jul-84												
26-Jul-84		1.796		0.278	0.471	0.000		0.013	0.023	0.004	0.291	
30-Jul-84												
02-Aug-84		1.724		0.119	0.423	0.000		0.012	0.017	0.000	0.295	
09-Aug-84												
10-Aug-84		1.888		0.222	0.457	0.000		0.015	0.042	0.000	0.330	
16-Aug-84		2.015		0.087	0.467	0.000		0.010	0.035	0.004	0.299	
21-Aug-84												
23-Aug-84		2.255		0.026	0.499	0.000		0.013	0.032	0.000	0.362	
07-Sep-84		2.040		0.853	0.523	0.000		0.011	0.001	0.032	0.307	
09-Sep-84												
10-Sep-84		2.637		0.865	0.557	0.000		0.011	0.005	0.022	0.319	
07-Nov-84												
08-Nov-84												
09-Nov-84												
23-Nov-84		1.947		0.137	0.504	0.001		0.020	0.019	0.000	0.349	
25-Dec-84		3.869		0.531	0.916	0.002		0.024	0.028	0.028	0.472	
08-Jan-85		4.292		0.650	0.951	0.002		0.022	0.026	0.013	0.490	
20-Feb-85												
28-Feb-85		4.334		0.663	1.013	0.003		0.021	0.040	0.000	0.524	
16-Mar-85												

**Table 7.** Snake River at SN2 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Mar-85	15											
27-Mar-85	16	4.30	1.55	3.168	10.970	5.301	0.082	0.220		0.413	86.000	
16-Apr-85	38		1.20	2.662	9.472	4.397	0.068					
23-Apr-85	43											
29-Apr-85	56	3.30	0.95	2.929	10.950	4.643	0.076	0.280		0.353	76.600	
30-Apr-85	60											
07-May-85	97											
14-May-85	89											
18-May-85	99		1.45	2.079	8.424	3.380	0.057	0.260		0.263	56.000	
21-May-85	98											
23-May-85	116											
25-May-85	186	4.20	2.25	1.785	7.266	2.814	0.046	0.250		0.219	47.400	
28-May-85	246											
01-Jun-85	235	4.40		1.519	5.420	2.072	0.033			0.156	36.200	
04-Jun-85	250											
09-Jun-85	493	4.50	1.70	1.191	4.070	1.507	0.025	0.170		0.108	27.180	
11-Jun-85	365											
16-Jun-85	362	4.75			4.740	1.690	0.029			0.115	28.760	
19-Jun-85	303											
22-Jun-85	275				5.350	1.990	0.034	0.170		0.136	33.500	
25-Jun-85	179											
28-Jun-85	123	4.35			6.070	2.330	0.040	0.190		0.166	38.900	
09-Jul-85	134											
14-Jul-85	96	4.45			7.090	2.690	0.045	0.350		0.190	44.800	
20-Jul-85	110	4.70			6.844	2.660	0.043	0.290		0.193	44.200	
23-Jul-85	110											
27-Jul-85	110	4.55			7.930	3.050	0.050	0.190		0.227	50.000	
28-Jul-85	110		0.85									
03-Aug-85	88	4.60	0.75					0.190		0.214	46.500	
06-Aug-85	77											
11-Aug-85	63		1.05		7.470	3.320	0.050	0.470		0.254	55.100	
18-Aug-85	53	4.50	0.95		7.970	3.600	0.056	0.350		0.281	59.100	
20-Aug-85	48											
24-Aug-85	40	4.50	1.30		8.420	4.000	0.059	0.230		0.312	65.300	
31-Aug-85	34	4.30	0.65		8.740	4.200	0.063					
03-Sep-85	38				9.750	4.720	0.067					
14-Sep-85	33	4.40	0.65		9.460	4.410	0.069					
23-Sep-85	33		0.85									
26-Sep-85	32	4.40										
17-Oct-85	32	4.40										
22-Oct-85	29											
20-Nov-85	20	4.20			10.300	4.890	0.075	0.200		0.386	78.900	
28-Nov-85	20	4.10										
26-Dec-85	17	4.10		1.996	7.148	3.320	0.044			0.414	84.100	
16-Jan-86	12	4.20						0.270		0.259	60.600	
25-Feb-86	12			3.166	11.180	5.312	0.075	0.310		0.414	88.800	
25-Mar-86	12							0.340		0.429	92.900	
24-Apr-86	28			2.931	10.340	4.791	0.076			0.359	80.700	

**Table 7.** Snake River at SN2 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Mar-85												
27-Mar-85			4.437		0.583	1.032	0.002		0.021	0.016	0.009	0.522
16-Apr-85			3.489		0.644	0.860	0.002		0.015	0.030	0.004	0.393
23-Apr-85												
29-Apr-85			3.620		0.601	0.869	0.001		0.018	0.012	0.000	0.459
30-Apr-85												
07-May-85												
14-May-85												
18-May-85			2.483		0.849	0.636	0.001		0.013	0.033	0.010	0.372
21-May-85												
23-May-85												
25-May-85			2.049		0.761	0.508	0.005		0.015	0.025	0.013	0.292
28-May-85												
01-Jun-85			1.542		0.173	0.358	0.002		0.013	0.010	0.007	0.216
04-Jun-85												
09-Jun-85			1.131		0.386	0.292	0.001		0.012	0.010	0.003	0.159
11-Jun-85												
16-Jun-85			1.100	0.026	0.364	0.266	0.000	0.003	0.013	0.000	0.003	0.172
19-Jun-85												
22-Jun-85			1.300	0.025	0.306	0.308	0.000	0.004	0.012	0.043	0.001	0.215
25-Jun-85												
28-Jun-85			1.590	0.027	0.694	0.364	0.000	0.005	0.014	0.057	0.001	0.243
09-Jul-85												
14-Jul-85			1.680	0.028	0.189	0.432	0.001	0.008	0.013	0.040	0.000	0.293
20-Jul-85			1.690	0.026	0.266	0.431	0.002	0.005	0.017	0.043	0.000	0.280
23-Jul-85												
27-Jul-85			2.160	0.028	0.478	0.503	0.000	0.006	0.015	0.015	0.000	0.345
28-Jul-85												
03-Aug-85												
06-Aug-85												
11-Aug-85			2.240	0.026	0.904	0.593	0.001	0.005	0.014	0.051	0.000	0.348
18-Aug-85			2.670	0.028	0.771	0.656	0.000	0.009	0.014	0.007	0.000	0.398
20-Aug-85												
24-Aug-85			2.730	0.027	0.619	0.773	0.002	0.009	0.016	0.033	0.000	0.464
31-Aug-85			3.230	0.028	0.795	0.827	0.001	0.011	0.017	0.041	0.000	0.469
03-Sep-85			3.410	0.025	0.850	0.962	0.002	0.012	0.013	0.026	0.009	0.527
14-Sep-85			3.230	0.027	0.428	0.893	0.001	0.010	0.026	0.027	0.000	0.481
23-Sep-85												
26-Sep-85												
17-Oct-85												
22-Oct-85												
20-Nov-85			3.850	0.025	0.127	0.927	0.000	0.010	0.016	0.031	0.000	0.513
28-Nov-85												
26-Dec-85			2.689	0.012	0.171	0.663	0.000	0.000	0.007	0.000	0.000	0.324
16-Jan-86												
25-Feb-86			4.126	0.020	0.296	1.043	0.000	0.002	0.012	0.012	0.000	0.512
25-Mar-86												
24-Apr-86			3.830	0.023	0.538	0.894	0.005	0.011	0.018	0.032	0.078	0.425

**Table 7.** Snake River at SN2 water quality data (mg/L)\*

\* Discharge (*Q*) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
30-Apr-86	29	3.66		2.906	10.240	4.696	0.075	0.350		0.354	80.200	
11-May-86	57	4.27										
20-May-86	104	4.48		1.533	6.441	2.367	0.037	0.520		0.169	39.500	
22-May-86	145											
27-May-86	207	4.65		1.428	5.664	2.157	0.032			0.144	35.700	
03-Jun-86	258	4.41										
11-Jun-86	312	4.60										
17-Jun-86	408	4.45										
24-Jun-86	364	4.50										
07-Jul-86	273											
22-Jul-86	165											
05-Aug-86	92											
26-Jan-87	17			2.965		5.390	0.084					15.795
19-Feb-87	15			7.099		6.029	0.089					15.635
18-Mar-87	13			3.422		5.814	0.091					15.675
23-Apr-87	32			4.752		4.852	0.078					12.320
13-May-87	173			2.213	6.994	2.799	0.045					22.140
26-May-87	136			9.227	6.305	2.937	0.043					16.310
02-Jun-87	187											
09-Jun-87	346			2.791	4.148	1.151	0.027					12.700
16-Jun-87	238			3.319	4.810	1.571	0.032					12.640
23-Jun-87	168			0.574	7.054	1.896	0.039					16.110
01-Jul-87	129			3.486	6.170	2.400	0.041					15.175
07-Jul-87	92			1.304	6.631	2.347	0.047					18.580
15-Jul-87	70			3.331	7.779	3.274	0.055					22.205
22-Jul-87	58			2.133	8.375	5.430	0.060					25.305
28-Jul-87	78			2.485	8.458	6.208	0.060					27.905
04-Aug-87	66				8.553							70.513
11-Aug-87	52				9.983							76.125
18-Aug-87	41											
25-Aug-87	55											75.090
01-Sep-87	39				9.211	4.419	0.065					84.856
08-Sep-87	34				10.185							88.268
16-Sep-87	35				10.492							87.834
23-Sep-87	27				13.208							98.349
30-Sep-87	24			3.360	11.113	7.114	0.083					95.600
10-Oct-87	21			3.802	11.655	8.478	0.088					26.705
20-Oct-87	17			4.289	11.987	9.204	0.091					31.770
11-Nov-87	17			5.036	11.894	6.083	0.090					31.220
28-Nov-87	19			5.197	11.830	6.075	0.089					32.670
27-Dec-87	19				11.250							
23-Jan-88	11			4.436	12.635	6.249	0.099					106.465
21-Feb-88	12			4.335	12.585	6.172	0.099					
19-Mar-88	12			4.538	12.820	6.252	0.100					
10-Apr-88	23			3.415	11.900	6.110	0.094					
23-Apr-88	23			3.168	11.440	5.676	0.088					
03-May-88	30			2.849	10.820	5.168	0.083					
11-May-88	37			2.772	11.170	4.815	0.087					

**Table 7.** Snake River at SN2 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
30-Apr-86			3.840	0.023	0.573	0.872	0.002	0.009	0.016	0.030	0.004	0.419
11-May-86												
20-May-86			1.425	0.019	1.282	0.387	0.000	0.003	0.010	0.029	0.000	0.218
22-May-86												
27-May-86			1.646	0.017	0.559	0.373	0.000	0.000	0.008	0.000	0.000	0.197
03-Jun-86												
11-Jun-86												
17-Jun-86												
24-Jun-86												
07-Jul-86												
22-Jul-86												
05-Aug-86												
26-Jan-87			5.041	0.026	0.382	1.041			0.025		0.073	0.530
19-Feb-87			5.383	0.026	0.542	1.098			0.029		0.086	0.544
18-Mar-87			5.369	0.028	0.518	1.106			0.048		0.213	0.560
23-Apr-87			4.251	0.025	0.697	0.941			0.037		0.077	0.446
13-May-87			3.069	0.020	1.287	0.492	0.009	0.019				0.310
26-May-87			2.228	0.023	0.656	0.412	0.004	0.013				0.256
02-Jun-87												
09-Jun-87			1.382	0.021	0.224	0.239	0.004					0.160
16-Jun-87			1.310	0.024	0.336	0.248	0.006				0.064	0.167
23-Jun-87			1.832	0.027	0.542	0.327	0.009	0.020	0.025			0.247
01-Jul-87			1.963	0.026	0.478	0.381	0.004				0.075	0.252
07-Jul-87			2.367	0.029	0.489	0.443	0.008	0.016	0.024		0.078	0.294
15-Jul-87			3.170	0.027	0.748	0.628	0.009					0.387
22-Jul-87			3.445	0.031	0.596	0.664	0.012	0.018			0.065	0.444
28-Jul-87			3.470	0.030	0.701	0.690	0.017	0.010	0.029	0.032	0.073	0.417
04-Aug-87								0.038	0.025	0.137		
11-Aug-87							0.006	0.024	0.030	0.113		
18-Aug-87												
25-Aug-87												
01-Sep-87			3.813	0.030	0.585	0.905		0.002	0.004		0.017	0.576
08-Sep-87							0.002	0.025	0.029	0.130		
16-Sep-87									0.027	0.041		
23-Sep-87								0.014				
30-Sep-87			4.935	0.032	0.022	1.105	0.001	0.006	0.025	0.084		0.671
10-Oct-87			5.025	0.031	0.385	1.128	0.004	0.011	0.012		0.035	0.706
20-Oct-87			5.561	0.029	0.020	1.168	0.008		0.020	0.045	0.001	0.662
11-Nov-87			5.412	0.029	0.879	1.143	0.001	0.004	0.018		0.004	0.650
28-Nov-87			5.289	0.028	0.924	1.126	0.005	0.009	0.015		0.008	0.665
27-Dec-87								0.010	0.019	0.127		
23-Jan-88			5.066	0.029	0.036	1.181	0.006	0.027	0.037	0.168	0.075	0.663
21-Feb-88			5.095	0.029	0.038	1.174	0.007	0.024	0.040	0.205	0.038	0.663
19-Mar-88			5.183	0.028	0.034	1.194	0.004	0.024	0.031	0.126	0.042	0.664
10-Apr-88			5.206	0.026	0.645	1.118		0.010	0.018	0.015		0.606
23-Apr-88			4.382	0.024	0.919	0.999		0.019	0.016	0.021		0.506
03-May-88			3.720	0.024	0.942	0.884		0.004	0.014	0.036		0.461
11-May-88			3.241	0.023	0.066	0.799	0.006	0.014	0.014	0.018	0.021	0.506

