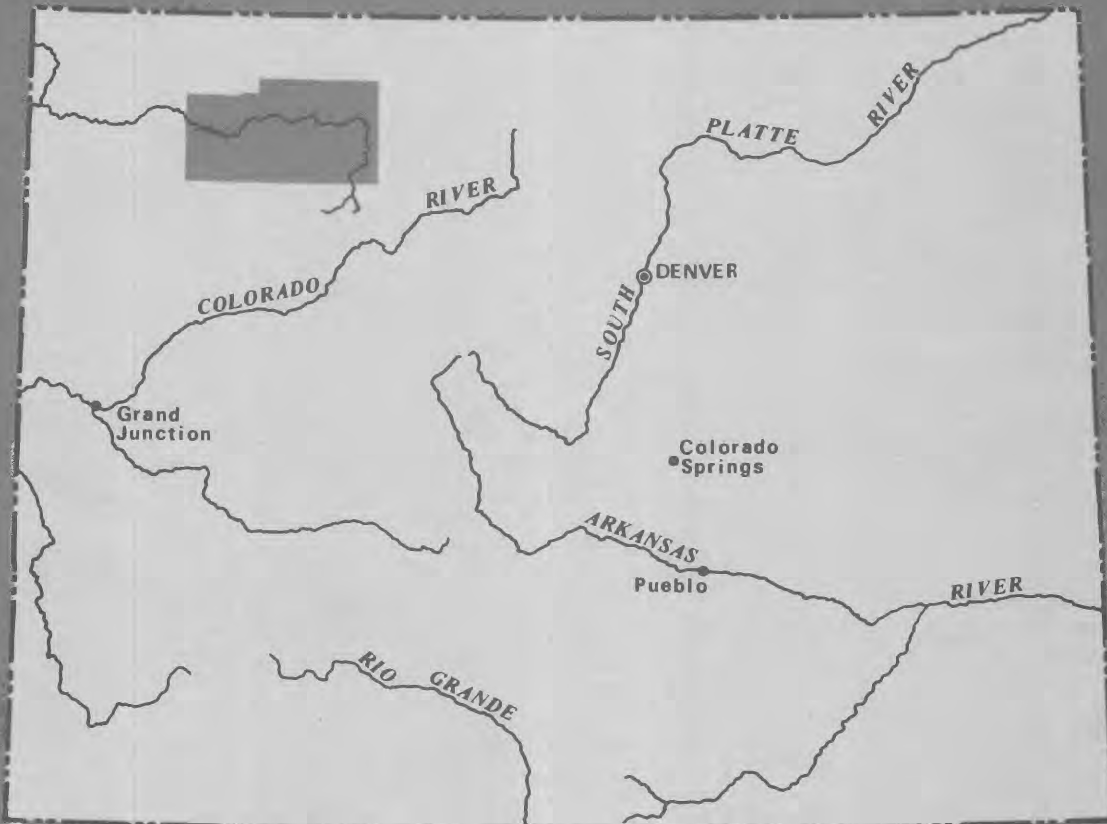
WATER-QUALITY CHARACTERISTICS OF SIX SMALL, SEMIARID WATERSHEDS IN THE GREEN RIVER COAL REGION OF COLORADO

U.S. GEOLOGICAL SURVEY



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John T. Turk and Randolph S. Parker

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Water Resources Division
Box 25046, Mail Stop 415
Denver Federal Center
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Analysis of major and trace constituents in streams flowing through six semiarid watersheds indicates that the stream chemistry is characterized by saturation with respect to common carbonate minerals (calcium, magnesium, iron, manganese, and lead). The solubility of the carbonate minerals may be a major control on the absolute and relative concentrations of calcium, magnesium, bicarbonate, iron, manganese, and lead; however, other mechanisms probably control the concentrations of cadmium and zinc.

Statistical analyses indicated that the mean concentrations of the major ions in the two climatic areas studied are significantly (P=0.05) different from one another, with larger mean concentrations in the more arid area. Trace-metal concentrations were similar from one area to another and indistinguishable (P=0.05) from site to site for lead, cadmium, and zinc. Linear regressions of major ion concentration to specific conductance are similar in both areas for sodium, bicarbonate, sulfate, and chloride.

Results of the study may be useful in providing a first approximation of stream chemistry in other watersheds with the same geologic setting, in selecting representative watersheds to allow investigation of geochemical controls, and in determining future changes in stream chemistry in the watersheds studied.

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Dallas L. Peck, Director

For additional information write to:

District Chief
U.S. Geological Survey
Box 25046, Mail Stop 415
Denver Federal Center
Lakewood, CO 80225

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METRIC CONVERSION

Multiply inch-pound unit	*By*	*To obtain metric unit*
inch (in.)	25.40	millimeter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
micromho (μmho)	1.000	microsiemens

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ABSTRACT

Analysis of major and trace constituents in streams flowing through six semiarid watersheds indicates that the stream chemistry is characterized by saturation with respect to common carbonate minerals (calcium, magnesium, iron, manganese, and lead). The solubility of the carbonate minerals may be a major control on the absolute and relative concentrations of calcium, magnesium, bicarbonate, iron, manganese, and lead; however, other mechanisms probably control the concentrations of cadmium and zinc.

Statistical analyses indicated that the mean concentrations of the major ions in the two climatic areas studied are significantly (P=0.05) different from one another, with larger mean concentrations in the more arid area. Trace-metal concentrations were similar from one area to another and indistinguishable (P=0.05) from site to site for lead, cadmium, and zinc. Linear regressions of major ion concentration to specific conductance are similar in both areas for sodium, bicarbonate, sulfate, and chloride.

Results of the study may be useful in providing a first approximation of stream chemistry in other watersheds with the same geologic setting, in selecting representative watersheds to allow investigation of geochemical controls, and in determining future changes in stream chemistry in the watersheds studied.

INTRODUCTION

Increasing national needs for energy have resulted in a significant increase in the production of coal in Colorado. From 1965 to 1975 coal production in Colorado has increased by 68 percent (Colorado Division of Mines, 1976). Much of the present and future coal mining in northwestern Colorado is and will be surface strip mining within small, semiarid watersheds. Few data are available to define the hydrology and water quality of such watersheds. Without such data and an understanding of the processes controlling the hydrology and water quality of these watersheds, it is impossible to predict the impact of mining. To obtain the data needed to define the hydrologic and water-quality processes within the watersheds, the U.S. Geological Survey, in cooperation with the U.S. Bureau of Land Management, has begun the study of small, semiarid watersheds in Colorado.