**Table 7. Snake River at SN2 water quality data (mg/L)\***\* Discharge (*Q*) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
18-May-88	157			1.580	6.441	2.761	0.045					
25-May-88	129			1.910	7.498	3.391	0.053					
01-Jun-88	166			1.527	6.096	2.555	0.042					
09-Jun-88	434										39.179	
13-Jun-88	329										55.158	
14-Jun-88	304										36.993	
21-Jun-88	312										41.867	
29-Jun-88	307										44.250	
06-Jul-88	171										48.759	
13-Jul-88	113											
27-Dec-88	15										104.974	
31-Dec-88	14										109.396	
27-Jan-89	11			2.220		10.650	3.140				108.949	9.911
20-Feb-89	10			1.124		6.948	0.096				111.237	25.700
28-Mar-89	13			3.134		6.948	0.096				110.020	25.210
12-Apr-89	17			2.937		6.513	0.090				113.444	23.540
27-Apr-89	59			2.903		6.627	0.092				73.101	23.570
02-May-89	38			1.709		3.728	0.056				84.572	13.030
09-May-89	84			2.091		4.194	0.065				84.205	14.940
16-May-89	78			2.092		10.230	2.977				70.344	9.518
24-May-89	256			2.163		4.594	0.063				37.169	15.020
31-May-89	321			1.777		3.684	0.055				38.375	13.050
06-Jun-89	231			0.943		1.758	0.024				42.559	7.385
14-Jun-89	218			1.105		1.861	0.027				45.047	8.927
20-Jun-89	268			1.314		2.317	0.034				43.901	10.580
24-Jun-89	179											
29-Jun-89	164			1.269		2.344	0.034					11.000
18-Jul-89	89			2.275		1.114	3.209					10.140
26-Jul-89	145			1.345		2.302	0.034					10.920
27-Jul-89	111			1.518		2.768	0.040				30.430	12.170
31-Jul-89	123			2.660		5.508	0.070					20.620
12-Aug-89	78			1.800		3.670	0.052					15.480
24-Aug-89	45											79.557
26-Aug-89	42			2.063		4.019	2.983					9.620
31-Aug-89	38											
10-Sep-89	36			1.618		3.514	0.049					13.100
19-Sep-89	36											88.547
26-Sep-89	33			1.696		3.672	0.049					14.190
15-Oct-89	25			1.818		4.068	0.053					15.580
16-Oct-89	27			1.820		4.025	0.052					99.485
28-Oct-89	22											
07-Nov-89	19			1.875		5.480	2.727					8.911
20-Nov-89	19											102.316
27-Nov-89	16											
29-Dec-89	13			2.230		4.350	0.055					15.150
31-Dec-89	13			2.606		5.896	0.073					18.040

**Table 7.** Snake River at SN2 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
18-May-88			1.840	0.020	0.806	0.420	0.001		0.007	0.001		0.271
25-May-88			2.592	0.020	0.992	0.578		0.016	0.008	0.017		0.346
01-Jun-88			1.953	0.019	0.707	0.393		0.007	0.008	0.007		0.274
09-Jun-88												
13-Jun-88												
14-Jun-88												
21-Jun-88												
29-Jun-88												
06-Jul-88												
13-Jul-88												
27-Dec-88												
31-Dec-88												
27-Jan-89			0.511	0.022	0.137	0.650			0.029		0.000	0.042
20-Feb-89			5.678	0.028	0.358	0.791			0.027		0.000	0.754
28-Mar-89			5.726	0.028	0.428	1.109			0.025		0.000	0.751
12-Apr-89			5.305	0.027	0.628	1.038			0.020		0.000	0.670
27-Apr-89			5.283	0.027	0.687	1.027			0.022		0.000	0.695
02-May-89			2.427	0.022	0.831	0.492			0.013		0.000	0.364
09-May-89			3.063	0.022	0.762	0.575			0.010		0.000	0.443
16-May-89			0.507	0.021	0.133	0.640			0.025			0.029
24-May-89			3.347	0.022	0.773	0.664			0.013		0.000	0.454
31-May-89			2.612	0.023	0.794	0.515			0.006		0.000	0.456
06-Jun-89			1.147	0.016	0.439	0.233			0.003		0.000	0.184
14-Jun-89			1.294	0.017	0.733	0.243			0.009		0.000	0.179
20-Jun-89			1.560	0.022	0.473	0.293			0.008		0.000	0.233
24-Jun-89												
29-Jun-89			1.617	0.024	0.783	0.285			0.007		0.000	0.216
18-Jul-89			0.527	0.022	0.136	0.068			0.019		0.000	0.030
26-Jul-89			1.483	0.026	0.577	0.261			0.008		0.000	0.248
27-Jul-89			1.698	0.025	0.769	0.325			0.015		0.000	0.317
31-Jul-89			4.355	0.030	0.522	0.878			0.020		0.000	0.688
12-Aug-89			2.475	0.029	0.782	0.512			0.012		0.000	0.489
24-Aug-89												
26-Aug-89			0.479	0.020	0.135	0.064			0.019		0.000	0.040
31-Aug-89												
10-Sep-89			2.368	0.024	0.769	0.491			0.012		0.000	0.482
19-Sep-89												
26-Sep-89			2.675	0.022	0.354	0.581			0.012		0.000	0.535
15-Oct-89			3.010	0.024	0.392	0.644			0.012		0.000	0.604
16-Oct-89			2.974	0.024	0.322	0.634			0.014		0.000	0.556
28-Oct-89												
07-Nov-89			0.432	0.020	0.124	0.058			0.019		0.000	0.029
20-Nov-89												
27-Nov-89												
29-Dec-89			3.154	0.024	0.367	0.679			0.011		0.000	0.589
31-Dec-89			4.656	0.026	0.367	0.947			0.019		0.000	0.723

**Table 8.** Snake River at SN3 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
23-Oct-79	22				10.610	3.833	0.065	0.412	0.042	0.375	47.532	
27-Dec-79	15		0.40		12.270	4.209	0.075	0.241	0.051	0.274	54.834	
21-Feb-80	12	5.10	0.10		12.340	4.464	0.081	0.279	0.010	0.275	54.805	
10-Apr-80	12											
14-Apr-80	12		0.30		16.190	4.574	0.085	0.301	0.011	0.285	56.055	
16-Apr-80	12											
04-May-80	26	5.30	0.20	2.914	13.550	4.083	0.078	0.100		0.300	51.000	
05-May-80	32			3.724	14.100	4.242	0.056					
19-May-80	37	5.50	0.50	3.795	12.340	4.070	0.079	0.200		0.300	52.000	
01-Jun-80	191		0.40	2.537	7.417	1.976	0.040					
06-Jun-80	357	5.30	1.50		5.766	1.546	0.029	0.354	0.093	0.087	15.474	
27-Jun-80	360	6.80	1.00		5.516	1.348	0.029	0.138	0.006	0.095	16.370	
10-Jul-80	202	6.80	0.50	2.400	6.538	1.641	0.034	0.100		0.200	19.000	
04-Aug-80	64	6.10	0.20	2.889	8.274	2.511	0.051	0.500		0.200	31.000	
18-Aug-80	43	5.80	0.20	0.947	3.294	1.092	0.020	0.352	0.026	0.185		
18-Sep-80	30	5.20	0.10	2.525	10.520	3.344	0.060	0.248	0.034	0.211	42.225	
21-Oct-80	23	4.51	0.20	2.613	12.160	4.022	0.060	0.312	0.049	0.267	47.554	
18-Dec-80	15	5.10	0.10	2.924	15.470	3.990	0.073	0.167	0.006	0.394	57.438	
10-Jan-81	13	5.00	0.10	2.939	11.920	4.154	0.076	0.228	0.018	0.271	56.023	
25-Mar-81	10	5.01	0.20	3.244	12.150	4.424	0.080	0.212	0.023	0.297	61.825	
17-Apr-81	18	5.40	0.60	2.842	8.080	4.164	0.069	0.467	0.106	0.267	44.338	
04-May-81	63	5.62	1.70	1.555	8.884	2.255	0.041					
15-May-81	38	5.34	0.60	2.029	10.510	3.147	0.057	0.272	0.006	0.261	39.529	
01-Jun-81	154	6.50	1.10	1.511	7.867	1.739	0.033	0.221	0.006	0.099	19.458	
17-Jun-81	106	6.12	0.90	1.725	12.220	2.201	0.034	0.205	0.006	0.121	25.541	
23-Jun-81	88	6.25	0.50	1.458	6.292	1.509	0.033	0.126	0.018	0.137	23.641	
07-Jul-81	66	6.29	0.40	1.722	6.893	2.295	0.040	0.113	0.006	0.127	26.000	
22-Jul-81	51	5.00	0.20	2.063	9.660	2.883	0.045	0.224	0.006	0.221	39.469	
06-Aug-81	34	4.94	0.40	2.331	10.700	3.235	0.057	0.216	0.038	0.239	44.229	
20-Aug-81	40			5.241	9.973	3.355	0.057	0.345	0.006	0.241	39.099	
02-Jan-82	12	4.93	0.80	2.952	13.090	4.174	0.055	0.186	0.018	0.241	53.670	
13-May-82	37											
25-May-82	68	5.36	1.90	2.218	10.090	2.835	0.053	0.253	0.000	0.153	35.609	
28-May-82	101		0.90	1.790	9.867	2.702	0.043	0.324	0.000	0.150	35.427	
01-Jun-82	164	5.33		2.115	7.893	2.155	0.031	0.242	0.008	0.142	27.417	
04-Jun-82	165	5.35	0.90	1.686	9.218	2.319	0.048	0.557	0.220	0.160	28.653	
07-Jun-82	232	5.50	1.40	1.625	6.797	1.960	0.023	0.340	0.000	0.139	27.230	
10-Jun-82	278	5.80	1.70	1.442	6.309	1.844	0.031	0.298	0.017	0.131	24.549	
13-Jun-82	310	5.65	1.50	1.376	5.817	1.661	0.031	0.196	0.000	0.109	20.844	
16-Jun-82	316	5.60	1.60	1.434	6.278	1.799	0.024	0.270	0.000	0.112	24.491	
19-Jun-82	284	6.20	1.50	1.298	6.239	1.705	0.033	0.228	0.000	0.097	22.832	
22-Jun-82	359	6.25	1.10	1.266	5.448	1.460	0.028	0.422	0.249	0.087	17.201	
25-Jun-82	396	5.40	1.20	1.240	5.555	1.475	0.027	0.252	0.012	0.110	18.445	
28-Jun-82	440	5.85	1.40	1.186	5.245	1.387	0.029	0.475	0.000	0.084	16.755	
01-Jul-82	438	5.45	0.90	1.129	5.118	1.313	0.027	0.365	0.000	0.076	16.343	
04-Jul-82	376	5.75	0.60	1.462	5.296	1.435	0.029	0.968	0.000	0.085	19.007	
08-Jul-82	261	6.30	1.30	1.370	6.124	1.649	0.020	0.378	0.059	0.099	19.938	
12-Jul-82	242	6.05	0.80	1.275	6.055	1.633	0.029	0.476	0.012	0.080	19.703	

**Table 8.** Snake River at SN3 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
23-Oct-79	0.000	0.082	1.356	0.029	0.215	0.597	0.010		0.010			0.243
27-Dec-79	4.447	0.090	1.490	0.028	0.087	0.649	0.002		0.011			0.245
21-Feb-80	0.019	0.020	1.435	0.039	0.065	0.690	0.020		0.011			0.239
10-Apr-80												
14-Apr-80	0.000	0.000	1.208	0.032	0.072	0.697	0.002		0.010			0.296
16-Apr-80				0.000	0.028	0.055	0.620	0.001		0.013		0.291
04-May-80				1.565	0.017	0.203	0.626	0.001		0.007		0.219
05-May-80					0.541	0.023	0.107	0.537	0.002		0.014	
19-May-80						0.255	0.017	0.273	0.219	0.001		0.193
01-Jun-80							0.255	0.017	0.273	0.219	0.001	0.112
06-Jun-80	0.036	0.082	0.254	0.017	0.586	0.177	0.001		0.004			0.073
27-Jun-80	0.000	0.017	0.010	0.016	0.112	0.125	0.000		0.006			0.093
10-Jul-80				0.069	0.019	0.119	0.150	0.000		0.005		0.078
04-Aug-80				0.220	0.022	0.135	0.314	0.001		0.006		0.146
18-Aug-80	34.467	0.013	0.102	0.013	0.075	0.154	0.000		0.009			0.220
18-Sep-80	1.124	0.005	0.868	0.021	0.288	0.533	0.001		0.012			0.253
21-Oct-80	0.000	0.000	1.450	0.021	0.321	0.653	0.001		0.012			0.275
18-Dec-80	1.378	0.000	2.150	0.023	0.195	0.719	0.001		0.011			0.358
10-Jan-81	0.000	0.000	1.676	0.020	0.139	0.679	0.001		0.014			0.292
25-Mar-81	0.009	0.000	2.146	0.020	0.146	0.723	0.001		0.016			0.267
17-Apr-81	0.000	0.000	1.663	0.022	0.312	0.708	0.001		0.011			0.267
04-May-81			0.318	0.017	0.385	0.340	0.001		0.017			0.178
15-May-81	0.000	0.000	0.856	0.018	0.343	0.404	0.001		0.010			0.191
01-Jun-81	0.000	0.000	0.301	0.013	0.322	0.219	0.000		0.004			0.078
17-Jun-81	0.000	0.000	0.334	0.016	0.253	0.258	0.001		0.007			0.133
23-Jun-81	0.000	0.000	0.296	0.016	0.129	0.185	0.001		0.006			0.110
07-Jul-81	0.000	0.000	0.696	0.016	0.210	0.300	0.001		0.015			0.138
22-Jul-81	0.020	0.017	0.904	0.019	0.254	0.442	0.001		0.010			0.232
06-Aug-81	0.018	0.000	1.227	0.022	0.292	0.537	0.001		0.014			0.296
20-Aug-81	0.000	0.009	3.146	0.024	0.634	0.521	0.001		0.029			0.272
02-Jan-82	0.000	0.021	1.492	0.019	0.140	0.677	0.001		0.030			0.290
13-May-82												
25-May-82	0.000	0.000	1.173	0.019	0.383	0.388			0.010			0.200
28-May-82	0.000	0.000	0.758	0.015	0.302	0.368	0.001		0.008			0.160
01-Jun-82	0.000	0.000	0.443	0.014	0.337	0.310	0.001					0.128
04-Jun-82	0.000	0.179	0.879	0.017	0.622	0.269	0.001		0.011			0.259
07-Jun-82	0.000	0.000	0.547	0.011	0.171	0.277	0.001		0.007			0.095
10-Jun-82	0.000	0.000	0.624	0.015	0.289	0.255	0.001		0.008			0.133
13-Jun-82	0.000	0.000	0.420	0.016	0.332	0.221	0.001		0.009			0.134
16-Jun-82	0.000	0.000	0.375	0.014	0.212	0.232	0.001					0.108
19-Jun-82	0.020	0.000	0.207	0.019	0.245	0.212	0.001		0.007			0.117
22-Jun-82	0.417	0.155	0.507	0.016	0.283	0.168	0.000		0.006			0.094
25-Jun-82	0.000	0.000	0.145	0.017	0.164	0.158	0.000		0.004			0.090
28-Jun-82	0.000	0.000	0.296	0.017	0.226	0.143	0.001		0.005			0.093
01-Jul-82	0.565	0.000	0.272	0.017	0.196	0.133	0.000		0.005			0.085
04-Jul-82	0.428	0.000	0.586	0.019	0.293	0.196	0.001		0.007			0.116
08-Jul-82	0.000	0.000	0.458	0.019	0.174	0.337	0.000		0.006			0.083
12-Jul-82	0.000	0.000	0.427	0.018	0.202	0.477	0.001		0.006			0.128

**Table 8.** Snake River at SN3 water quality data (mg/L)\*\* Discharge (*Q*) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
16-Jul-82	206	6.15	1.00	1.481	6.853	1.941	0.030	0.804		0.083	23.920	
20-Jul-82	173	6.25	1.00	1.733	6.911	1.894	0.030	0.878		0.093	23.084	
24-Jul-82	152	6.05	1.10	1.740	6.833	1.881	0.032	0.240	0.000	0.089	20.095	
28-Jul-82	182	6.10	2.20	1.758	6.545	1.906	0.024	0.229	0.000	0.097	21.858	
01-Aug-82	135	5.65	0.80	1.948	6.460	1.890	0.033	0.279	0.000	0.097	24.485	
05-Aug-82	116	6.40	0.40	1.944	6.712	1.923		0.388	0.015	0.106	22.115	
09-Aug-82	93	5.15	0.40	1.943	6.783	1.995	0.037	0.351	0.000	0.084	22.979	
15-Aug-82	100	5.60	0.60					0.500	0.000	0.106	21.326	
21-Aug-82	114	5.80	1.00	2.007	7.066	2.087	0.043			0.000		
28-Aug-82	77	6.15	1.20	2.155	7.375	2.263	0.029					
04-Sep-82	57	5.85	1.30	1.821	8.328	2.548	0.047	0.000				
12-Sep-82	68	6.20	1.20	1.833	8.411	2.501	0.042					
19-Sep-82	56	7.30	1.10	1.430	7.401	2.193	0.030			0.000		
26-Sep-82	52	6.30	0.90	1.866	8.250	2.485	0.029	0.000		0.000	29.910	
03-Oct-82	46	5.70	0.80	2.257	9.210	3.100	0.056					
10-Oct-82	46	5.30	1.00	2.090	8.290	2.714	0.053	0.250		0.170	50.090	
18-Oct-82	43	5.35		3.402	9.934	3.346	0.057					
25-Oct-82	38	5.15		3.106	9.692	3.236	0.056	0.210		0.170	51.270	
08-Nov-82	25	5.05		3.206	10.070	3.402	0.043	0.350		0.170	52.930	
27-Nov-82	25	4.70		3.494	10.880	3.696	0.047	0.310		0.180	56.490	
28-Dec-82	20	4.65		2.083	11.250	3.862	0.028					
31-Jan-83	15	4.90		2.565	11.660	3.960	0.031					
27-Feb-83	13	5.05		2.308	12.070	4.115	0.034	0.450		0.200	62.190	
31-Mar-83	13	4.80		3.222	11.360	5.511	0.052	0.000				
21-Apr-83	14	5.10		2.753	12.490	4.212	0.035	0.210		0.220	64.090	
06-May-83	15	5.10		2.565	12.390	3.866	0.032					
20-May-83	17	5.50		2.599	12.890	4.107	0.037	0.240		0.180	61.950	
01-Jun-83	119			1.703	7.548	2.061	0.003			0.000		
07-Jun-83	136			2.208	7.793	2.145	0.002	0.720		0.100	35.840	
16-Jun-83	284			1.392	4.456	1.356	0.000	0.920		0.000	23.500	
23-Jun-83	523	5.95								0.086	18.090	
30-Jun-83	422	5.60						0.172		0.092	19.630	
06-Jul-83	339	6.00			7.160	1.910	0.036	0.164		0.085	19.600	
13-Jul-83	254				6.640	1.790	0.035					
14-Jul-83	239	5.75						0.134		0.094	22.970	
21-Jul-83	177	6.25						0.135		0.101	23.000	
28-Jul-83	148	5.60						0.101		0.117	26.650	
04-Aug-83	110	5.70						0.281		0.120	28.620	
13-Aug-83	87	6.65		2.905	7.474	2.373	0.004	0.410		0.126	30.600	
20-Aug-83	81	6.30		2.060	7.505	2.268	0.001	0.155		0.127	31.300	
31-Aug-83	111	5.70		1.579	7.744	2.390	0.002			0.154	34.500	
07-Sep-83	69	5.75		1.785	8.054	2.485	0.005	0.180		0.152	35.200	
15-Sep-83	54	5.60		1.742	8.839	2.783	0.008	0.405		0.164	38.200	
22-Sep-83	42	6.75		1.851	8.746	2.768	0.008	0.272		0.169	39.200	
29-Sep-83	35	5.70		2.017	9.052	2.898	0.009	0.228		0.174	39.400	
05-Oct-83	36	6.60		2.025	9.181	2.964	0.011	0.386		0.180	41.000	
12-Oct-83	33	5.65		3.110	9.579	3.153	0.037	0.572		0.182	41.600	
19-Oct-83	33	5.80		3.187	9.889	3.184	0.038			0.167	43.000	

**Table 8.** Snake River at SN3 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
16-Jul-82	0.000	0.000	0.192	0.017	0.125	0.675	0.001		0.009			0.162
20-Jul-82	0.000	0.000	0.159	0.017	0.105	0.589	0.001		0.006			0.144
24-Jul-82	0.000	0.000	0.546	0.019	0.258	0.550	0.001		0.008			0.151
28-Jul-82	0.000	0.000	0.391	0.015	0.203	0.505	0.001		0.026			0.137
01-Aug-82	0.000	0.003	0.510	0.020	0.377	0.497	0.001		0.012			0.165
05-Aug-82	0.000	0.000				0.454						
09-Aug-82	0.000	0.000	0.429	0.020	0.312	0.425	0.001		0.009			0.173
15-Aug-82	0.000	0.000										
21-Aug-82	0.000		0.932	0.024	0.639	0.358	0.001		0.010			0.169
28-Aug-82			1.365	0.020	0.810	0.369	0.001					0.207
04-Sep-82	0.000		1.538	0.024	0.816	0.396	0.001		0.011			0.187
12-Sep-82			0.473	0.019	0.317	0.344	0.001		0.026			0.172
19-Sep-82	0.000		1.330	0.013	0.131	0.329	0.000		0.025			0.016
26-Sep-82	0.000		1.230	0.020	0.531	0.394	0.001		0.026			0.180
03-Oct-82	0.000		1.782	0.023	0.618	0.525	0.001		0.011			0.288
10-Oct-82	0.000		1.385	0.023	0.536	0.458	0.001		0.014			0.258
18-Oct-82	0.000		0.929	0.023	0.220	0.535	0.001		0.015			0.267
25-Oct-82	0.000		1.582	0.021	0.425	0.510	0.001		0.014			0.248
08-Nov-82	0.000		0.940	0.020	0.138	0.505	0.000		0.011	0.031		0.259
27-Nov-82	0.000		1.803	0.019	0.298	0.575	0.000		0.011	0.018		0.389
28-Dec-82	0.000		1.255	0.006	0.133	0.614	0.000		0.000	0.019		0.296
31-Jan-83			1.730	0.006	0.174	0.620	0.000		0.000	0.000		0.302
27-Feb-83	0.000		2.118	0.007	0.249	0.653	0.000		0.000	0.028		0.314
31-Mar-83	0.000		4.702	0.015	0.101		0.000		0.003	0.000		0.533
21-Apr-83	0.000		1.137	0.007	0.093	0.662	0.000		0.000	0.000		0.334
06-May-83	0.000		1.234	0.007	0.331	0.565	0.000		0.000	0.053		0.267
20-May-83	0.000		1.874	0.010	0.335	0.613	0.000		0.000	0.035		0.307
01-Jun-83	0.000		0.897	0.007	1.085	0.271	0.000		0.000	0.022		0.138
07-Jun-83	0.000		0.621	0.004	0.419	0.267	0.000		0.000	0.055		0.153
16-Jun-83	1.540		0.729	0.019	1.495	0.225	0.000		0.000	0.000		0.132
23-Jun-83												
30-Jun-83												
06-Jul-83				0.024	0.520	0.206	0.000	0.002	0.006			0.187
13-Jul-83			0.829	0.020	0.494	0.268	0.000	0.002	0.009			0.160
14-Jul-83												
21-Jul-83												
28-Jul-83												
04-Aug-83												
13-Aug-83			0.350	0.020	0.304	0.320	0.000		0.000	0.111		0.232
20-Aug-83			0.461	0.013	0.247	0.325	0.000		0.000	0.059		0.177
31-Aug-83			1.009	0.010	0.362	0.353	0.000		0.000	0.000		0.209
07-Sep-83			0.928	0.010	0.296	0.359	0.000		0.000	0.000		0.202
15-Sep-83			0.753	0.008	0.410	0.406	0.000		0.000	0.000		0.228
22-Sep-83			0.889	0.009	0.280	0.395	0.000		0.000	0.000		0.223
29-Sep-83			0.995	0.009	0.313	0.423	0.000		0.000	0.000		0.247
05-Oct-83			0.864	0.008	0.215	0.438	0.000		0.000	0.000		0.230
12-Oct-83			1.099	0.018	0.249	0.457	0.000		0.011	0.024		0.238
19-Oct-83			1.388	0.018	0.298	0.457	0.000		0.011	0.037		0.277

**Table 8.** Snake River at SN3 water quality data (mg/L)\*

\* Discharge (Q) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Oct-83	29	6.20		3.159	10.190	3.210	0.041	0.258		0.184	48.900	
21-Nov-83	23	5.80						0.215		0.224	48.100	
30-Nov-83	23	5.70						0.308		0.242	50.200	
10-Dec-83	23	5.90						0.352		0.233	49.800	
30-Dec-83	20	5.00						0.223		0.242	51.400	
08-Jan-84	17							0.593		0.241	50.700	
28-Jan-84	15	5.45						0.178		0.259	55.400	
18-Feb-84	15	5.70						0.494		0.268	56.000	
19-Mar-84	13	5.50						0.198		0.269	58.000	
16-Apr-84	13	4.60		2.693	13.520	4.203	0.059	0.316		0.164	42.400	
22-Apr-84	15											
07-May-84	18	5.20		2.540	12.310	3.675	0.051					
15-May-84	91			1.899	9.523	2.504	0.031					
21-May-84	160	6.25	3.20	1.397	8.888	2.211	0.027	0.391		0.131	27.700	
23-May-84	235											
29-May-84	319	5.80	3.20	1.097	5.884	1.590	0.014	0.343		0.110	22.590	
07-Jun-84	238	6.25		0.428	3.202	5.734	0.000	0.197		0.064	12.770	
14-Jun-84	394	6.00	1.90	1.053	5.442	1.385	0.010	0.200		0.073	18.140	
19-Jun-84	430											
21-Jun-84	439	6.35	1.50	1.123	5.327	1.411	0.011	0.169		0.087	18.560	
26-Jun-84	381											
28-Jun-84	385	5.30	1.30	1.138	5.585	1.471	0.012	0.147		0.089	20.620	
05-Jul-84	314	5.65	1.50	1.147	5.844	1.469	0.012	0.118		0.083	19.450	
11-Jul-84	271											
12-Jul-84	247	5.75	1.70	1.175	6.371	1.628	0.008	0.111		0.095	20.930	
17-Jul-84	191		1.10									
19-Jul-84	174	5.90		1.186	6.921	1.752	0.010	0.187		0.100	20.390	
24-Jul-84	176											
26-Jul-84	221	6.20		1.191	6.911	1.801	0.009	0.176		0.097	23.000	
30-Jul-84	225											
02-Aug-84	244	6.20	1.40	1.247	7.114	1.862	0.012	0.113		0.105	23.770	
09-Aug-84	193											
10-Aug-84	176		1.40	1.393	7.605	1.991	0.016	0.146		0.113	25.560	
16-Aug-84	156		1.30	1.473	7.740	2.093	0.017	0.115		0.106	26.770	
21-Aug-84	162											
23-Aug-84	149		2.50	1.487	7.228	2.164	0.017	0.160		0.135	30.700	
07-Sep-84	104			1.580	7.723	2.191	0.028	0.168		0.115	30.400	
09-Sep-84	100											
10-Sep-84	92	6.18		1.761	8.062	2.290	0.029	0.307		0.134	34.367	
07-Nov-84	45											
08-Nov-84	44											
09-Nov-84	44											
23-Nov-84	34		1.30	1.627	7.599	2.182	0.040	0.698		0.103	22.880	
25-Dec-84	24		1.60	2.207	11.180	3.556	0.059	0.252		0.237	48.800	
08-Jan-85	19	5.15	1.35	2.327	11.590	3.699	0.061				50.700	
20-Feb-85	15											
28-Feb-85	15	5.20	1.60	2.507	12.240	3.983	0.067	0.366		0.254	54.500	
16-Mar-85	15	6.05										

**Table 8.** Snake River at SN3 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Oct-83			0.757	0.016	0.140	0.456	0.000		0.001	0.056		0.257
21-Nov-83												
30-Nov-83												
10-Dec-83												
30-Dec-83												
08-Jan-84												
28-Jan-84												
18-Feb-84												
19-Mar-84												
16-Apr-84		1.229			0.201	0.613	0.000		0.008	0.000	0.002	0.312
22-Apr-84												
07-May-84		0.736			0.187	0.519	0.000		0.004	0.000	0.005	0.255
15-May-84		0.000			0.020	0.308	0.000		0.002	0.000	0.007	0.136
21-May-84		0.530			0.289	0.247	0.000		0.000	0.000	0.000	0.115
23-May-84												
29-May-84		0.255			0.221	0.208	0.000		0.001	0.000	0.000	0.121
07-Jun-84		0.000			0.050	0.020	0.000		0.002	0.000	0.000	0.027
14-Jun-84		0.358			0.305	0.155	0.000		0.007	0.000	0.005	0.099
19-Jun-84												
21-Jun-84		0.000			0.131	0.163	0.000		0.006	0.000	0.000	0.096
26-Jun-84												
28-Jun-84		0.035			0.119	0.168	0.000		0.003	0.011	0.000	0.109
05-Jul-84		0.205			0.164	0.175	0.000		0.006	0.009	0.000	0.102
11-Jul-84												
12-Jul-84		0.164			0.087	0.203	0.000		0.005	0.034	0.004	0.118
17-Jul-84												
19-Jul-84		0.190			0.096	0.225	0.000		0.004	0.000	0.000	0.115
24-Jul-84												
26-Jul-84		0.180			0.142	0.231	0.000		0.005	0.014	0.018	0.135
30-Jul-84												
02-Aug-84		0.525			0.251	0.221	0.000		0.006	0.026	0.011	0.141
09-Aug-84												
10-Aug-84		0.658			0.263	0.234	0.000		0.007	0.032	0.000	0.161
16-Aug-84		0.308			0.154	0.249	0.000		0.004	0.008	0.000	0.155
21-Aug-84												
23-Aug-84		0.633			0.337	0.318	0.000		0.009	0.011	0.000	0.237
07-Sep-84		0.817			0.540	0.299	0.002		0.023	0.007	0.036	0.172
09-Sep-84												
10-Sep-84		0.582			0.434	0.310	0.000		0.013	0.012	0.018	0.175
07-Nov-84												
08-Nov-84												
09-Nov-84												
23-Nov-84		0.349			0.314	0.317	0.001		0.014	0.009	0.000	0.241
25-Dec-84		1.370			0.338	0.527	0.002		0.010	0.002	0.014	0.285
08-Jan-85		1.021			0.132	0.572	0.002		0.013	0.007	0.033	0.304
20-Feb-85												
28-Feb-85		1.411			0.236	0.609	0.001		0.012	0.002	0.008	0.311
16-Mar-85												