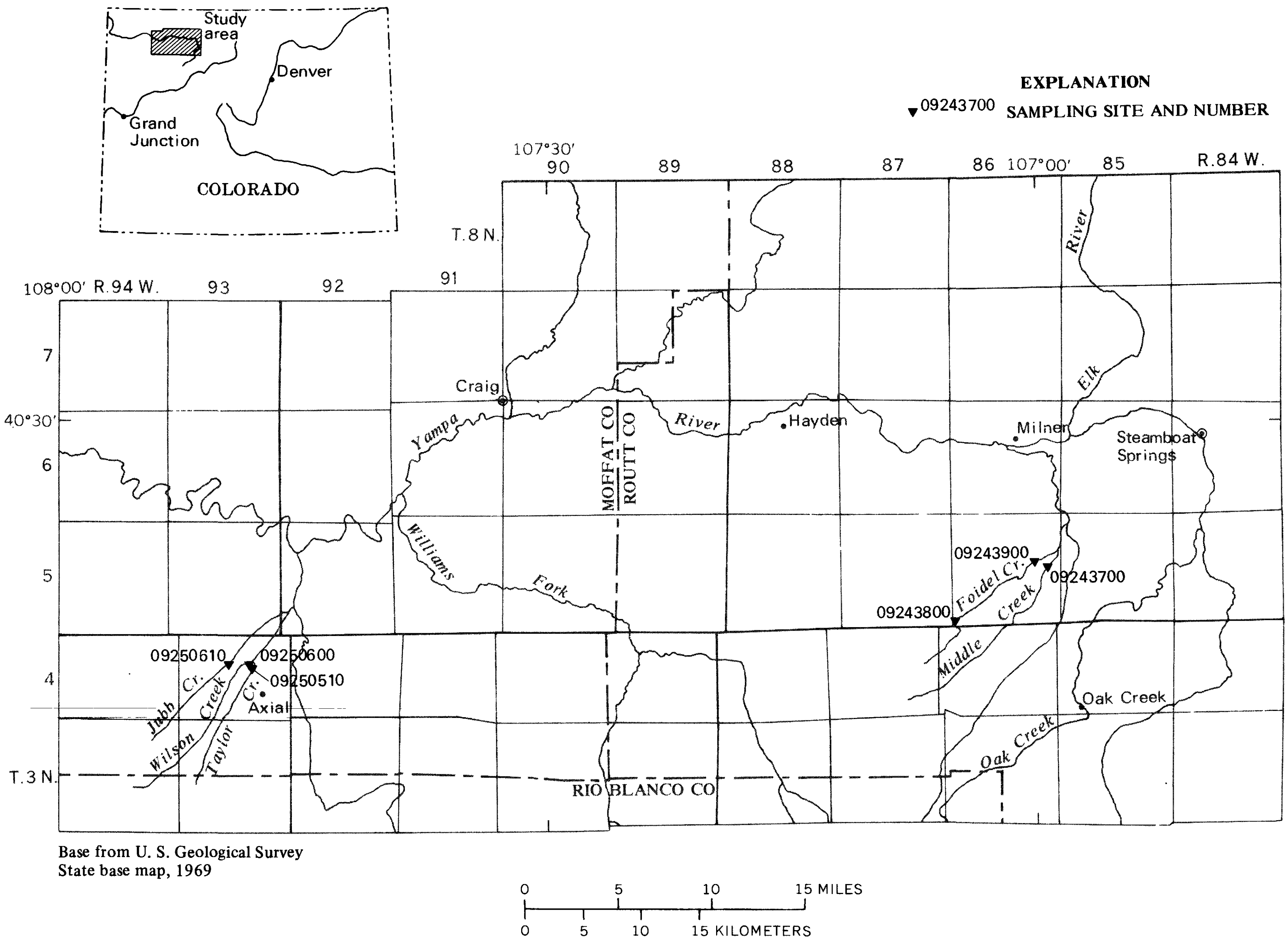

Figure 1.--Location of sampling sites.

As data are collected, they will be used to define relationships among the individual chemical constituents and to compare these relationships among the monitored watersheds. Such comparisons will help to identify hydrochemical regions within which relationships can be transferred from watershed to watershed. Ultimately, these regions need to be identified and the transferability of individual chemical relations defined. Only in this way can a cost-effective method be established to predict the impact of mining on the innumerable small watersheds that may be mined. This report presents the data collected from six watersheds in northwestern Colorado and describes an initial step in the regionalization of water-quality characteristics and identification of transferability of data from individual, studied watersheds to unstudied watersheds in northwestern Colorado.

PHYSIOGRAPHIC SETTING

The watersheds included in this study, Middle and Foidel Creeks near the town of Oak Creek and Taylor, Wilson, and Jubb Creeks near Axial, are located in a semiarid part of northwestern Colorado (fig. 1 and table 1). Precipitation near Oak Creek averages about 18 in. per year while precipitation near Axial averages about 12 in. per year (Hounslow and others, 1978). The watersheds are within the Green River coal region, in which coal occurs in the Mesaverde Group of Late Cretaceous age. The coal beds are interbedded with, and overlain by, sandstones and shales of Late Cretaceous and early Tertiary age. The deposits were formed in alternating marine, brackish, and freshwater environments coincident with rapid erosion caused by orogenic activity, initially to the west and later from the Rocky Mountain arch to the east (Del Rio and others, 1960).

Mineralogical analyses of the regolith are available only for the Foidel Creek area (Hounslow and others, 1978). Minerals identified in the Foidel Creek area that may undergo reactions proposed in this report include kaolinite, illite, dolomite, calcite, siderite, gypsum, and pyrite.

Table 1.--*Description of sampling sites*

Sampling site	Site number	Drainage area (square mile)
Middle Creek near Oak Creek-------------------	09243700	23.5
Foidel Creek near Oak Creek-------------------	09243800	8.61
Foidel Creek at mouth near Oak Creek----------	09243900	17.5
Taylor Creek at mouth near Axial--------------	09250510	7.22
Wilson Creek near Axial-----------------------	09250600	22
Jubb Creek near Axial-------------------------	09250610	7.53

DATA COLLECTION

Data were collected in each watershed from October 1975 to September 1978. Stream discharge at each station was monitored by continuously recording water-stage gages calibrated according to methods described by Buchanan and Somers (1968; 1969). Samples for water-quality analysis of major and minor constituents were collected by standard procedures (Brown and others, 1970) and analyzed by the U.S. Geological Survey Central Laboratory in Denver, Colo., using established methods (Skougstad and others, 1978). At the time the samples were collected, measurements also were made of pH, water temperature, and specific conductance.

RESULTS AND DISCUSSION

Major Dissolved Constituents

Mineral Saturation

One method that can be used to evaluate the effect of geologic terrane on the quality of ground water or surface water is to determine with which minerals the water is saturated. For example, it is likely that at one time water was in contact with the mineral gypsum if the concentrations of calcium and sulfate in a sample equal or exceed the concentrations predicted by equation 1:

$$Ca^{+2} \cdot SO_4{}^{-2} = 10^{-4.334}, \qquad (1)$$

where:

Ca^{+2}=the activity of the calcium ion[1];

$SO_4{}^{-2}$=the activity of the sulfate ion[1]; and

$10^{-4.334}$=the product of the calcium and sulfate activities for a solution in equilibrium with the mineral gypsum, at 25° Celsius.

By determining the minerals with which a water sample is saturated one can approximate the limits on the maximum concentrations of individual ions and the ratios of ions to each other.

[1]For a complete discussion of the calculation of mineral saturation in natural waters, and correction of ion concentrations with activity coefficients, see Garrels and Christ (1965).

The usefulness of mineral saturation as a means of predicting the water quality of an area has led to the development of rapid, computer techniques for the calculation of mineral saturation. One such technique, used in this study, is the computer program SOLMNEQ (Kharaka and Barnes, 1973). This program corrects the analytical concentrations of individual ions for the effects of ion-pair formation and ionic strength. The resulting ion activities are multiplied by one another and the product is compared to the thermodynamic-solubility product for an extensive library of minerals. For each mineral in the library the activity product for the sample and the activity product at saturation are shown in the output of the program. Minerals for which the activity product of major ions in the samples from this study equaled or exceeded the activity product at saturation are shown in table 2.

Table 2.--*Number of samples saturated or supersaturated with respect to minerals composed of major ions*

Site	Number of samples analyzed using SOLMNEQ	Number of samples saturated or supersaturated with respect to		
		Calcite	Dolomite	Magnesite
Middle Creek near Oak Creek-----------	24	16	17	10
Foidel Creek near Oak Creek-----------	10	6	7	2
Foidel Creek at mouth near Oak Creek--	5	5	5	1
Taylor Creek at mouth near Axial------	8	8	8	6
Wilson Creek near Axial---------------	31	31	31	31
Jubb Creek near Axial-----------------	15	14	14	14

The data presented in table 2 indicate that most samples from all six sites were saturated or supersaturated with respect to the minerals calcite and dolomite. Saturation with respect to magnesite was common for the samples from Jubb Creek and Wilson Creek and occurred to some extent at all six sites.

The number of samples collected during this study that were saturated or supersaturated with respect to calcite and dolomite, together with the secondary carbonate minerology of the study area, indicate that ground water recharging the streams is probably also saturated with calcite and dolomite. During most of the year, when minimal surface runoff is available to dilute the ground-water seepage, the smallest measured concentrations of calcium, magnesium, and carbonate will equal or exceed the concentrations predicted from the solubility products of calcite and dolomite. As will be shown in later sections, the minimum concentration of carbonate places a limit on the maximum predicted concentrations of dissolved heavy metals.

Ion/Specific-Conductance Regressions

Specific conductance, defined as the electrical conductivity of water at 25° Celsius, depends on both the relative and absolute concentrations of the major ions in solution. If the concentrations of the major ions relative to each other are controlled by the mineralogy of the source rocks, and if a steady-state condition exists among various processes that supply ions to and remove ions from solution, then specific conductance can be used to predict the absolute concentrations of the individual major ions. Typically, linear regressions between individual major ions and specific conductance are used to predict major-ion concentrations from specific conductance.

Regressions of the major-ion concentrations as a function of specific conductance were made for the data collected during this study using the following equation:

$$c=m(sc)+b, \qquad (2)$$

where:

c=concentration of an individual major ion, in milligrams per liter;
m=slope of the linear, least-squares regression equation, in milligrams per liter per micromho per centimeter;
sc=specific conductance, in micromhos per centimeter; and
b=intercept of regression line, in milligrams per liter.

The results of the regressions are summarized in table 3.