**Table 8.** Snake River at SN3 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Mar-85	15											
27-Mar-85	16	5.35	1.10	2.589	12.690	4.079	0.069	0.206		0.259	56.600	
16-Apr-85	38		1.00	2.083	10.830	3.167	0.055				42.400	
23-Apr-85	43											
29-Apr-85	56	5.50	1.00	2.269	12.060	3.640	0.065	0.278		0.223	50.200	
30-Apr-85	60											
07-May-85	97											
14-May-85	89											
18-May-85	99		1.00	1.713	9.922	2.644	0.049	0.317		0.148	36.700	
21-May-85	98											
23-May-85	116											
25-May-85	186	5.80	1.75	1.479	8.695	2.301	0.041	0.202		0.128	31.300	
28-May-85	246											
01-Jun-85	235	5.20		1.283	6.312	1.779	0.031	0.241		0.117	25.830	
04-Jun-85	250											
09-Jun-85	493	5.05	1.70	1.039	4.562	1.322	0.023	0.152		0.105	20.930	
11-Jun-85	365											
16-Jun-85	362	5.65			5.550	1.470		0.156		0.068	19.670	
19-Jun-85	303											
22-Jun-85	275	6.15			6.170	1.630		0.182		0.088	21.130	
25-Jun-85	179											
28-Jun-85	123	6.30			7.220	1.900		0.138		0.099	24.180	
09-Jul-85	134											
14-Jul-85	96	6.05			7.640	1.950		0.171		0.106	24.240	
20-Jul-85	110	5.80			7.890	2.100		0.160		0.107	25.940	
23-Jul-85	110											
27-Jul-85	110	6.60			10.510	3.640		0.183		0.118	29.090	
28-Jul-85	110		1.10									
03-Aug-85	88	6.20	1.00		8.000	2.220		0.145		0.120	28.650	
06-Aug-85	77											
11-Aug-85	63		1.00		9.010	2.600		0.132		0.135	33.300	
18-Aug-85	53	5.80	0.75		9.500	2.800				0.156	35.900	
20-Aug-85	48											
24-Aug-85	40	5.90	0.75		10.060	3.040		0.351		0.162	38.800	
31-Aug-85	34	5.85	0.70		10.400	3.160						
03-Sep-85	38											
14-Sep-85	33	5.80	0.80		11.060	3.390						
23-Sep-85	33		1.00									
26-Sep-85	32	6.40										
17-Oct-85	32	5.55			11.350	3.390						
22-Oct-85	29											
20-Nov-85	20	5.80			11.810	3.810		0.166		0.250	50.800	
28-Nov-85	20	5.80										
26-Dec-85	17	5.10		2.038	9.729	3.068	0.045	0.256		0.250	53.900	
16-Jan-86	12	5.20						0.210		0.266	56.000	
25-Feb-86	12			2.491	12.750	4.067	0.062	0.166		0.263	57.700	
25-Mar-86	12							0.170		0.270	59.000	
24-Apr-86	28			2.235	12.170	3.633	0.063	0.537		0.195	50.700	

**Table 8.** Snake River at SN3 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Mar-85				1.316		0.174	0.607	0.001		0.010	0.022	0.023
27-Mar-85				0.378		0.171	0.453	0.001		0.011	0.012	0.000
16-Apr-85												0.224
23-Apr-85												
29-Apr-85			0.557		0.214	0.522	0.001		0.011	0.000	0.012	0.285
30-Apr-85												
07-May-85												
14-May-85												
18-May-85		0.004			0.259	0.366	0.000		0.004	0.031	0.008	0.217
21-May-85												
23-May-85												
25-May-85		0.523			0.442	0.307	0.001		0.006	0.011	0.001	0.176
28-May-85												
01-Jun-85		0.175			0.111	0.235	0.002		0.009	0.000	0.005	0.178
04-Jun-85												
09-Jun-85		0.396			0.271	0.210	0.001		0.010	0.025	0.005	0.120
11-Jun-85												
16-Jun-85		0.205	0.018	0.241	0.168	0.001	0.000	0.006				0.109
19-Jun-85												
22-Jun-85		0.256	0.016	0.207	0.178	0.000	0.004	0.001				0.124
25-Jun-85												
28-Jun-85		0.230	0.018	0.233	0.205	0.000	0.000	0.000				0.139
09-Jul-85												
14-Jul-85		0.361	0.017	0.199	0.207	0.000	0.003	0.003				0.185
20-Jul-85		0.225	0.019	0.188	0.254	0.001	0.000	0.001				0.210
23-Jul-85												
27-Jul-85		2.830	0.064		0.367	0.002	0.016	0.026				0.368
28-Jul-85												
03-Aug-85		0.588	0.019	0.325	0.268	0.000	0.006	0.004				0.155
06-Aug-85												
11-Aug-85		0.782	0.019	0.445	0.333	0.000	0.001	0.006				0.195
18-Aug-85		0.761	0.019	0.322	0.369	0.001	0.002	0.005				0.222
20-Aug-85												
24-Aug-85		0.890	0.021	0.324	0.425	0.000	0.005	0.009				0.250
31-Aug-85		0.797	0.022	0.362	0.454	0.001	0.003	0.006				0.263
03-Sep-85												
14-Sep-85		1.100	0.022	0.397	0.517	0.000	0.008	0.010				0.281
23-Sep-85												
26-Sep-85												
17-Oct-85		0.990	0.019	0.438	0.495	0.000	0.007	0.005				0.264
22-Oct-85												
20-Nov-85		1.330	0.021	0.236	0.573	0.000	0.001	0.009				0.318
28-Nov-85												
26-Dec-85		0.586	0.013	0.097	0.474	0.000	0.000	0.004	0.001	0.000		0.245
16-Jan-86												
25-Feb-86		1.181	0.016	0.209	0.615	0.000	0.000	0.007	0.016	0.001	0.001	0.307
25-Mar-86												
24-Apr-86		1.515	0.021	0.317	0.517	0.000	0.000	0.008	0.000	0.000	0.000	0.249

**Table 8.** Snake River at SN3 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
30-Apr-86	29	4.89		1.163	10.240	3.054	0.054			0.199	51.300	
11-May-86	57	6.22										
20-May-86	104	5.15		1.314	7.450	2.022	0.033	0.312		0.133	28.760	
22-May-86	145											
27-May-86	207	5.25		1.275	6.610	1.916	0.030	0.272		0.133	27.490	
03-Jun-86	258	4.94										
11-Jun-86	312	5.70										
17-Jun-86	408	5.75										
24-Jun-86	364	5.40										
07-Jul-86	273											
22-Jul-86	165											
05-Aug-86	92											
26-Jan-87	17			2.356		4.431	0.072				12.010	
19-Feb-87	15			2.407		4.425	0.076				11.145	
18-Mar-87	13			2.104		4.456	0.075				10.535	
23-Apr-87	32			3.754		3.350	0.066				8.340	
13-May-87	173			2.131	8.424	6.520	0.044				19.950	
26-May-87	136				8.098							
02-Jun-87	187			5.652	5.819	1.733	0.030				11.685	
09-Jun-87	346			4.763	4.992	1.324	0.026				11.225	
16-Jun-87	238			1.962	5.409	1.324	0.027				9.842	
23-Jun-87	168			0.920	6.278	1.362	0.032				12.280	
01-Jul-87	129			2.178	6.543	1.498	0.031				10.760	
07-Jul-87	92			0.937	7.428	1.699	0.037				12.420	
15-Jul-87	70			1.282	8.713	3.199	0.044				16.210	
22-Jul-87	58			1.558	8.980	4.205	0.046				18.290	
28-Jul-87	78			2.147	9.193	5.851	0.046				21.035	
04-Aug-87	66				9.640					38.176		
11-Aug-87	52				9.751					43.900		
18-Aug-87	41									50.505		
25-Aug-87	55									46.889		
01-Sep-87	39			4.550	10.660	3.894	0.057			52.162	16.265	
08-Sep-87	34				12.784					57.222		
16-Sep-87	35				11.418					55.077		
23-Sep-87	27				12.023					59.682		
30-Sep-87	24			2.643	12.095	6.313	0.066			59.590	20.005	
10-Oct-87	21			3.323	12.729	7.670	0.075				20.840	
20-Oct-87	17			3.823	12.613	8.342	0.072				21.960	
11-Nov-87	17			4.445	12.361	9.754	0.070				22.380	
28-Nov-87	19			5.099	13.095	4.671	0.074				24.784	
27-Dec-87	19				12.385							
23-Jan-88	11			3.529	13.300	4.585	0.078			69.052		
21-Feb-88	12			3.620	13.775	4.711	0.080					
19-Mar-88	12			4.022	14.010	4.788	0.083					
10-Apr-88	23			2.607	13.200	4.596	0.078					
23-Apr-88	23			2.403	12.610	4.180	0.072					
03-May-88	30			2.271	12.450	3.973	0.071					
11-May-88	37			1.964	11.220	3.304	0.064					

**Table 8.** Snake River at SN3 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
30-Apr-86			1.026	0.018	0.192	0.438	0.003	0.007	0.014	0.073	0.059	0.219
11-May-86			0.164	0.016	0.333	0.263	0.001	0.000	0.002	0.013	0.000	0.149
20-May-86												
22-May-86												
27-May-86			0.590	0.015	0.420	0.272	0.000	0.000	0.002	0.000	0.000	0.155
03-Jun-86												
11-Jun-86												
17-Jun-86												
24-Jun-86												
07-Jul-86												
22-Jul-86												
05-Aug-86												
26-Jan-87			1.952	0.021	0.045	0.698				0.092	0.356	
19-Feb-87			2.899	0.024	0.294	0.668			0.029		0.084	0.333
18-Mar-87			2.017	0.023	0.246	0.655			0.023		0.067	0.339
23-Apr-87			1.981	0.023	0.636	0.535						0.281
13-May-87			1.982	0.019	0.935	0.334	0.011	0.013			0.089	0.209
26-May-87							0.007					
02-Jun-87			0.442	0.017	0.282	0.216						0.127
09-Jun-87			0.511	0.018	0.117	0.168	0.006					0.111
16-Jun-87			0.461	0.019	0.182	0.160	0.006	0.018				0.104
23-Jun-87			1.020	0.019	0.373	0.204	0.006	0.015				0.143
01-Jul-87			0.541	0.018	0.146	0.185	0.003					0.123
07-Jul-87			0.577	0.022	0.132	0.229	0.007	0.013			0.053	0.158
15-Jul-87			1.361	0.020	0.391	0.314	0.007	0.012			0.085	0.203
22-Jul-87			1.282	0.022	0.237	0.320	0.009				0.053	0.216
28-Jul-87			1.749	0.022	0.371	0.348	0.010					0.215
04-Aug-87								0.019	0.020	0.121		
11-Aug-87							0.008	0.007	0.013	0.088		
18-Aug-87												
25-Aug-87												
01-Sep-87			1.565	0.026	0.303	0.520	0.004	0.004	0.015	0.030		0.332
08-Sep-87												
16-Sep-87							0.007	0.019	0.026	0.104		
23-Sep-87									0.020	0.133		
30-Sep-87			2.236	0.023	0.404	0.309	0.003	0.009	0.006		0.018	0.372
10-Oct-87			3.203	0.026	0.451	0.720	0.008	0.012	0.020	0.054	0.041	0.453
20-Oct-87			2.791	0.025	0.499	0.705	0.008	0.018	0.015	0.062	0.074	0.399
11-Nov-87			3.039	0.024	0.567	0.664	0.007	0.012	0.028	0.057	0.001	0.383
28-Nov-87			3.077	0.023	0.585	0.693	0.003	0.009	0.016	0.028	0.024	0.412
27-Dec-87								0.017	0.020	0.117		
23-Jan-88			1.216	0.023	0.072	0.696	0.003	0.017	0.017	0.114	0.047	0.380
21-Feb-88			1.304	0.022	0.089	0.713	0.001	0.008	0.010	0.033		0.395
19-Mar-88			1.621	0.024	0.145	0.727	0.003	0.018	0.023	0.145	0.029	0.401
10-Apr-88			2.284	0.022	0.334	0.664				0.010	0.015	0.023
23-Apr-88			1.809	0.021	0.504	0.569		0.010	0.008	0.013		0.294
03-May-88			1.783	0.023	0.578	0.521	0.007	0.009	0.007	0.014		0.279
11-May-88			0.970	0.020	0.466	0.423		0.006	0.004	0.000		0.258

**Table 8.** Snake River at SN3 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
18-May-88	157			1.453	8.379	2.519	0.045					
25-May-88	129			1.642	9.551	2.801	0.050					
01-Jun-88	166			1.292	7.358	2.160	0.039					
09-Jun-88	434										26.819	
13-Jun-88	329										27.886	
14-Jun-88	304										26.566	
21-Jun-88	312										27.313	
29-Jun-88	307										24.598	
06-Jul-88	171										26.124	
13-Jul-88	113											
27-Dec-88	15										67.584	
31-Dec-88	14										71.792	
27-Jan-89	11			2.590		5.718	0.069				70.532	18.830
20-Feb-89	10										74.143	
28-Mar-89	13			2.280		5.074	0.065				72.078	19.100
12-Apr-89	17			3.108		5.218	0.078				73.274	13.570
27-Apr-89	59			2.999		6.449	0.082				45.717	22.610
02-May-89	38			2.197		5.716	3.055				57.910	8.893
09-May-89	84			2.411		5.374	0.069				49.680	19.820
16-May-89	78			1.975		4.092	0.059				47.518	13.820
24-May-89	256			1.985		4.160	0.062				29.117	13.960
31-May-89	321			2.126		4.402	0.065				27.949	14.740
06-Jun-89	231			1.227		2.033	0.034				29.217	8.293
14-Jun-89	218			1.094		1.832	0.031				29.888	1.796
20-Jun-89	268			1.181		1.764	0.030				28.224	7.342
24-Jun-89	179											
29-Jun-89	164			1.322		1.943	0.033					7.748
18-Jul-89	89			1.837		2.700	0.045					9.746
26-Jul-89	145											
27-Jul-89	111										31.132	
31-Jul-89	123			2.186		3.362	0.055					11.840
12-Aug-89	78			2.084		3.027	0.051					11.600
24-Aug-89	45										50.618	
26-Aug-89	42			2.566		3.789	0.062					13.630
31-Aug-89	38											
10-Sep-89	36			2.654		3.913	0.063					13.710
19-Sep-89	36										51.168	
26-Sep-89	33			2.334		3.849	0.061					12.420
15-Oct-89	25			2.531		4.386	0.069					14.540
16-Oct-89	27										59.689	
28-Oct-89	22			2.668		4.406	0.069					13.960
07-Nov-89	19											
20-Nov-89	19			2.433		4.291	0.067				63.079	15.050
27-Nov-89	16			2.636		4.412	0.072					13.820
29-Dec-89	13			2.896		4.885	0.075					14.790
31-Dec-89	13			2.557		4.275	0.063					15.260

**Table 8.** Snake River at SN3 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
18-May-88			1.332	0.021	0.957	0.325	0.005	0.010	0.007	0.012	0.006	0.203
25-May-88			1.204	0.019	0.608	0.358		0.004	0.006	0.013		0.216
01-Jun-88			0.670	0.017	0.286	0.252		0.004	0.004			0.172
09-Jun-88												
13-Jun-88												
14-Jun-88												
21-Jun-88												
29-Jun-88												
06-Jul-88												
13-Jul-88												
27-Dec-88												
31-Dec-88												
27-Jan-89		4.395	0.027	0.611	0.927			0.016		0.000	0.763	
20-Feb-89												
28-Mar-89		4.095	0.026	0.792	0.818			0.015		0.000	0.598	
12-Apr-89		1.022	0.022	0.105	0.650			0.008		0.000	0.522	
27-Apr-89		5.147	0.027	0.677	1.032			0.019		0.000	0.779	
02-May-89		0.501	0.021	0.137	0.065			0.019		0.000	0.039	
09-May-89		4.291	0.023	0.457	0.860			0.014		0.000	0.602	
16-May-89		0.956	0.020	0.074	0.516			0.013			0.358	
24-May-89		1.425	0.019	0.233	0.520			0.009		0.000	0.352	
31-May-89		1.733	0.021	0.252	0.533			0.007		0.000	0.354	
06-Jun-89		0.977	0.019	0.439	0.202			0.006		0.000	0.166	
14-Jun-89		0.701	0.018	0.407	0.179			0.004		0.000	0.130	
20-Jun-89		0.301	0.018	0.306	0.162			0.008		0.000	0.128	
24-Jun-89												
29-Jun-89		0.580	0.019	0.353	0.169			0.003		0.000	0.145	
18-Jul-89		1.244	0.022	0.507	0.266			0.007		0.000	0.227	
26-Jul-89												
27-Jul-89												
31-Jul-89		1.497	0.028	0.461	0.400			0.071		0.000	0.349	
12-Aug-89		1.077	0.026	0.503	0.344			0.008		0.000	0.270	
24-Aug-89												
26-Aug-89		1.999	0.027	0.737	0.484			0.015		0.000	0.374	
31-Aug-89												
10-Sep-89		0.777	0.026	0.211	0.497			0.011		0.000	0.350	
19-Sep-89												
26-Sep-89		0.696	0.023	0.362	0.497			0.009		0.000	0.314	
15-Oct-89		1.311	0.026	0.182	0.584			0.022		0.000	0.390	
16-Oct-89												
28-Oct-89		1.399	0.024	0.038	0.573			0.011		0.000	0.364	
07-Nov-89												
20-Nov-89		2.818	0.022	0.658	0.588			0.012		0.000	0.324	
27-Nov-89		1.191	0.022	0.025	0.593			0.010		0.000	0.392	
29-Dec-89		1.598	0.024	0.101	0.648			0.012		0.000	0.430	
31-Dec-89		3.354	0.026	0.902	0.579			0.013		0.000	0.336	

**Table 9.** Snake River at SN4 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
23-Oct-79	22			2.656	15.340	3.880	0.071					
27-Dec-79	15		0.30		13.890	4.168	0.084	0.379	0.214	0.289	56.054	
21-Feb-80	12	6.10	0.10		15.730	4.557	0.094	0.348	0.006	0.204	56.517	
10-Apr-80	12										22.000	
14-Apr-80	12	6.80	0.10		15.320	4.517	0.093	0.365	0.006	0.229	60.562	
16-Apr-80	12											
04-May-80	26	5.60	0.30		14.680	4.040	0.085	0.470	0.013	0.177	48.542	
05-May-80	32											
19-May-80	37	6.00	0.90		15.390	4.349	0.093	0.300		0.400	53.000	
01-Jun-80	191		0.70									
06-Jun-80	357	5.60	1.30		6.322	1.674	0.036	0.292	0.024	0.109	19.640	
27-Jun-80	360		1.20		5.960	1.534	0.031	0.131	0.027	0.105	16.524	
10-Jul-80	202		0.50									
04-Aug-80	64	6.70	0.20	3.048	9.976	2.675	0.057	0.400		0.200	34.000	
18-Aug-80	43		0.40	2.891	14.770	2.982	0.065	0.000	0.006	0.243	38.375	
18-Sep-80	30	6.40	0.10	2.618	13.180	3.413	0.070	0.317	0.006	0.166	43.462	
21-Oct-80	23	6.12	0.20	2.715	14.460	4.013	0.068	0.378	0.014	0.212	49.772	
18-Dec-80	15	6.11	0.10	2.946	17.180	4.406	0.088	0.228	0.006	0.268	58.055	
10-Jan-81	13											
25-Mar-81	10	6.38	0.30	3.468	18.990	4.679	0.098	0.731	0.006	0.214	61.299	
17-Apr-81	18	6.00	1.30	4.227	16.140		0.065	2.686	0.145	0.260	40.928	
04-May-81	63	6.75	1.90	1.734	12.500	2.570	0.053	0.736	0.009	0.189	28.538	
15-May-81	38	6.00	0.60	2.427	13.470	3.427	0.070	0.631	0.008	0.159	42.304	
01-Jun-81	154	6.57	1.10	1.440	9.126	1.781	0.039	0.273	0.025	0.100	20.907	
17-Jun-81	106	6.68	0.90	1.747	12.980	2.177	0.043	0.248	0.006	0.117	26.482	
23-Jun-81	88	5.51	0.60	1.695	9.438	2.409	0.049	0.235	0.006	0.131	27.017	
07-Jul-81	66	6.89	0.50	1.896	9.691	2.617	0.055	0.398	0.026	0.140	32.490	
22-Jul-81	51	6.08	0.40	2.235	10.770	2.853	0.061	0.299	0.063	0.150	39.724	
06-Aug-81	34	6.22	0.20	2.510	12.830	3.253	0.071	0.263	0.006	0.178	45.979	
20-Aug-81	40			3.510	11.320	3.200	0.063	1.274	0.006	0.271	41.207	
02-Jan-82	12											
13-May-82	37	5.75	0.60	2.691	15.080	3.459	0.077	0.476	0.000	0.146	44.679	
25-May-82	68	6.46	0.60	2.408	12.150	2.889	0.069	0.367	0.000	0.128	37.966	
28-May-82	101		1.40	1.938	11.930	2.814	0.067	0.429	0.000	0.127	36.015	
01-Jun-82	164	6.79		1.729	9.880	2.332	0.055	0.292	0.000	0.116	29.006	
04-Jun-82	165	5.65	1.70	1.596	7.411	2.200	0.043	0.297	0.013	0.160	28.065	
07-Jun-82	232	6.50	2.00	1.609	8.692	2.069	0.048	0.369	0.003	0.088	26.728	
10-Jun-82	278	6.10	1.60	1.583	8.406	1.998	0.044	0.256	0.010	0.093	23.759	
13-Jun-82	310	6.35	1.90	1.523	7.533	1.723	0.039	0.227	0.000	0.100	21.021	
16-Jun-82	316	6.40	1.20	1.456	7.858	1.806	0.041	0.282	0.000	0.093	23.804	
19-Jun-82	284	6.60	2.50	1.448	7.805	1.803	0.040	0.435	0.008	0.048	23.459	
22-Jun-82	359	6.35	2.90	1.357	6.763	1.533	0.037	0.509	0.046	0.139	17.306	
25-Jun-82	396	6.20	1.20	1.265	6.732	1.540	0.036	0.291	0.032	0.126	19.187	
28-Jun-82	440	6.55	1.90	1.276	6.417	1.468	0.034	0.730	0.000	0.088	17.211	
01-Jul-82	438	6.45	1.00	1.181	6.228	1.411	0.032	0.745	0.000	0.104	16.497	
04-Jul-82	376	6.15	1.40	1.228	6.508	1.474	0.035	0.288	0.000	0.074	16.967	
08-Jul-82	261	6.60	1.00	1.453	7.473	1.734	0.040	0.410	0.000	0.096	20.277	
12-Jul-82	242	6.60	0.70	1.760	7.655	1.781	0.030	0.421	0.000	0.086	19.747	

**Table 9.** Snake River at SN4 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
23-Oct-79			0.139	0.022	0.123	0.439	0.001		0.011			0.284
27-Dec-79	0.000	0.194	0.852	0.029	0.155	0.447	0.003		0.011			0.236
21-Feb-80	2.452	0.000	0.137	0.030	0.268	0.484	0.002		0.005			0.265
10-Apr-80												
14-Apr-80	9.148	0.000	0.135	0.034	0.053	0.470	0.001		0.005			0.244
16-Apr-80												
04-May-80	0.000	0.000	0.089	0.030	0.046	0.394	0.001		0.001			0.198
05-May-80												
19-May-80			0.064	0.024	0.043	0.387	0.001		0.004			0.219
01-Jun-80												
06-Jun-80			0.052	0.016	0.016	0.162	0.001		0.002			0.102
27-Jun-80	0.000	0.000	0.074	0.007	0.020	0.110	0.001		0.004			0.067
10-Jul-80												
04-Aug-80			0.095	0.022	0.095	0.252	0.001		0.003			0.157
18-Aug-80	0.000	0.000	0.000	0.023	0.075	0.326	0.001		0.001			0.257
18-Sep-80	0.000	0.011	0.354	0.025	0.195	0.380	0.001		0.004			0.278
21-Oct-80	3.265	0.000	0.613	0.022	0.249	0.454	0.001		0.019			0.293
18-Dec-80	0.000	0.000	0.903	0.024	0.208	0.468	0.001		0.013			0.330
10-Jan-81												
25-Mar-81	0.000	0.010	0.655	0.025	0.186	0.493	0.001		0.009			0.368
17-Apr-81	0.000	0.026	0.438	0.021	0.158	0.503	0.001		0.015			0.335
04-May-81	0.517	0.000	0.526	0.019	0.464	0.304	0.001		0.013			0.159
15-May-81	0.006	0.000	0.820	0.025	0.321	0.372	0.001		0.007			0.280
01-Jun-81	0.000	0.000	0.325	0.016	0.245	0.170	0.000		0.002			0.122
17-Jun-81	0.000	0.000	0.356	0.018	0.189	0.210	0.000		0.009			0.196
23-Jun-81	0.000	0.007	0.546	0.019	0.198	0.228	0.000		0.007			0.153
07-Jul-81	0.000	0.000	0.280	0.021	0.133	0.266	0.001		0.007			0.194
22-Jul-81	0.000	0.000	0.259	0.023	0.173	0.346	0.001		0.009			0.276
06-Aug-81	0.000	0.006	0.002	0.026	0.156	0.387	0.001		0.008			0.305
20-Aug-81	16.288	0.000	1.970	0.024	0.512	0.392	0.001		0.020			0.289
02-Jan-82												
13-May-82	0.000	0.000	0.097	0.023	0.113	0.348	0.001		0.005			0.302
25-May-82	0.000	0.000	0.552	0.020	0.251	0.284	0.000		0.008			0.285
28-May-82	0.000	0.000	0.363	0.019	0.176	0.288	0.001		0.010			0.284
01-Jun-82	0.000	0.012	0.456	0.020	0.402	0.263	0.001		0.010			0.260
04-Jun-82	0.000	0.000	1.467	0.019	0.581	0.312	0.001		0.008			0.191
07-Jun-82	0.000	0.000	0.139	0.017	0.084	0.212	0.001		0.007			0.290
10-Jun-82	0.000	0.000	0.276	0.017	0.212	0.199	0.001		0.007			0.301
13-Jun-82	0.000	0.055	0.637	0.017	0.372	0.174	0.001		0.010			0.217
16-Jun-82	0.466	0.000	0.148	0.017	0.128	0.162	0.001		0.007			0.243
19-Jun-82	0.000	0.000	0.000	0.017	0.042	0.159	0.001		0.007			0.176
22-Jun-82	0.299	0.000	0.000	0.017	0.029	0.128	0.001		0.005			0.156
25-Jun-82	0.000	0.000	0.171	0.016	0.092	0.118	0.000		0.006			0.166
28-Jun-82	0.000	0.000	0.457	0.017	0.197	0.113	0.001		0.006			0.138
01-Jul-82	0.745	0.000	0.239	0.018	0.205	0.126	0.000		0.018			0.114
04-Jul-82	0.000	0.000	0.309	0.018	0.150	0.128	0.001		0.005			0.117
08-Jul-82	0.000	0.000	0.641	0.021	0.365	0.247	0.001		0.007			0.444
12-Jul-82	0.000	0.000	0.215	0.016	0.097	0.278	0.002		0.009			0.129