Table 3.--*Linear, least-square relationships of individual major ions to specific conductance*

[Site=site number in figure 1; n=number of data pairs used in analysis; m=slope of regression line; b=intercept of regression line; r=correclation coefficient; p=probability of obtaining a larger value of r with n pairs of randomly related data; S.G.=statistical grouping; regression equations for sites with the same letter designation are not significantly different from each other at a probability of 0.05 (5 percent)]

Site	n	m	b	r	p	S.G.
			CALCIUM			
09243700	25	0.069	25.5	0.85	0.001	A
09243800	10	.134	-16.2	.96	.001	B
09243900	8	.092	15.2	.97	.001	C
09250510	9	.051	15.5	.85	.01	D
09250600	33	.021	67.7	.49	.01	E
09250610	15	.051	6.5	.78	.001	D

Table 3.--*Linear, least-square relationships of individual major ions to specific conductance*--Continued

Site	*n*	*m*	*b*	*r*	*p*	S.G.
			MAGNESIUM			
09243700	25	0.032	8.0	0.86	0.001	A
09243800	10	.050	.72	.94	.001	A
09243900	8	.054	-5.1	.92	.01	A
09250510	9	.092	-15.6	.98	.001	B
09250600	33	.057	5.2	.82	.001	C
09250610	15	.093	-6.7	.95	.001	B
			SODIUM			
09243700	25	0.047	-2.6	0.86	0.001	A
09243800	10	.037	-2.2	.90	.001	A
09243900	8	.045	2.7	.74	.05	A
09250510	9	.062	-12.4	.92	.001	A
09250600	33	.060	52.2	.76	.001	B
09250610	15	.061	-12.6	.89	.001	A
			POTASSIUM			
09243700	23	.003	1.8	0.48	.05	A
09243800	10	.003	1.4	.79	.01	A
09243900	8	-.004	7.8	.49	.1	A
09250510	9	-.002	10.8	.34	.1	B
09250600	33	.002	6.3	.46	.01	C
09250610	15	.001	4.7	.30	.1	B
			BICARBONATE			
09243700	25	0.289	99.7	0.78	0.001	A
09243800	10	.357	36.6	.82	.01	A
09243900	8	.24	32.8	.73	.05	B
09250510	9	.289	79.1	.90	.001	A
09250600	32	.135	215	.68	.001	C
09250610	15	.26	99.4	.93	.001	A
			SULFATE			
09243700	24	0.19	-7.6	0.85	0.001	A
09243800	10	.320	-90.3	.74	.02	A
09243900	8	.356	-48.1	.90	.01	B
09250510	9	.315	-68.9	.97	.001	A
09250600	33	.272	-53.5	.81	.001	C
09250610	14	.37	-105	.91	.001	A
			CHLORIDE			
09243700	22	0.007	-0.05	0.77	0.001	A
09243800	10	.007	-.28	.83	.01	A
09243900	8	.004	3.3	.55	.1	A
09250510	9	.030	-6.9	.90	.001	A
09250600	33	.021	112	.21	.1	B
09250610	15	.021	1.8	.72	.01	A

Development of regression relationships for water-quality constituents in a watershed, such as those summarized in table 3, allows water-quality characteristics of the watershed to be monitored by equipment that continuously records specific conductance. Changes in chemical interactions or the supply of dissolved ions in the watershed would be indicated by significant changes in specific conductance and resulting changes in the regression relationships.

Regression relationships also may be used to compare water quality between intensively studied watersheds and those in similar terrane for which few data are available. If the analysis of limited data from a watershed matches an existing regression analysis for an individual constituent, the geohydrologic mechanisms controlling the occurrence of that constituent in both watersheds within similar geologic terrane are probably similar. The greater the number of such matches, the more similar the water quality of the two watersheds.

Regression relationships summarized in table 3 serve several purposes in the assessment of water-quality conditions. For example, specific-conductance monitors can be used to continuously record fluctuations in water quality, including the short-term fluctuations associated with thunderstorm activity. Additionally, if changes in the regression coefficients occur over time, these changes can be used to demonstrate that major changes have occurred in chemical interactions or the supply of dissolved ions. Perhaps most important is the use of regression relationships to demonstrate the comparability of water quality among intensively studied basins and those for which few data are available. Thus, these relationships not only provide the capability of continuous data collection on selected streams, they also may make possible the transfer of data analysis from studies of model basins to basin assessments with critical time or monetary constraints.

Similarities or differences between the geohydrology of the six study watersheds were evaluated using a F-test (Graybill, 1976, p. 294). This evaluation tests the hypothesis that the six linear models (one for each station, table 3) for an individual constituent are identical at some pre-established probability--95 percent in this instance. By iterating the F-test results, sites may be statistically grouped as shown by the letter designations in table 3. Ideally, if the geohydrologic mechanisms controlling the occurrence of a constituent were the same in all six watersheds, all six watersheds would have the same statistical grouping.

Results of the evaluation for the six study watersheds indicate that the geohydrologic mechanisms controlling the occurrence of sodium and chloride are the most similar and that the geohydrologic mechanisms controlling the occurrence of calcium are the least similar. These variations indicate that factors other than mineralogy are affecting the occurrence of the individual constituents in some watersheds.

Climatic Effects

Differences in climate are the principal factors affecting water quality in areas with similar land use, geology, and mineralogy. In areas with a drier, warmer climate such as the Axial area, dilution is less and evaporation is more than in areas with a wetter, cooler climate such as the Oak Creek area. Therefore, mean concentrations of individual constituents in streamflow should be greater in the Axial area than in the Oak Creek area. The statistical characteristics of the mean concentration of the major ions and specific conductance in streams in the two areas are summarized in table 4; the statistical groupings shown were made using a simple analysis of variance.

The mean concentrations for all constituents except calcium are greater in the surface water in the Axial area than in the Oak Creek area. Streamflow within either the Oak Creek or the Axial areas tends to be within a statistical group and separate from the statistical group of the other area.

For calcium, however, the variation in concentration from one stream to another within a climatic area is greater than the variation between the two climatic areas. A possible explanation for the anomalous calcium concentrations is that calcium is actively precipitated in both climatic areas and, thus, does not react as a conservative ion. If this is true, then minor variations from one stream to another in pH, instream biological activity, transpiration, and temperature will be more important than will be the amount of concentration by evaporation attributable to climate only. This is because any tendency towards increased calcium concentration by evaporation could cause a corresponding increase in calcium removal by chemical precipitation, probably as the mineral calcite (table 2). Similarly, any tendency towards calcium dilution by snowmelt causes a corresponding increase in calcium dissolution from previously deposited calcite.

Although direct data verifying the precipitation of calcium in these streams are not available, changes in the slope of the regressions of calcium concentration to specific conductance (table 3) provide additional indirect evidence. If the ground-water discharge to these streams is of similar composition before evaporation, then increased evaporation should result in increased specific conductance. Further, precipitation of calcium caused by evaporation would cause calcium to account for a decreasing proportion of the specific conductance as the specific conductance increases due to evaporation. Thus, a plot of the regression slope of calcium concentration for individual sites as a function of the mean specific conductance for the site should show progressively smaller slopes with increased specific conductance. Data from the sites in this study plot in this manner, as shown in figure 2.

Table 4.--*Statistical characteristics of the mean concentrations of major ions and specific conductance in streamflow*

[Site=site number in figure 1; n=number of samples; $\bar{x}$=mean concentration, in milligrams per liter (major ions) or micromhos per centimeter at 25° Celsius (specific conductance); Sx=standard error, in milligrams per liter (major ions) or micromhos per centimeter at 25° Celsius (specific conductance); CI95=95-percent confidence interval, in milligrams per liter (major ions) or micromhos per centimeter at 25° Celsius (specific conductance); S.G.=statistical grouping, the means for sites with the same letter designation are not significantly different from each other at a probability of 0.05 (5 percent)]

Site	n	$\bar{x}$	Sx	CI95	S.G.
		CALCIUM			
09243700	26	68	2.7	62-74	A
09243800	10	89	7.9	71-107	B
09243900	8	109	7.0	92-126	C
09250510	9	68	5.9	54-82	A
09250600	35	106	3.8	98-114	C
09250610	15	87	7.3	71-103	B
		MAGNESIUM			
09243700	26	28	1.2	26-30	A
09243800	10	40	3.0	33-47	A
09243900	8	50	4.4	40-60	B
09250510	9	78	9.1	57-99	C
09250600	35	111	3.8	104-118	D
09250610	15	140	10.8	117-163	E
		SODIUM			
09243700	26	26	1.8	22-30	A
09243800	10	27	2.3	22-32	A
09243900	8	49	4.5	38-60	B
09250510	9	51	6.4	36-66	B
09250600	35	165	3.8	157-173	C
09250610	15	85	7.7	68-102	D
		POTASSIUM			
09243700	24	3.5	0.2	3.1-3.9	A
09243800	10	3.4	.2	2.9-3.8	A
09243900	8	4.1	.6	2.7-5.5	A
09250510	9	8.4	.7	6.8-10.0	B
09250600	35	9.6	.2	9.2-10.0	C
09250610	15	7.6	.7	6.1-9.1	B

Table 4.--*Statistical characteristics of the mean concentrations of major ions and specific conductance in streamflow*--Continued

Site	*n*	$\bar{x}$	*Sx*	CI95	S.G.
		CHLORIDE			
09243700	23	4.2	0.3	3.6-4.8	A
09243800	10	5.2	.5	4.1-6.3	A
09243900	8	7.7	.6	6.3-9.1	A
09250510	9	23	3.2	16-30	B
09250600	35	152	4.2	143-161	C
09250610	15	35	3.2	28-42	B
		SULFATE			
09243700	25	160	7.6	90-122	A
09243800	10	161	24	107-215	A
09243900	8	315	29	246-384	B
09250510	9	252	31	181-323	B
09250600	35	457	15	427-487	C
09250610	14	479	48	375-583	C
		BICARBONATE			
09243700	26	277	12	252-302	A
09243800	10	316	25	259-373	A
09243900	8	282	25	223-341	A
09250510	9	374	31	303-445	B
09250600	34	468	10	448-488	C
09250610	15	514	31	448-580	C
		SPECIFIC CONDUCTANCE			
09243700	29	628	27	573-683	A
09243800	10	784	56	657-911	A
09243900	14	1,050	60	921-1,180	B
09250510	26	1,050	77	885-1,210	B
09250600	35	1,870	44	1,780-1,960	C
09250610	17	1,560	99	1,350-1,770	D

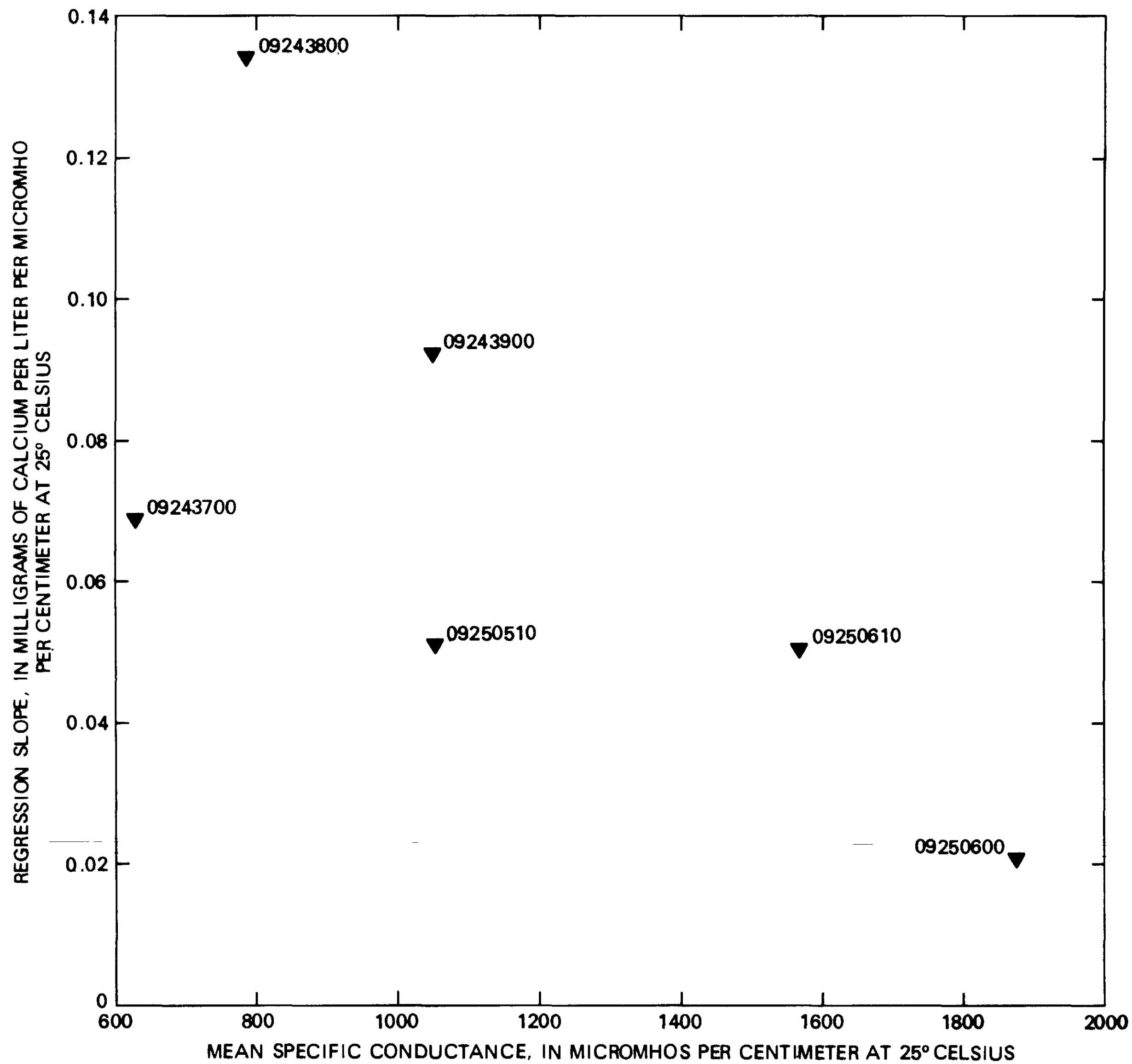

Figure 2.-- Relationship of the regression slope of calcium concentration to specific conductance, as a function of the mean specific conductance.

Anthropogenic Effects

Variations in the mean concentrations of some chemical constituents may be caused by anthropogenic effects, such as coal mining and oil-field brine disposal, in addition to natural causes. For example, coal mining upstream from station 09243900 would be expected to result in increased concentrations of sulfate from the dissolution of gypsum or pyrite oxidation. Hounslow and others (1978) indicate that gypsum and pyrite were ubiquitous in the overburden at the sites of eight mines they studied in the western United States, including the Energy Fuel Mine in the Foidel Creek basin. Similarly, oil exploration and subsequent brine disposal would be expected to result in increased concentrations of sodium and chloride at station 09250600, which is downstream from active oil-drilling operations. The data in table 4 indicate that sulfate concentrations are significantly larger at station 09243900 than at the other stations in the Oak Creek area, and that the sodium and chloride concentrations are significantly larger at station 09250600 than at the other stations in the Axial area. Anthropogenic effects such as these complicate the regionalization of data from model watersheds because they obscure or alter the natural geochemical trends that need to be regionalized.

Regionalization

The lack of water-quality data for small, semiarid watersheds in the coal-mining areas of the western United States makes regionalization of the available data desirable. Regionalization of data enables those assessing the water quality of these watersheds to do so in less time and at less expense but at greater risk of error. Also, watersheds that do not have the same geochemical characteristics as other watersheds in the region can be differentiated early in the selection process for mining or other land-use changes, and a more intensive study can be made to adequately describe their geochemical characteristics.

In the two study areas regionalization of geochemical characteristics using major ions and specific conductance was complicated primarily by climatic and anthropogenic effects, while similarity in physical geology and mineralogy aided in regionalization. Mean concentrations of individual major ions and measures of total mineralization indicated by specific conductance do not readily lend themselves to regionalization. The data in table 4 indicate that mean concentrations of major ions group together only within climatic areas. The Axial area, having a lesser amount of precipitation than the Oak Creek area, has significantly larger specific-conductance values. Thus, the use of such average values needs to be restricted to climatic areas that may be too precisely defined to allow regional application. This increases the data needed to adequately define the characteristics of large regions, such as those proposed for coal mining in the western United States. Anthropogenic effects of coal mining and oil exploration may be readily detected by changes in the chemistry of sulfate and sodium or chloride. Such land-use activities occupying only a small percentage of the surface area of a watershed may be sufficient to hinder the use of data for the purposes of regionalization, as seems to be the case in this study. Additional data are necessary to confirm this.

Similarity in the geology and mineralogy of the climatic areas in this study tends to establish consistent proportions of many of the major ions as indicated by statistical similarity in the regressions of ion concentration to specific conductance. By grouping together the data from stations for which the ion/specific-conductance regressions were not significantly different from one another (table 3), a regionalized relationship can be obtained. For example, the sodium/specific-conductance regressions in table 3 do not significantly differ from one another except for station 09250600, where oil-field brine disposal may locally increase concentrations. Characteristics of ion-concentration regressions to specific conductance for sites from both climatic areas where the regressions in table 3 did not differ significantly from one another are shown in table 5.

The grouped data identified in table 5, the regression line, and the 95-percent confidence band for the regressions are shown in figures 3 to 6. If these regression lines are valid throughout similar geologic terrane in northwestern Colorado, as might be established by a minimum of samples from each individual watershed, then predictions of water chemistry based on these regressions may be valid throughout the hydrochemical region. Deviations from these regressions could be expected for watersheds with significantly different geology or land use than occurs in the watersheds considered in this study. Similarly, changes in land use within the study watersheds may cause future changes in water-quality characteristics from those shown in figures 3 to 6.