**Table 9.** Snake River at SN4 water quality data (mg/L)\*

\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
16-Jul-82	206	6.90	1.00	1.925	8.360	2.254	0.035	0.860	0.000	0.093	24.078	
20-Jul-82	173	6.80	1.20	1.856	8.289	1.983	0.034	0.882	0.004	0.096	23.985	
24-Jul-82	152	6.15	0.60					0.311	0.000	0.097	21.833	
28-Jul-82	182	6.55	2.10	1.830	7.947	1.970	0.041	0.381	0.175	0.117	23.496	
01-Aug-82	135	6.40	0.50	1.947	8.013	2.011	0.043	0.253	0.007	0.107	25.499	
05-Aug-82	116	6.60	0.40	2.061	8.241	2.057	0.046	0.537	0.327	0.141	24.421	
09-Aug-82	93	6.45	1.20	2.067	8.320	2.095	0.039	0.281	0.068	0.118	25.245	
15-Aug-82	100	6.65	0.90	2.040	8.370	1.943	0.045	0.400	0.000	0.106	21.407	
21-Aug-82	114	6.60	0.75	2.019	8.393	2.010	0.040	0.290		0.070	35.330	
28-Aug-82	77	6.60	0.90	1.772	10.010	2.526	0.055	1.030		0.150	40.850	
04-Sep-82	57	6.55	1.10	1.934	10.450	2.666	0.060	1.570		0.100	44.700	
12-Sep-82	68	6.45	1.00	3.069	10.850	2.693	0.058					
19-Sep-82	56	6.75	0.70	1.277	6.924	1.773	0.047	0.640		0.080	24.860	
26-Sep-82	52	6.70	0.50	2.001	9.484	2.485	0.058	0.330		0.110	42.910	
03-Oct-82	46	6.40	0.60	2.078	9.765	2.579	0.068	0.260		0.110	48.070	
10-Oct-82	46	6.20	0.80	2.087	10.750	2.862	0.071	0.580		0.100	51.190	
18-Oct-82	43	6.55		3.378	12.290	3.448	0.056	0.430		0.130	52.300	
25-Oct-82	38	6.35		3.095	11.880	3.370	0.056	0.440		0.100	52.870	
08-Nov-82	25	6.05		2.235	12.260	3.425	0.022	0.190		0.110	55.750	
27-Nov-82	25	5.75		2.593	12.990	3.685	0.033	0.380		0.160	57.220	
28-Dec-82	20	5.85		2.488	13.790	3.921	0.038	0.220		0.150	60.970	
31-Jan-83	15	5.65		2.889	14.320	4.027	0.040	0.330		0.160	61.680	
27-Feb-83	13	6.40		2.977	14.970	4.178	0.045	0.300		0.140	63.680	
31-Mar-83	13	5.70		3.126	15.320	4.246	0.047	0.290		0.150	66.090	
21-Apr-83	14	6.20		3.248	15.370	4.236	0.045	0.740		0.160	64.020	
06-May-83	15	5.80		2.589	14.430	3.828	0.040	0.430		0.150	57.690	
20-May-83	17	6.60		2.897	15.060	4.052	0.047	2.850		0.160	58.860	
01-Jun-83	119			2.124	9.036	2.234	0.010	0.390		0.110	43.300	
07-Jun-83	136			2.650	9.350	2.306	0.013	1.150		0.080	37.730	
16-Jun-83	284			2.011	5.385	1.463	0.000	1.520		0.050	22.110	
23-Jun-83	523	6.45									17.090	
30-Jun-83	422	6.05						0.250		0.100	20.790	
06-Jul-83	339	6.50						0.161		0.095	21.310	
13-Jul-83	254											
14-Jul-83	239	6.20								0.107	24.020	
21-Jul-83	177	6.80						0.221		0.105	24.290	
28-Jul-83	148	6.00										
04-Aug-83	110	6.05						0.168		0.128	30.800	
13-Aug-83	87	6.80		2.437	9.467	2.495	0.010	0.235		0.137	33.300	
20-Aug-83	81	6.85		2.327	9.331	2.486	0.010	0.476		0.135	33.700	
31-Aug-83	111	6.95		2.434	9.378	2.533	0.013	0.222		0.145	36.300	
07-Sep-83	69	7.00		2.902	9.869	2.645	0.017	0.220		0.148	37.900	
15-Sep-83	54	7.00		2.483	10.670	2.884	0.020			0.154	40.900	
22-Sep-83	42	7.40		2.774	13.140	3.141	0.031	0.222		0.174	43.300	
29-Sep-83	35	6.95		2.870	11.040	3.038	0.020					
05-Oct-83	36	7.25		2.743	11.340	3.109	0.023	0.352		0.191	45.000	
12-Oct-83	33	7.30		2.743	11.660	3.218	0.025	0.432		0.171	44.300	
19-Oct-83	33	6.30										

**Table 9.** Snake River at SN4 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
16-Jul-82	0.000	0.000	0.310	0.019	0.162	0.510	0.001		0.011			0.170
20-Jul-82	0.000	0.000	0.189	0.018	0.114	0.427	0.001		0.008			0.145
24-Jul-82	0.008	0.000										
28-Jul-82	0.000	0.123	0.207	0.020	0.134	0.368	0.000		0.005			0.155
01-Aug-82	0.000	0.000	0.405	0.021	0.239	0.365	0.001		0.008			0.168
05-Aug-82	0.000	0.457	0.329	0.023	0.189	0.365	0.001		0.007			0.192
09-Aug-82	0.000	0.000	0.313	0.018	0.158	0.338	0.000		0.017			0.170
15-Aug-82	0.000	0.000	0.429	0.021	0.457	0.252	0.000		0.013			0.128
21-Aug-82	0.320		0.614	0.021	0.452	0.279	0.001		0.018			0.144
28-Aug-82	0.860		0.653	0.026	0.425	0.325	0.001		0.013			0.225
04-Sep-82	1.120		0.590	0.023	0.291	0.299	0.001		0.021			0.251
12-Sep-82			0.537	0.022	0.333	0.288	0.001		0.010			0.221
19-Sep-82	0.350		0.697	0.020	0.348	0.215	0.001		0.009			0.203
26-Sep-82	0.490		0.988	0.023	0.480	0.305	0.001		0.020			0.278
03-Oct-82	0.490		0.398	0.023	0.231	0.302	0.001		0.008			0.272
10-Oct-82	0.500		0.575	0.025	0.262	0.338	0.001		0.011			0.308
18-Oct-82	0.580		0.381	0.020	0.180	0.401	0.001		0.011			0.243
25-Oct-82	0.450		0.063	0.019	0.067	0.390	0.001		0.012			0.241
08-Nov-82	0.540		0.630	0.010	0.170	0.379	0.000		0.000	0.000		0.289
27-Nov-82	0.620		0.434	0.012	0.118	0.415	0.000		0.000	0.013		0.322
28-Dec-82	0.600		0.643	0.012	0.188	0.453	0.000		0.000	0.000		0.329
31-Jan-83	0.580		0.633	0.011	0.150	0.452	0.000		0.000	0.043		0.332
27-Feb-83	0.540		0.661	0.011	0.120	0.452	0.000		0.000	0.039		0.336
31-Mar-83	0.430		0.194	0.011	0.047	0.458	0.000		0.000	0.055		0.338
21-Apr-83	0.490		0.778	0.007	0.142	0.458	0.000		0.000	0.000		0.346
06-May-83	0.350		1.459	0.008	0.344	0.381	0.000		0.000	0.012		0.281
20-May-83	0.350		0.758	0.011	0.156	0.402	0.000		0.000	0.066		0.306
01-Jun-83	0.670		0.493	0.008	0.458	0.216	0.000		0.000	0.018		0.166
07-Jun-83	1.640		0.475	0.005	0.280	0.218	0.000		0.000	0.085		0.199
16-Jun-83	2.330		1.167	0.010	0.195	0.228	0.000		0.000	0.021		0.213
23-Jun-83												
30-Jun-83												
06-Jul-83												
13-Jul-83												
14-Jul-83												
21-Jul-83												
28-Jul-83												
04-Aug-83												
13-Aug-83			0.273	0.012	0.113	0.258	0.000		0.000	0.046		0.227
20-Aug-83			0.494	0.009	0.257	0.276	0.000		0.000	0.002		0.325
31-Aug-83			0.764	0.010	0.392	0.335	0.000		0.000	0.038		0.351
07-Sep-83			0.481	0.009	0.178	0.304	0.000		0.000	0.017		0.373
15-Sep-83			0.367	0.010	0.174	0.319	0.000		0.000	0.068		0.390
22-Sep-83			0.260	0.020	0.145	0.368	0.000		0.000	0.036		0.365
29-Sep-83			0.762	0.008	0.325	0.343	0.000		0.000	0.009		0.334
05-Oct-83			0.674	0.011	0.286	0.344	0.000		0.000	0.048		0.325
12-Oct-83			0.272	0.007	0.096	0.354	0.000		0.000	0.000		0.309
19-Oct-83												

**Table 9.** Snake River at SN4 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Oct-83	29	6.30		3.659	12.630	3.454	0.028	0.446		0.171	43.000	
21-Nov-83	23	6.20						0.666		0.187	50.600	
30-Nov-83	23	6.60						0.306		0.184	51.300	
10-Dec-83	23	6.50						0.200		0.187	51.700	
30-Dec-83	20	5.70						0.227		0.203	52.600	
08-Jan-84	17							0.313		0.183	51.900	
28-Jan-84	15	6.85						0.239		0.202	55.300	
18-Feb-84	15	6.90						0.310		0.199	56.300	
19-Mar-84	13	6.80						0.200		0.201	58.500	
16-Apr-84	13	6.20		2.762	16.480	4.340	0.088	0.353		0.171	43.700	
22-Apr-84	15											
07-May-84	18	6.15		2.319	14.220	3.576	0.074					
15-May-84	91			1.867	11.590	2.722	0.059					
21-May-84	160	6.70	2.90	1.519	10.270	2.369	0.052	0.335		0.141	26.240	
23-May-84	235											
29-May-84	319	6.75	3.30	1.218	7.509	1.729	0.040	0.160		0.105	23.370	
07-Jun-84	238	6.25	1.90	1.482	8.813	2.057	0.044	0.208		0.110	27.530	
14-Jun-84	394	6.15	2.30	1.098	6.555	1.469	0.031	0.238		0.090	19.070	
19-Jun-84	430											
21-Jun-84	439	6.95	2.10	1.263	6.698	1.526	0.033	0.391		0.092	20.010	
26-Jun-84	381											
28-Jun-84	385	6.30	1.50	1.202	6.900	1.558	0.032	0.179		0.094	20.470	
05-Jul-84	314	6.20	1.60	1.275	7.197	1.622	0.034	0.167		0.093	20.860	
11-Jul-84	271											
12-Jul-84	247	6.15	1.60	1.483	7.690	1.714	0.035	0.170		0.102	22.440	
17-Jul-84	191		1.50									
19-Jul-84	174	6.30		1.382	8.420	1.916	0.040	0.162		0.107	25.660	
24-Jul-84	176											
26-Jul-84	221	7.10	1.60	1.479	8.285	1.924	0.040	0.325		0.103	24.330	
30-Jul-84	225											
02-Aug-84	244	6.90	1.70	1.475	8.687	2.041	0.043	0.114		0.112	26.490	
09-Aug-84	193											
10-Aug-84	176		1.50	1.560	9.444	2.172	0.048	0.154		0.125	29.280	
16-Aug-84	156		1.30	1.653	9.803	2.299	0.050	0.131		0.133	30.700	
21-Aug-84	162											
23-Aug-84	149		1.30	1.625	8.917	2.269	0.049	0.164		0.126	31.300	
07-Sep-84	104											
09-Sep-84	100	6.95		1.652	10.023	2.470	0.000	0.203		0.122	35.333	
10-Sep-84	92											
07-Nov-84	45		0.95									
08-Nov-84	44											
09-Nov-84	44											
23-Nov-84	34		1.45	1.856	10.270	2.411	0.051	0.212		0.135	32.300	
25-Dec-84	24		1.25	2.456	13.640	3.646	0.068	0.297		0.172	50.200	
08-Jan-85	19	6.00	1.60	2.518	13.890	3.717	0.070				51.900	
20-Feb-85	15											
28-Feb-85	15	5.95	1.70	2.895	14.980	3.986	0.075	0.295		0.181	56.800	
16-Mar-85	15	6.90										

**Table 9.** Snake River at SN4 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Oct-83			0.425	0.007	0.168	0.346	0.000		0.000	0.000		0.309
21-Nov-83												
30-Nov-83												
10-Dec-83												
30-Dec-83												
08-Jan-84												
28-Jan-84												
18-Feb-84												
19-Mar-84												
16-Apr-84			0.000		0.018	0.406	0.000		0.002	0.006	0.000	0.337
22-Apr-84												
07-May-84			0.469		0.133	0.324	0.000		0.002	0.000	0.000	0.252
15-May-84			1.306		0.353	0.233	0.001		0.002	0.000	0.007	0.167
21-May-84			2.046		0.829	0.234	0.003		0.003	0.000	0.027	0.166
23-May-84												
29-May-84			0.380		0.149	0.143	0.001		0.000	0.000	0.001	0.191
07-Jun-84			0.158		0.130	0.172	0.001		0.000	0.000	0.017	0.176
14-Jun-84			0.335		0.172	0.109	0.002		0.000	0.000	0.020	0.101
19-Jun-84												
21-Jun-84			0.173		0.053	0.120	0.001		0.000	0.000	0.005	0.105
26-Jun-84												
28-Jun-84			0.043		0.009	0.118	0.001		0.000	0.000	0.038	0.085
05-Jul-84			0.104		0.021	0.136	0.000		0.000	0.002	0.007	0.096
11-Jul-84												
12-Jul-84			0.235		0.088	0.156	0.000		0.000	0.000	0.004	0.106
17-Jul-84												
19-Jul-84			0.238		0.093	0.193	0.000		0.000	0.000	0.010	0.133
24-Jul-84												
26-Jul-84			0.147		0.039	0.192	0.000		0.000	0.000	0.009	0.144
30-Jul-84												
02-Aug-84			0.241		0.080	0.187	0.000		0.000	0.000	0.021	0.163
09-Aug-84												
10-Aug-84			0.470		0.172	0.198	0.000		0.000	0.000	0.000	0.184
16-Aug-84			0.279		0.114	0.210	0.000		0.000	0.000	0.000	0.176
21-Aug-84												
23-Aug-84			0.412		0.145	0.260	0.000		0.000	0.000	0.000	0.256
07-Sep-84												
09-Sep-84			0.753		0.327	0.263	0.000		0.011	0.002	0.001	0.227
10-Sep-84												
07-Nov-84												
08-Nov-84												
09-Nov-84												
23-Nov-84			0.184		0.127	0.272	0.001		0.003	0.000	0.002	0.209
25-Dec-84			0.026		0.077	0.398	0.001		0.008	0.041	0.029	0.325
08-Jan-85			0.378		0.137	0.409	0.000		0.010	0.016	0.000	0.318
20-Feb-85												
28-Feb-85			0.605		0.166	0.428	0.002		0.007	0.018	0.007	0.345
16-Mar-85												