Trace Dissolved Constituents

Concentrations of many trace dissolved constituents are of interest because of possible adverse effects on water use, such as for drinking supplies, aquatic habitat, or irrigation, even though many of these constituents are also necessary for life. In deciding whether or not a surface-water source meets promulgated standards for current or possible future uses, it is necessary to estimate the probable range of concentration of many trace constituents. These estimates may be made either stochastically by determining the mean and range of existing data or deterministically by postulating mechanisms that can limit the range of concentration. Both approaches will be discussed with mineral solubility as the proposed controlling mechanism for the deterministic assessment. Other mechanisms, such as ion exchange, may further restrict concentrations; however, the data necessary to evaluate such mechanisms are not available.

Stochastic Approach and Regionalization

Statistical characteristics of the mean concentrations of iron, manganese, lead, cadmium, and zinc in streamflow are summarized in table 6. All data were transformed by taking the logarithm of the concentration before determination of the mean, standard error, 95-percent confidence interval, and analysis of variance. The log-transformation was necessary to achieve a normally distributed data base for statistical testing.

Table 5.--*Linear, least-squares regression characteristics of individual ions to specific conductance for sites not significantly different from one another*

[Sites included=site numbers of sites grouped together for regression calculations; *n*=number of data pairs used in the regression calculations; *m*=slope of the regression line, in milligrams per liter per micromho per centimeter at 25° Celsius; *b*=intercept of the regression line, in milligrams per liter; *r*=correlation coefficient of the regression; *p*=probability of obtaining a larger value of *r* with *n* pairs of randomly related data]

Sites included	*n*	*m*	*b*	*r*	*p*
SODIUM					
09243700 09243800 09243900 09250510 09250610	67	0.061	-13.4	0.95	0.0001
BICARBONATE					
09243700 09243800 09243900 09250510 09250610	58	0.260	110.9	0.95	0.0001
SULFATE					
09243700 09243800 09243900 09250510 09250610	56	0.372	-124.8	0.96	0.0001
CHLORIDE					
09243700 09243800 09243900 09250510 09250610	64	0.028	-12.8	0.87	0.0001

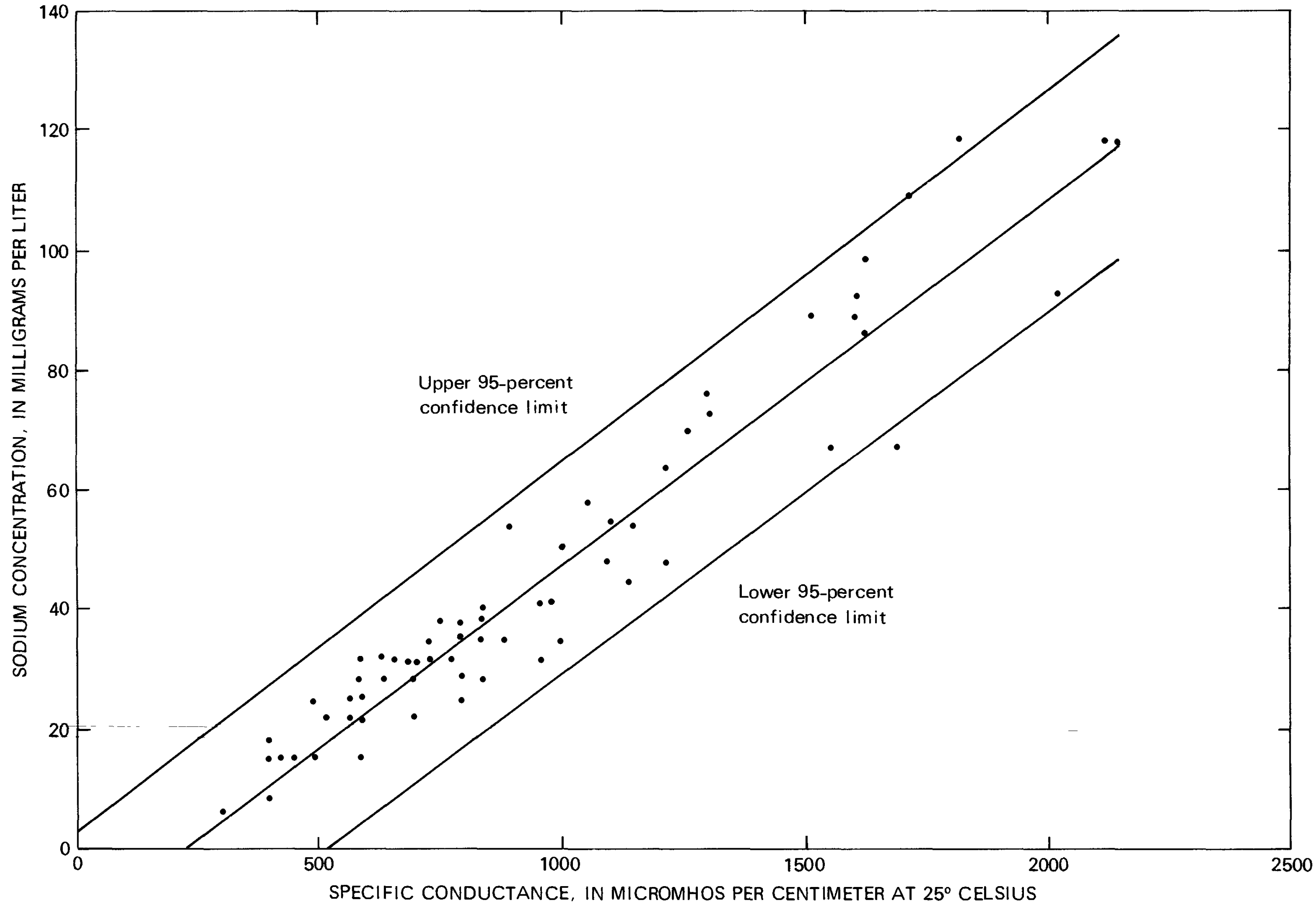

Figure 3.-- Relationship of sodium to specific conductance.

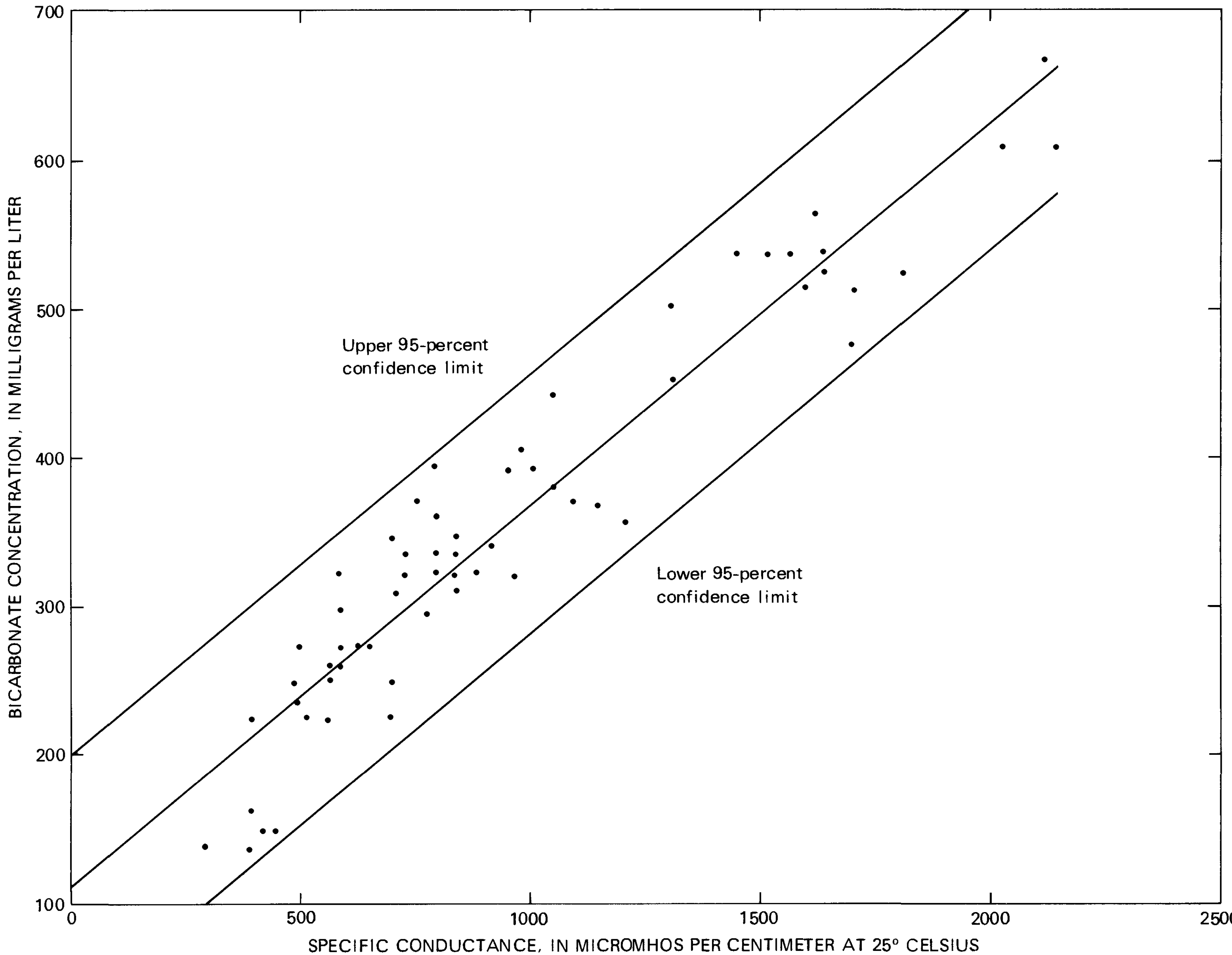

Figure 4.-- Relationship of bicarbonate to specific conductance.

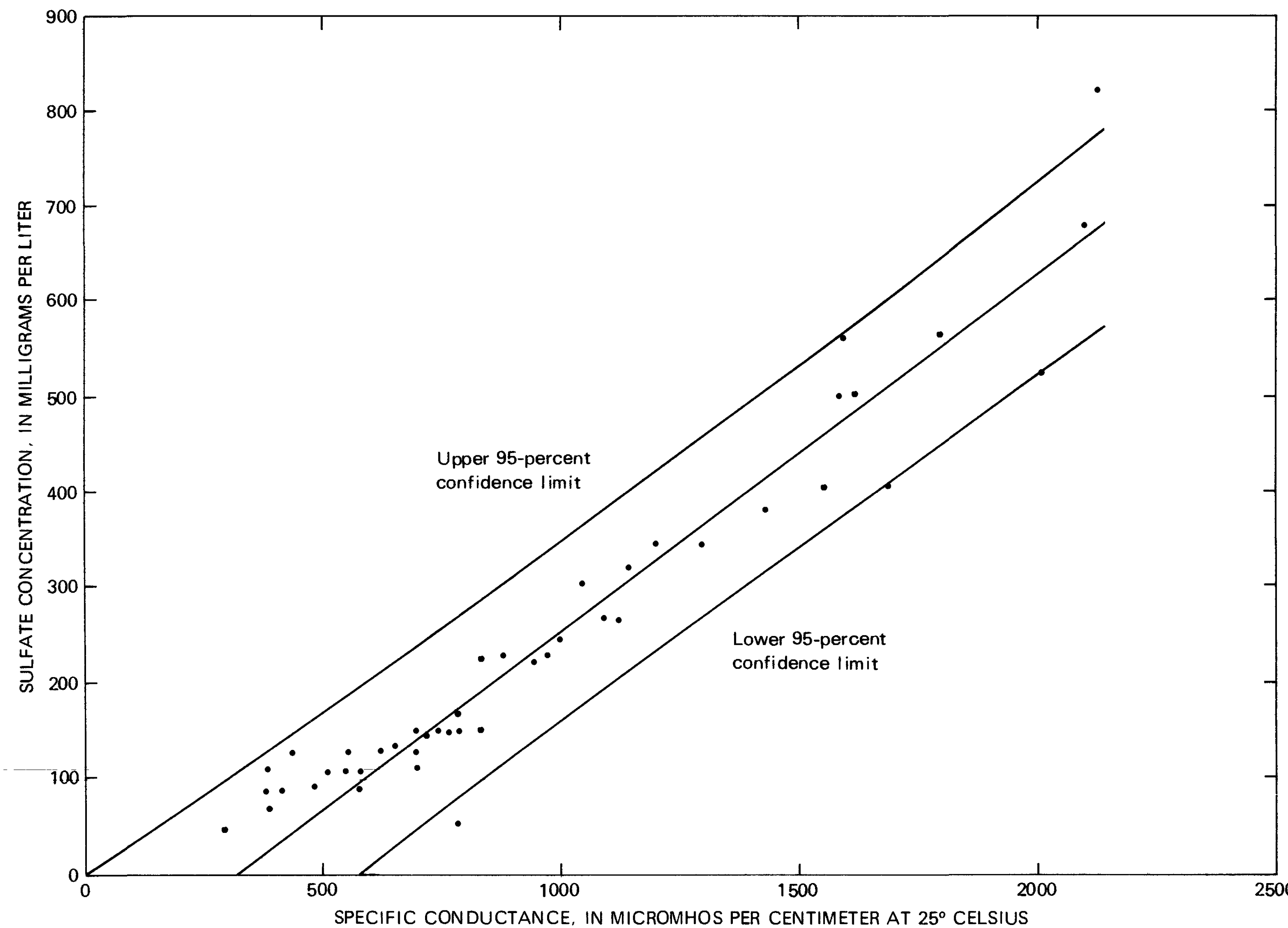

Figure 5.-- Relationship of sulfate to specific conductance.

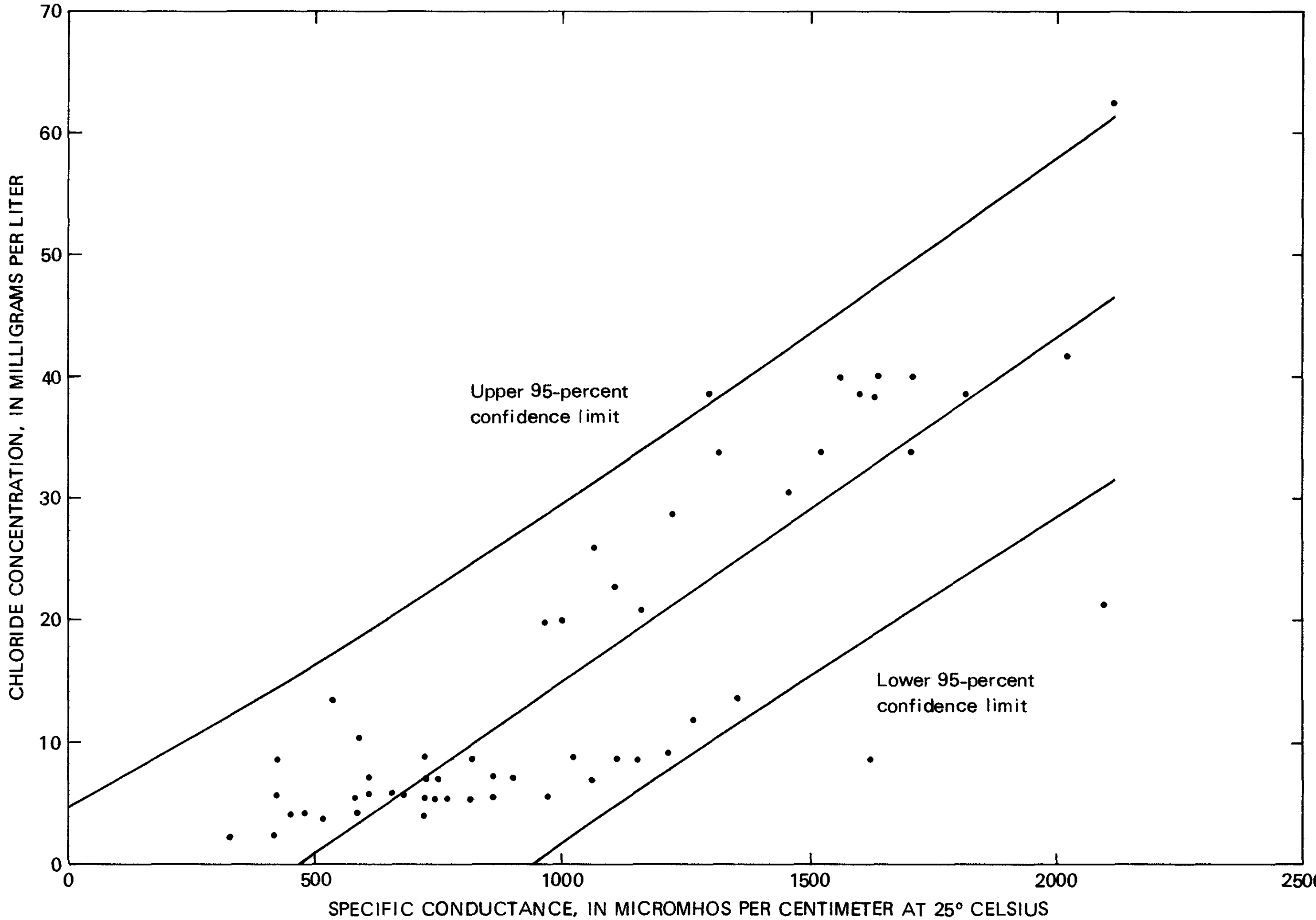

Figure 6.-- Relationship of chloride to specific conductance.