**Table 9.** Snake River at SN4 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
26-Mar-85	15											
27-Mar-85	16	6.40	1.00	2.695	15.350	4.101	0.079	0.337		0.197	56.700	
16-Apr-85	38		1.15	2.189	12.910	3.177	0.064				43.700	
23-Apr-85	43											
29-Apr-85	56	7.50	0.95	2.426	13.700	3.540	0.072	0.303		0.190	50.800	
30-Apr-85	60											
07-May-85	97											
14-May-85	89											
18-May-85	99		1.50	1.952	11.470	2.759	0.060	0.283		0.159	38.800	
21-May-85	98											
23-May-85	116											
25-May-85	186	6.70	1.95	1.818	9.864	2.395	0.049	0.309		0.138	33.250	
28-May-85	246											
01-Jun-85	235	6.80		1.535	7.992	1.912	0.038	0.204		0.113	25.640	
04-Jun-85	250											
09-Jun-85	493	6.10	1.80	1.219	5.886	1.386	0.026	0.152		0.087	18.370	
11-Jun-85	365											
16-Jun-85	362	6.20		1.050	6.640	1.490	0.029	0.241		0.090	19.310	
19-Jun-85	303											
22-Jun-85	275	6.70		1.030	7.500	1.710	0.034	0.173		0.091	21.710	
25-Jun-85	179											
28-Jun-85	123	6.60		1.400	8.640	1.960	0.039	0.149		0.116	25.930	
09-Jul-85	134											
14-Jul-85	96	6.50		1.380	9.010	2.090	0.040	0.204		0.121	27.350	
20-Jul-85	110	6.20		1.340	9.500	2.200	0.045	0.161		0.117	28.340	
23-Jul-85	110											
27-Jul-85	110	7.45		1.500	10.000	2.410	0.048	0.182		0.129	31.400	
28-Jul-85	110		0.70									
03-Aug-85	88	7.20	0.85	1.520	9.430	2.310	0.045	0.274		0.149	32.900	
06-Aug-85	77											
11-Aug-85	63		0.75	1.630	10.100	2.510	0.048	0.157		0.142	35.700	
18-Aug-85	53	6.20	0.75	1.750	10.900	2.770	0.052	0.293		0.149	38.200	
20-Aug-85	48											
24-Aug-85	40	6.30		2.070	11.800	3.000	0.057	0.176		0.168	41.600	
31-Aug-85	34	6.50	0.75	2.080	12.500	3.200	0.063					
03-Sep-85	38											
14-Sep-85	33	6.50	0.60	2.240	13.000	3.430	0.069					
23-Sep-85	33		1.45									
26-Sep-85	32	7.40										
17-Oct-85	32	6.85		2.050	12.900	3.340	0.063					
22-Oct-85	29											
20-Nov-85	20	6.60		2.140	13.900	3.760	0.072	0.494		0.169	52.800	
28-Nov-85	20	7.25										
26-Dec-85	17	5.90		2.093	9.107	2.483	0.042	0.351		0.179	55.800	
16-Jan-86	12	6.10						0.274		0.202	55.900	
25-Feb-86	12			2.512	15.310	4.068	0.071	0.307		0.189	60.400	
25-Mar-86	12							0.313		0.069	58.400	
24-Apr-86	28			2.298	14.070	3.589	0.072			0.206	49.500	

**Table 9.** Snake River at SN4 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
26-Mar-85												
27-Mar-85			0.000		0.028	0.437	0.001		0.002	0.000	0.000	0.339
16-Apr-85			0.603		0.199	0.318	0.001		0.004	0.001	0.000	0.205
23-Apr-85												
29-Apr-85			0.482		0.163	0.360	0.001		0.006	0.036	0.008	0.279
30-Apr-85												
07-May-85												
14-May-85												
18-May-85			0.167		0.107	0.277	0.000		0.007	0.017	0.009	0.234
21-May-85												
23-May-85												
25-May-85			0.138		0.185	0.236	0.001		0.005	0.000	0.003	0.182
28-May-85												
01-Jun-85			0.294		0.285	0.185	0.001		0.003	0.009	0.004	0.149
04-Jun-85												
09-Jun-85			0.235		0.250	0.176	0.001		0.004	0.008	0.005	0.094
11-Jun-85												
16-Jun-85			0.166		0.156	0.129	0.000		0.006	0.025	0.000	0.090
19-Jun-85												
22-Jun-85			0.144		0.109	0.138	0.000		0.005	0.010	0.000	0.104
25-Jun-85												
28-Jun-85			0.344		0.215	0.159	0.001		0.007	0.021	0.000	0.138
09-Jul-85												
14-Jul-85			0.262		0.282	0.177	0.000		0.004	0.011	0.000	0.149
20-Jul-85			0.187		0.130	0.201	0.000		0.090	0.007	0.000	0.224
23-Jul-85												
27-Jul-85			0.233		0.138	0.222	0.001		0.006	0.029	0.000	0.183
28-Jul-85												
03-Aug-85			0.221		0.146	0.223	0.000		0.007	0.027	0.000	0.156
06-Aug-85												
11-Aug-85			0.081		0.141	0.258	0.001		0.001	0.000	0.005	0.188
18-Aug-85			0.361		0.183	0.292	0.000		0.005	0.003	0.000	0.222
20-Aug-85												
24-Aug-85			0.494		0.213	0.321	0.001		0.002	0.000	0.000	0.263
31-Aug-85			0.582		0.276	0.347	0.001		0.008	0.042	0.000	0.276
03-Sep-85												
14-Sep-85			0.268		0.164	0.399	0.001		0.007	0.023	0.000	0.318
23-Sep-85												
26-Sep-85												
17-Oct-85			1.230		0.442	0.377	0.000		0.003	0.000	0.000	0.298
22-Oct-85												
20-Nov-85			0.679		0.240	0.435	0.000		0.004	0.034	0.000	0.355
28-Nov-85												
26-Dec-85			0.318	0.009	0.144	0.298	0.000		0.003	0.000	0.000	0.263
16-Jan-86												
25-Feb-86			0.000	0.016	0.023	0.438	0.000		0.000	0.000	0.000	0.303
25-Mar-86												
24-Apr-86			0.251	0.020	0.090	0.338	0.000		0.006	0.000	0.001	0.231

**Table 9.** Snake River at SN4 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
30-Apr-86	29	5.73		0.000	0.000	0.000	0.000	0.616		0.185	49.100	
11-May-86	57	6.96										
20-May-86	104	5.92		1.438	8.945	2.086	0.040	0.439		0.132	27.900	
22-May-86	145											
27-May-86	207	6.12		1.345	8.291	1.995	0.038	0.222		0.115	25.940	
03-Jun-86	258	5.84										
11-Jun-86	312	6.40										
17-Jun-86	408	6.30										
24-Jun-86	364	6.45										
07-Jul-86	273											
22-Jul-86	165											
05-Aug-86	92											
26-Jan-87	17			4.220		4.297	0.080				10.325	
19-Feb-87	15			1.610		3.892	0.084				9.847	
18-Mar-87	13			3.955		4.534	0.085				10.041	
23-Apr-87	32			3.016		3.226	0.075				7.645	
13-May-87	173			2.275	9.626	6.682	0.051				21.385	
26-May-87	136											
02-Jun-87	187			4.645	7.652	1.890	0.037				10.337	
09-Jun-87	346			4.250	5.971	1.352	0.029				10.099	
16-Jun-87	238			0.443	6.240	1.157	0.029				9.536	
23-Jun-87	168			0.489	7.488	1.590	0.035				12.790	
01-Jul-87	129			0.926	7.726	1.545	0.037				10.179	
07-Jul-87	92			1.089	8.870	1.865	0.044				13.095	
15-Jul-87	70			1.417	10.328	3.632	0.051				15.705	
22-Jul-87	58			1.862	11.285	4.424	0.055				18.760	
28-Jul-87	78			2.319	11.302	6.267	0.055				21.130	
04-Aug-87	66				11.391						36.373	
11-Aug-87	52				11.915						41.346	
18-Aug-87	41										45.963	
25-Aug-87	55										42.740	
01-Sep-87	39			7.604	12.326	4.134	0.066				51.362	15.825
08-Sep-87	34				13.895						52.807	
16-Sep-87	35				1.366						51.423	
23-Sep-87	27				13.930						55.648	
30-Sep-87	24			2.745	14.135	6.271	0.077				57.325	18.320
10-Oct-87	21			3.435	15.373	7.490	0.083					19.335
20-Oct-87	17			4.044	15.949	8.572	0.081					21.080
11-Nov-87	17			4.444	15.152	9.591	0.082					20.505
28-Nov-87	19			4.736	15.305	4.609	0.084					23.330
27-Dec-87	19			4.025	14.965	4.415	0.083					
23-Jan-88	11			3.622	15.030	4.520	0.086				65.289	
21-Feb-88	12			4.030	16.335	4.696	0.090					
19-Mar-88	12			4.077	16.470	4.730	0.091					
10-Apr-88	23			2.618	15.470	4.467	0.087					
23-Apr-88	23			2.504	15.020	4.185	0.083					
03-May-88	30			2.459	14.600	4.006	0.082					
11-May-88	37			2.135	13.470	3.492	0.076					

**Table 9.** Snake River at SN4 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
30-Apr-86			0.422	0.000	0.001	0.002	0.000		0.000	0.000	0.000	0.002
11-May-86												
20-May-86			0.649	0.014	0.410	0.200	0.000		0.003	0.007	0.000	0.153
22-May-86												
27-May-86			0.413	0.014	0.236	0.205	0.000		0.003	0.000	0.000	0.145
03-Jun-86												
11-Jun-86												
17-Jun-86												
24-Jun-86												
07-Jul-86												
22-Jul-86												
05-Aug-86												
26-Jan-87			1.122	0.023	0.199	0.482				0.065	0.332	
19-Feb-87				1.115	0.024	0.243	0.480			0.078	0.333	
18-Mar-87					1.558	0.025	0.500	0.553			0.090	0.358
23-Apr-87						1.707	0.021	0.405	0.381		0.061	0.268
13-May-87							2.018	0.019	0.683	0.275	0.010	
26-May-87												
02-Jun-87							0.065	0.016	0.017	0.155		0.167
09-Jun-87								0.246	0.015	0.072	0.114	0.002
16-Jun-87									0.490	0.016	0.250	0.114
23-Jun-87										0.577	0.017	0.175
01-Jul-87											0.575	0.166
07-Jul-87											0.654	0.180
15-Jul-87												0.916
22-Jul-87												1.127
28-Jul-87												0.678
04-Aug-87												
11-Aug-87												
18-Aug-87												
25-Aug-87												
01-Sep-87												
08-Sep-87												
16-Sep-87												
23-Sep-87												
30-Sep-87												
10-Oct-87												
20-Oct-87												
11-Nov-87												
28-Nov-87												
27-Dec-87												
23-Jan-88												
21-Feb-88												
19-Mar-88												
10-Apr-88												
23-Apr-88												
03-May-88												
11-May-88												

**Table 9.** Snake River at SN4 water quality data (mg/L)\*\* Discharge ( $Q$ ) units are cubic feet per second (cfs). pH is dimensionless. DOC is reported in mg C/L.

DATE	Q*	pH*	DOC*	Na	Ca	Mg	Sr	Cl	Br	F	SO4	Si
18-May-88	157			1.471	8.928	2.427	0.049					
25-May-88	129			1.732	10.920	2.810	0.058					
01-Jun-88	166			1.433	8.652	2.250	0.047					
09-Jun-88	434										20.460	
13-Jun-88	329										27.297	
14-Jun-88	304										19.918	
21-Jun-88	312										19.847	
29-Jun-88	307										20.107	
06-Jul-88	171										23.455	
13-Jul-88	113											
27-Dec-88	15										65.109	
31-Dec-88	14										66.991	
27-Jan-89	11			2.340		4.167	0.076				66.118	12.760
20-Feb-89	10			2.361		4.139	0.077				69.247	12.740
28-Mar-89	13			2.286		3.812	0.074				61.445	11.420
12-Apr-89	17			2.812		4.743	0.091				66.567	14.450
27-Apr-89	59			2.124		3.478	0.072				54.565	11.860
02-May-89	38			2.380		3.857	0.081				51.279	13.180
09-May-89	84			2.537		4.126	0.089				45.525	11.450
16-May-89	78			2.392		3.511	0.075				43.828	11.980
24-May-89	256										22.281	
31-May-89	321			1.281		1.829	0.036				20.714	8.054
06-Jun-89	231			1.324		2.126	0.040				22.688	8.504
14-Jun-89	218			1.335		2.070	0.039				23.610	8.610
20-Jun-89	268			1.367		1.936	0.037				20.379	8.237
24-Jun-89	179			1.331		2.058	0.042				7.854	
29-Jun-89	164			1.490		2.214	0.041				8.634	
18-Jul-89	89			2.146		2.809	0.051				10.390	
26-Jul-89	145											
27-Jul-89	111										32.636	
31-Jul-89	123			1.510		2.563	0.048				10.610	
12-Aug-89	78			1.774		3.029	0.057				11.680	
24-Aug-89	45										46.486	
26-Aug-89	42			1.873		3.409	0.062				12.530	
31-Aug-89	38			1.416		2.510	0.047				10.480	
10-Sep-89	36			2.230		3.469	0.059				11.910	
19-Sep-89	36			1.618		3.230	0.057				50.541	11.830
26-Sep-89	33			1.853		3.620	0.063				12.690	
15-Oct-89	25			1.982		3.906	0.068				13.500	
16-Oct-89	27										58.759	
28-Oct-89	22											
07-Nov-89	19										64.031	
20-Nov-89	19											
27-Nov-89	16											
29-Dec-89	13											
31-Dec-89	13			2.232		4.159	0.074				14.570	

**Table 9.** Snake River at SN4 water quality data (mg/L)

DATE	NO3	PO4	Al	Ba	Fe	Mn	Cd	Co	Cu	Ni	Pb	Zn
18-May-88			0.516	0.019	0.350	0.237	0.001	0.003		0.000	0.023	0.194
25-May-88			0.548	0.018	0.292	0.271		0.005		0.019	0.019	0.251
01-Jun-88			0.315	0.016	0.145	0.199		0.003		0.017		0.287
09-Jun-88												
13-Jun-88												
14-Jun-88												
21-Jun-88												
29-Jun-88												
06-Jul-88												
13-Jul-88												
27-Dec-88												
31-Dec-88												
27-Jan-89			0.489	0.022	0.118	0.429			0.055		0.000	0.329
20-Feb-89			1.100	0.022	0.216	0.415			0.008		0.000	0.324
28-Mar-89			0.063	0.022	0.069	0.355			0.003		0.000	0.280
12-Apr-89			0.964	0.025	0.228	0.435			0.004		0.000	0.354
27-Apr-89			0.480	0.022	0.283	0.260			0.005		0.000	0.244
02-May-89			0.086	0.022	0.174	0.312			0.004		0.000	0.339
09-May-89			0.055	0.020	0.026	0.324			0.004		0.000	0.337
16-May-89			0.359	0.020	0.243	0.285			0.001			0.416
24-May-89												
31-May-89			0.333	0.017	0.257	0.149			0.002		0.000	0.152
06-Jun-89			0.285	0.016	0.201	0.151			0.000		0.000	0.146
14-Jun-89			0.247	0.018	0.107	0.148			0.001		0.000	0.128
20-Jun-89			0.176	0.018	0.076	0.128			0.000		0.000	0.123
24-Jun-89			0.395	0.015	0.431	0.174			0.005		0.000	0.191
29-Jun-89			0.108	0.018	0.044	0.138			0.002		0.000	0.122
18-Jul-89			0.337	0.021	0.294	0.224			0.006		0.000	1.931
26-Jul-89												
27-Jul-89												
31-Jul-89			0.844	0.021	0.467	0.238			0.005			0.262
12-Aug-89			0.595	0.023	0.322	0.278			0.003		0.000	0.260
24-Aug-89												
26-Aug-89			0.388	0.023	0.149	0.334			0.007		0.000	0.378
31-Aug-89			0.844	0.021	0.496	0.236			0.004		0.000	0.254
10-Sep-89			0.092	0.021	0.168	0.351			0.002		0.000	0.325
19-Sep-89			0.551	0.000	0.299	0.301			0.003		0.000	0.258
26-Sep-89			0.018	0.000	0.122	0.375			0.003		0.000	0.324
15-Oct-89			0.267	0.021	0.121	0.409			0.001		0.000	0.356
16-Oct-89												
28-Oct-89												
07-Nov-89												
20-Nov-89												
27-Nov-89												
29-Dec-89												
31-Dec-89			0.691	0.000	0.180	0.422			0.004		0.000	0.328

## **APPENDIX 2: ANNOTATED BIBLIOGRAPHY**

Research studies focusing on the Snake River and Deer Creek catchments, Colorado.