Table 6.--*Statistical characteristics of the mean of the logarithm (base 10) of dissolved trace metals*

[Site=site number in figure 1; *n*=number of samples; $\bar{x}$=mean concentration, in micrograms per liter; *Sx*=standard error, in micrograms per liter; CI95=95 percent confidence interval, in micrograms per liter; S.G.=statistical grouping, sites with the same letter designation are not significantly different from each other at a probability of 0.05 (5 percent)]

Site	*n*	$\bar{x}$	*Sx*	CI95	S.G.
			IRON		
09243700	26	48	1.3	18-130	A,B,C
09243800	10	100	1.3	35-310	A
09243900	8	71	1.4	22-230	A,B
09250510	9	40	1.2	14-110	A,B,C
09250600	34	27	1.2	11-66	C
09250610	15	35	1.4	12-105	B,C
			MANGANESE		
09243700	26	110	1.1	50-260	A
09243800	10	120	1.5	36-410	A
09243900	8	93	2.1	19-460	A
09250510	9	7	1.7	2-28	B
09250600	35	65	1.1	29-140	A
09250610	15	12	1.4	4-39	B
			LEAD		
09243700	9	2	1.3	1-5	A
09243800	4	2	1.6	0-10	A
09243900	3	3	2.1	0-30	A
09250510	3	1	1.6	0-4	A
09250600	10	1	1.3	0-4	A
09250610	4	1	1.8	0-8	A
			CADMIUM		
09243700	9	1	1.2	0-2	A
09243800	4	1	1.3	0-4	A
09243900	3	2	1.7	0-14	A
09250510	3	1	1.6	0-8	A
09250600	10	1	1.1	0-2	A
09250610	4	1	1.1	0-4	A
			ZINC		
09243700	9	4	1.8	1-19	A
09243800	4	14	1.2	4-54	A
09243900	3	13	1.2	2-66	A
09250510	3	10	1.0	2-43	A
09250600	9	7	1.5	2-24	A
09250610	4	10	2.3	1-69	A

The summaries of log-transformed data listed in table 6 indicate that at a probability of 0.05 there is no significant difference in the mean concentrations of lead, cadmium, or zinc among the six stations. Similarly, the mean concentrations of iron are not significantly different among stations in either of the two areas studied, and there is some overlap among stations from both areas. For manganese, however, station 09250600 has a significantly larger mean concentration than the other two stations in the Axial area. Also, the mean concentration of manganese at station 09250600 is not significantly different from the mean concentrations at the three Oak Creek stations.

The lack of statistically significant stochastic difference in the mean concentrations of the five trace ions among all or several stations makes it possible to combine the data for stations that are not significantly different (table 7). By combining data from the stations, it is possible to decrease the range of the 95-percent confidence interval of the mean, thus improving the estimate of mean concentrations of the five trace ions. Also, the means and range, if not significantly different between the two climatic areas, may provide a useful base with which to compare future data from these sites or to use for selecting other basins with similar geochemical characteristics.

Table 7.--*Statistical characteristics of the mean of the logarithm (base 10) of dissolved trace-metal concentrations for sites not significantly different from one another at a probability of 0.05 (5 percent)*

[Site=site number in figure 1; $\bar{x}$=mean concentration, in micrograms per liter; CI95=95 percent confidence interval, in micrograms per liter]

Site	IRON		MANGANESE		LEAD		CADMIUM		ZINC	
	$\bar{x}$	CI95	$\bar{x}$	CI95	$\bar{x}$	CI95	$\bar{x}$	CI95	$\bar{x}$	CI95
09243700	61	25-150	87	39-190	2	1-4	1	0-2	8	3-19
09243800	61	25-150	87	39-190	2	1-4	1	0-2	8	3-19
09243900	61	25-150	87	39-190	2	1-4	1	0-2	8	3-19
09250510	30	13-68	10	4-28	2	1-4	1	0-2	8	3-19
09250600	30	13-68	87	39-190	2	1-4	1	0-2	8	3-19
09250610	30	13-68	10	4-28	2	1-4	1	0-2	8	3-19

Deterministic Approach and Regionalization

Although stochastic approximations of the range of concentrations are simple and statistical procedures are readily available to determine whether or not approximations for one area are significantly different from those of another area, a sufficient data base does not always exist for this method. Also, readily applicable methods do not exist for predicting the effects of changes in land use upon the present data distribution. By comparison, a deterministic approach requires fewer data, less random approaches to data collection, and less need for data at certain concentrations. In using mineral solubility as a limit on trace-constituent concentrations, for example, there is little or no need for data representing intermediate concentrations. Samples collected at times when concentrations generally are largest or smallest may be used to effectively delineate ranges of concentration.

In the systems considered in this study, it is logical to assume that most trace constituents will occur in the aquifer matrix as oxides, hydroxides, carbonates, or sulfide minerals, either pure or as impurities substituted for some major constituent. To some extent, trace constituents also can be adsorbed on ion exchangers such as clay minerals or may be dissolved in the ground water. Oxidation of organic compounds or pyrite within spoil piles, however, may sufficiently decrease the pH of the water to dissolve minerals or shift ion-exchange equilibria sufficiently to detectably change the concentration of the constituent dissolved in ground water. By consideration of the law of mass action, it is possible to show that decreasing the pH will generally result in a transfer of trace metals from the previously mentioned minerals or ion-exchange sites into solution. Addition of this altered ground water or spoil drainage to a stream in which ground-water seepage is the major source of dissolved trace metals will increase the concentration of these trace metals in the water of the stream.

Although there is an infinite number of possible combinations of native ground water and variably altered ground water, it is useful to consider the properties of limiting cases. For example, if the discharge of spoil drainage is sufficiently small to produce no measurable effects on the pH and major-ion distribution in the stream, then what are the maximum effects the spoil drainage can have on the trace-metal concentrations? This question is most appropriately answered by consideration of mineral-solubility relationships in the native surface water. Other factors, such as biological use or ion exchange, are not readily predictable and require extensive experimental work to define. The regionalization of basins into groups of similar geochemistry will allow the selection of a few representative experimental watersheds in which to evaluate other mechanisms.

Mineral equilibria, however, are readily predicted and may operate continuously to remove material from solution. Although some minerals such as dolomite may readily supersaturate, removal of kinetic constraints by processes such as nucleation, biological catalysis, or incorporation as impurities into mineral homologues causes precipitation from saturated or supersaturated solutions in many natural and laboratory systems. Therefore, prediction of equilibrium solubility may be used as a first approximation of how large a concentration can be attained before natural processes may begin to effectively counteract further increases.

The trace metals considered in this study (iron, manganese, lead, cadmium, and zinc) can form carbonate minerals which may limit the solubility of these metals. In the oxidizing environment of a stream, iron and manganese also may be precipitated by formation of hydrous oxides that may remove additional amounts of the other trace metals by coprecipitation or adsorption. The amount of removal that can be expected from this latter process, however, is not readily calculated.

In the systems studied here, the carbonate minerals siderite, rhodochrosite, cerussite, otavite, and smithsonite had the smallest solubility of the corresponding divalent ions of iron, manganese, lead, cadmium, and zinc as determined by SOLMNEQ. Of these minerals, only siderite has been shown to occur in measurable concentrations in the study area (Hounslow and others, 1978). As mentioned previously, the more oxidized iron and manganese species should be even less soluble as hydrous oxides. The results of the solubility calculation are summarized in table 8. The negative logarithm of the mean carbonate ion activity (p_{CO_3}=) is shown for each site, along with the calculated maximum ion concentration assuming equilibrium with the corresponding carbonate mineral. The corresponding 95-percent confidence intervals of the mean concentrations from table 7 also are shown.

The data summarized in table 8 indicate good agreement between the predicted carbonate mineral solubility and the 95-percent confidence interval of the mean measured concentration for iron, manganese, and lead. Water at only two sites was undersaturated with respect to manganese carbonate. All predicted iron concentrations occur within the 95-percent confidence interval, as do all lead concentrations if the standard deviation of replicate, multiple laboratory standard reference sample determinations is applied to the predicted concentration. At the concentrations considered here, the standard deviation of replicate lead analyses is 2 micrograms per liter (Skougstad and others, 1978). The cadmium and zinc carbonate minerals are distinctly undersaturated, indicating that processes other than carbonate precipitation control concentrations in these systems. For example, ion exchange within the aquifer or even limited availability within the aquifer matrix may prevent supply of cadmium and zinc to the streams in concentrations large enough to cause carbonate-mineral precipitation. In the absence of direct data on alternative controls for cadmium and zinc within the streams themselves, the predicted solubilities can be considered as the maximum concentration limits, if other sources of these metals contribute additional cadmium or zinc to the streams at some future time.