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Bencala, KE and DM McKnight, 1987. Identifying in-stream variability: Sampling iron in an acidic stream. In RC Everett and DM McKnight, eds., *Chemical Quality of Water and the Hydrologic Cycle*, Chelsea, Michigan; Lewis Publishers: 255-269.

This study focused on small-scale spatial and temporal variations of stream chemistry in the Snake River. Results showed that the variations of iron concentrations ranged from 0.7 to 1.6 mg/L over a stream reach 1 km and over a 24-h period. These variations showed the importance of reconnaissance sampling over a range of spatial and temporal scales in establishing monitoring programs for studies of impacted watersheds by acid precipitation or toxic mine drainage.

Bencala, KE, DM McKnight, and GW Zellweger, 1987. Evaluation of natural tracers in an acidic and metal-rich stream. *Water Resources Research*, 23(5): 827-836.

Comparisons were made of natural tracers in the confluence of the Snake River with Deer Creek. Manganese and sulfate were used as conservative solutes to demonstrate computations of (1) the reactive losses of other solutes within the confluence and (2) the ratio of comparative inflows from Deer Creek and the Snake River.

Bencala, KE, DM McKnight, and GW Zellweger, 1990. Characterization of transport in an acidic and metal-rich mountain stream based on a lithium tracer injection and simulations of transient storage. *Water Resources Research*, 26(5): 989-1000.

Transport characteristics of the Snake River were established on the basis of the assumption of lithium as an ideally conservative tracer and use of simulations of advection, dispersion, and transient storage. Because of transient storage, the residence time of injected tracers was longer than would be calculated by consideration of convective travel-time. Distributed inflows along the stream were a significant source of in-stream chemical variation.

Bencala, KE, DM McKnight, GW Zellweger, and J Goad, 1986. The stability of rhodamine WT dye in trial studies of solute transport in an acidic and metal-rich stream. In *U.S. Geological Survey Water Supply Paper* 2310: 87-94.

In a trial study of field techniques, rhodamine WT and sodium chloride were co-injected for a period of 24 h into the Snake River 150 m above the confluence with Deer Creek. Subsequent batch experiments with rhodamine WT were conducted in bulk water obtained from the stream. Both field and batch experiments confirmed a decrease in fluorescence associated with the water chemistry of Snake River water from above the confluence.

Boyer, EW, 1994. Hydrology and the variation of dissolved organic carbon in soil and stream waters of two headwater catchments, Summit County, Colorado. M.S. thesis, Department of Environmental Sciences, University of Virginia. 102 pp.

Data collected from both field measurements and simulations support the hypothesis that hydrological flushing of catchment soils is the primary mechanism affecting the temporal variation of DOC in Snake River and in Deer Creek.

Boyer, EW, 1998. Landscape scale controls on dissolved organic carbon flux in a mountainous catchment. Ph.D. dissertation, Department. of Environmental Sciences, University of Virginia. 147 pp.

DOC concentrations in the Deer Creek basin were measured and characterized in wells, lysimeters, the snowpack, and in streamflow. Modeling of the catchment-scale contributions of DOC to streamflow was used to identify the importance of spatial variations in topography and snowmelt on the spring flush of DOC.

Boyer, EW, GM Hornberger, KE Bencala, and DM McKnight, 1995. Variation of dissolved organic carbon during snowmelt in soil and stream waters of two headwater catchments, Summit County, Colorado. In KA Tonnesen, MW Williams, and M. Tranter, eds., *Biogeochemistry of Seasonally Snow-Covered Catchments*, IAHS Publ. no. 228: 303-312.

DOC concentration data are presented from streamwaters of Snake River and Deer Creek and from lysimeters located in the catchments. Hydrological catchment responses (including flow paths through and residence times of water in the catchment) are among the main factors controlling DOC variation in streamflow.

Boyer, EW, GM Hornberger, KE Bencala, and DM McKnight, 1996. Overview of a simple model describing variation of dissolved organic carbon in an upland catchment. *Ecological Modelling*, 86:183-188.

Hydrological responses of the Deer Creek catchment were simulated using TOPMODEL; the predicted flows were routed through a simple model that accounted for temporal changes in DOC. Simulations were compared to measurements of DOC in soil and stream waters.

Boyer, EW, GM Hornberger, KE Bencala, and DM McKnight, 1997. Response characteristics of DOC flushing in an alpine catchment. *Hydrological Processes*, 11:1635-1647.

Concentrations of DOC in the lysimeters decrease rapidly during the melt period, supporting the hypothesis that hydrological flushing of catchment soils is the primary mechanism affecting the temporal variation of DOC in Deer Creek. Differences in flushing rates of DOC from soils are influenced by topography and the distribution of snow.

Catts, JG, 1982. Adsorption of Cu, Pb, and Zn onto birnessite., Ph.D. dissertation, Department of Geochemistry, Colorado School of Mines. 227 pp.

The adsorption of trace metals onto birnessite was studied in laboratory experiments and in Deer Creek, where active deposition of birnessite occurs.

Deul, M, 1947. The origin of the bog iron deposits near Montezuma, Summit County, Colorado. M.S. thesis, Dept. of Geology, University of Colorado. 37 pp.

Investigated iron depositing bacteria that are important in forming the hydrated ferric oxide bogs in the upper Snake River valley.

Hornberger, GM, KE Bencala, and DM McKnight, 1994. Hydrological controls on dissolved organic carbon during snowmelt in the Snake River near Montezuma, Colorado. *Biogeochemistry*, 25:147-165.

Each year during spring snowmelt, DOC concentrations rise in Deer Creek, peaking about one month prior to peak discharge. The subsequent decline in DOC with time is approximately exponential, suggesting a flushing mechanism to explain the observations. The hydrological response of the catchment was simulated using TOPMODEL, and predicted flows were routed through a simple model accounting for changes in DOC. The model reproduces the main features of the observed variation in DOC in the stream and lays a foundation for quantitatively linking hydrological processes with carbon cycling through upland catchments.

Lovering, TS, 1935. Geology and ore deposits of the Montezuma quadrangle, Colorado. *US Geological Survey Professional Paper* 178. 119 pp.

This comprehensive study characterizes the geologic environment of the Snake River/Deer Creek area. The predominant bedrock of both basins is metamorphic rock of Precambrian age. Deer Creek is underlain primarily by Swandyke Hornblende Gneiss, while Snake River is underlain primarily by granitic rocks of the Idaho Springs formation. Bog iron ore deposits are found in the upper Snake River valley.

McKnight, DM and KE Bencala, 1988. Diel variations in iron chemistry in an acidic stream in the Colorado Rocky Mountains. *Arctic and Alpine Research*, 20: 492-500.

Hourly sampling in the Snake River (above the confluence with Deer Creek) indicated that short-term fluctuations in iron chemistry occur, whereas the concentrations of most other dissolved constituents, including other trace metals, remain stable. Photoreduction of hydrous iron oxides, which are abundant in the fine sediment and as coatings on the rocks, may be responsible for these observations. Short-term fluctuations in iron chemistry are consistent with the lack of correlation between iron and other constituents in long-term data, and illustrate the potential importance of complex in-stream processes in such stream ecosystems.

McKnight, DM and KE Bencala, 1989. Reactive iron chemistry in an acidic mountain stream in Summit County, Colorado: A hydrologic perspective. *Geochimica et Cosmochimica Acta*, 53: 2225-2234.

A pH perturbation experiment was conducted in the upper reaches of the Snake River. During the experiment the pH was lowered from 4.2 to 3.2 for 3 h by injecting sulfuric acid. Lowering the pH of the stream caused a rapid increase in the dissolved iron concentrations due to dissolution and photoreduction of iron oxides. The changes in iron concentrations during the experiment indicate that variations exist in the solubility properties of the hydrous iron oxides on the streambed. Simulation of iron transport as a conservative solute indicated that hydrologic transport had a significant role in determining downstream experimental variation in iron concentration.

McKnight, DM and KE Bencala, 1990. The chemistry of iron, aluminum, and dissolved organic material in three acidic, metal-enriched, mountain streams, as controlled by watershed and in-stream processes. *Water Resources Research*, 26(12): 3087-3100.

Analysis of stream water chemistry data for an upper reach of the Snake River shows that several trace metal solutes (Al, Mn, and Zn) are correlated with major ions, indicating that watershed processes control their concentrations. Once in the stream biogeochemical processes can then control transport, if those processes occur on time scales comparable to those for hydrologic transport.

McKnight, DM, KE Bencala, GW Zellweger, GR Aiken, GL Feder, and KA Thorn, 1992. Sorption of dissolved organic carbon by hydrous aluminum and iron oxides occurring at the confluence of Deer Creek with the Snake River, Summit County, Colorado. *Environmental Science and Technology*, 26(7): 1388-1396.

At the confluence of the Snake River with Deer Creek, the composition of deposited oxides changes consistently with distance downstream, with the most upstream oxide samples having the greatest iron and organic carbon content. Deposits of oxides on the streambed have the capacity to sorb humic substances from streamwater. The trace metals associated with the oxides also decrease downstream; this may be explained by association of trace metals with organic complexation sites.

McKnight, DM and GL Feder, 1984. The ecological effect of acid conditions and precipitation of hydrous metal oxides in a Rocky Mountain stream. *Hydrobiologia*, 119(2): 129-138.

Periphyton and benthic invertebrate assemblages were studied near the confluence of Snake River and Deer Creek. Because acid conditions and high concentrations of dissolved trace metals limited growth of periphyton in the upper Snake River, periphyton were much less abundant than in Deer Creek. However, there were as many benthic invertebrates in Snake River as in Deer Creek. Below the confluence of the two streams, the precipitation and deposition of Al and Fe oxides greatly restricted growth of periphyton and benthic invertebrates, greatly decreasing the abundances of the communities.

McKnight, DM, RL Smith, RA Harnish, CL Miller, and KE Bencala, 1993. Seasonal relationships between planktonic microorganisms and dissolved organic material in an alpine stream. *Biogeochemistry*, 21: 39-59.

Heterotrophic activity of planktonic microorganisms in stream water was greatest during spring runoff, when concentrations of DOC and glucose were highest. The availability of labile DOC to the stream ecosystem is inferred to be the primary control on seasonal variation in heterotrophic activity of planktonic microbial populations.

McKnight, DM, RL Wershaw, KE Bencala, GW Zellweger, and GL Feder, 1992b. Humic substances and trace metals associated with Fe and Al oxides deposited in an acidic mountain stream. *The Science of the Total Environment*, 117-118: 485-498.

Organic solute sorption by hydrous iron and aluminum oxides was studied at the confluence of the Snake River with Deer Creek. From 1979 to 1986, typically 40% of the dissolved organic carbon (DOC) was removed from solution by sorption onto aluminum and iron oxides which precipitate as the two streamwaters mix.

Characterization of two reactive DOC fractions (fulvic and hydrophilic acids) showed that sorption preferentially removes molecules with greater contents of aromatic moieties, carboxylic acid groups, and amino acid residues.

Runkel, RL, 1993. Development and application of an equilibrium-based simulation model for reactive solute transport in small streams., PhD thesis, Department of Civil, Environmental, and Architectural Engineering, University of Colorado. 202 pp.

An equilibrium-based solute transport model is developed for simulating trace metal chemistry in streams. The model is exercised during a pH perturbation experiment in the Snake River and captures associated iron dynamics.

Runkel, RL, KE Bencala, RE Broshears, and SC Chapra, 1996. Reactive solute transport in streams 1: Development of an equilibrium-based model. *Water Resources Research*, 32(2): 409-418.

An equilibrium-based solute transport model is developed for simulating the fate of trace metals and their transport in streams.

Runkel, RL, DM McKnight, KE Bencala, and SC Chapra, 1996. Reactive solute transport in streams 2: Simulation of a pH modification experiment. *Water Resources Research*, 32(2): 419-430.

An equilibrium-based solute transport model was applied to the pH perturbation experiment described in McKnight and Bencala (1989). Dissolution from the streambed is represented by considering a trace component consisting of freshly precipitated hydrous iron oxides and an abundant compartment consisting of aged precipitates which are less soluble. Spatial variability in the solubility of hydrous iron oxide is attributed to heterogeneity in the streambed sediments, temperature effects, and/or variability in the effects of photoreduction.

Theobald, PK, HW Lakin, and DB Hawkins, 1963. The precipitation of aluminum, iron, and manganese at the junction of Deer Creek with the Snake River in Summit County, Colorado. *Geochimica et Cosmochimica Acta*, 27: 121-132.

This study was the first to characterize the geochemistry at the confluence of Snake River with Deer Creek. Precipitates on the beds of each stream are described, and the processes leading to the flocculent precipitate in the confluence area are discussed. Hydrous aluminum and iron oxides precipitate and coat the streambed in the mixing zone of the two streams.