The widespread occurrence of carbonate minerals (dolomite, calcite, and siderite) in the overburden of western coal areas (Hounslow and others, 1978) indicates that carbonate solubility may be a potential geochemical control on the concentrations of iron, manganese, and lead dissolved in many streams of this region. The range of carbonate-ion activity and the corresponding range of trace dissolved metals in equilibrium with the appropriate metal carbonate minerals may be readily approximated. From regressions of bicarbonate-ion concentration versus specific conductance and data on the pH characteristic to various ranges of specific conductance, the distribution of carbonate-ion activity with specific conductance may be determined for individual sites (Garrels and Christ, 1965). These ranges in carbonate-ion activity may, in turn, be used to predict metal solubility as a function of the specific conductance, at least for sites with chemistry similar to that of the streams studied here.

Table 8.--*Negative logarithm of the mean carbonate-ion activity (p_{CO_3}=), the 95-percent confidence interval of the mean metal concentration (CI95), and the predicted maximum solubility of the metal carbonate at the indicated mean carbonate-ion activity*

[$p_{CO_3}{-2}$=negative logarithm of mean carbonate-ion activity; CI95=corresponding 95-percent confidence interval of the mean metal concentration; P=predicted maximum solubility of the metal carbonate at the indicated mean carbonate-ion activity; concentrations given in micrograms per liter]

	$p_{CO_3}{-2}$	Iron		Manganese		Lead		Cadmium		Zinc	
		CI95	P	CI95	P	CI95	P	CI95	P	CI95	P
Middle Creek near Oak Creek--	4.70	25-150	57	39-190	83	1-4	0.4	0-2	28	3-19	620
Foidel Creek near Oak Creek--	5.04	25-150	130	39-190	180	1-4	0.8	0-2	56	3-19	1,360
Foidel Creek at mouth near Oak Creek.	4.90	25-150	91	39-190	130	1-4	0.6	0-2	45	3-19	980
Taylor Creek at mouth near Axial.	4.60	13-68	46	4-28	66	1-4	0.3	0-2	22	3-19	490
Wilson Creek near Axial------	4.52	13-68	38	39-190	55	1-4	0.2	0-2	18	3-19	410
Jubb Creek near Axial--------	4.47	13-68	34	4-28	49	1-4	0.2	0-2	18	3-19	370

SUMMARY

Analysis of major and trace constituents in streams flowing through six semiarid watersheds indicates that the stream chemistry is characterized by saturation with respect to common carbonate minerals (calcium, magnesium, iron, manganese, and lead). Mineralogic analyses provided direct evidence of the presence of the carbonate minerals calcite, dolomite, and siderite in the same geologic formations. The solubility of the carbonate minerals may be a major control on the absolute and relative concentrations of calcium, magnesium, bicarbonate, iron, manganese, and lead in streamflow. Other mechanisms such as ion exchange within the aquifers may control the concentrations of cadmium and zinc.

Statistical analyses indicate that mean concentrations of the major ions are not similar from one climatic area to another, even within basins with the same mineralogy and size. Linear regressions of ion concentration to specific conductance, however, are similar for sodium, bicarbonate, sulfate, and chloride in the two climatic areas. Calcium regressions are not similar from one area to another. The probable cause of this is calcite precipitation.

Statistical analyses of trace-constituent data indicate that mean concentrations are indistinguishable among the six sites for lead, cadmium, and zinc; somewhat similar from one climatic area to the other for iron; and generally dissimilar from one climatic area to the other for manganese.

Surface-water chemistry at two of the six sites showed pronounced changes that may be attributed to effects of coal and oil development in the watersheds. The principal effect of coal mining on stream chemistry may be an increased relative concentration of sulfate; the principal effect of oil-field brine disposal may be increased relative concentrations of sodium and chloride.

The regionalized results of this study may be useful as a guide in providing a first approximation of stream chemistry in other small, semiarid watersheds in western coal fields with the same geologic setting. The results also may be used to determine which unstudied watersheds have geochemical controls similar to or dissimilar to those in this study and to determine future changes in stream chemistry of the six watersheds studied. Additional data from other stations need to be analyzed in order to refine this initial attempt at a regionalization of water-quality characteristics of streams in northwestern Colorado.

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WATER-QUALITY DATA

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)
OCT												
22...	3.0	24	850	7.4	8.4	2.2	282	344	0	<.10	.00	<.010
NOV												
05...	5.0	.40	850	7.2	8.8	.9	278	339	0	.01	.06	.020
DEC												
02...	1.0	.38	800	9.8	8.5	1.7	277	336	1	.07	.03	.010
JAN												
22...	1.0	.30	780	12.1	8.2	3.1	249	304	0	1.9	.03	.010
FEB												
05...	1.0	.40	700	8.8	8.4	2.0	260	317	0	.28	.03	.010
MAR												
05...	.0	.50	660	10.6	7.6	11	224	273	0	.34	.03	.010
APR												
07...	--	--	--	--	--	--	--	--	--	--	--	--
08...	3.0	3.6	700	10.0	7.9	5.0	202	246	0	.34	.03	.010
MAY												
07...	10.0	16	410	6.4	8.3	1.3	135	164	0	.38	.03	.010
JUN												
04...	15.0	4.4	500	7.5	7.6	9.4	192	234	0	--	--	--
JUL												
16...	19.5	1.1	600	--	8.5	1.4	221	259	5	.07	.31	.100
AUG												
10...	13.5	1.8	--	8.6	8.4	1.5	189	216	7	.02	.15	.050

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	CYANIDE TOTAL (MG/L AS CN)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
OCT											
22...	7.5	.6	.00	350	63	84	33	38	.9	19	5.1
NOV											
05...	--	--	--	340	62	80	34	36	.9	--	--
DEC											
02...	18	7.7	.00	330	48	79	31	34	.8	18	3.7
JAN											
22...	--	--	--	320	73	78	31	33	.8	--	--
FEB											
05...	--	--	--	310	53	71	33	30	.7	17	3.0
MAR											
05...	--	--	--	280	60	69	27	27	.7	17	4.1
APR											
07...	--	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	260	63	63	26	24	.6	16	6.0
MAY											
07...	--	--	--	170	31	40	16	11	.4	12	2.5
JUN											
04...	5.2	5.2	--	230	43	56	23	16	.5	13	2.6
JUL											
16...	--	--	--	260	40	65	24	21	.6	15	3.6
AUG											
10...	--	--	--	200	12	49	19	13	.4	12	3.5

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	SULFATE DIS- SOLVED (MG/L AS SO4)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	ARSENIC DIS- SOLVED (UG/L AS AS)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM DIS- SOLVED (UG/L AS CD)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
OCT											
22...	5.3	130	.2	7.2	<1	60	ND	--	<10	<2	200
NOV											
05...	--	130	.2	6.8	--	50	--	--	60	--	130
DEC											
02...	8.1	130	.2	9.2	<1	50	ND	--	<10	2	130
JAN											
22...	--	140	.2	10	--	40	--	--	60	--	110
FEB											
05...	3.8	120	.2	8.8	--	70	--	--	<10	--	120
MAR											
05...	4.7	110	.2	9.2	2	50	<2	<2	70	2	130
APR											
07...	--	--	--	--	--	--	--	--	--	--	--
08...	5.6	110	.2	7.8	--	40	--	--	<10	--	190
MAY											
07...	2.2	59	.2	8.3	--	130	--	--	40	--	160
JUN											
04...	--	--	--	--	1	--	ND	2	40	ND	70
JUL											
16...	4.0	69	.2	7.7	--	170	--	--	100	--	90
AUG											
10...	2.7	50	.2	9.5	--	50	--	--	80	--	60

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	NICKEL, DIS-SOLVED (UG/L AS NI)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	ANTI-MONY, DIS-SOLVED (UG/L AS SB)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	MERCURY DIS-SOLVED (UG/L AS HG)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT DIS-CHARGE, SUS-PENDED (T/DAY)
OCT											
22...	2	--	7	<1	--	473	30.7	.64	<.5	--	--
NOV											
05...	--	--	--	--	--	--	--	.68	--	16	.02
DEC											
02...	ND	--	ND	<1	--	462	.47	.63	<.5	--	--
JAN											
22...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	428	.46	.58	--	40	.04
MAR											
05...	ND	.4	ND	<1	<1	388	.52	.53	<.5	57	.08
APR											
07...	--	--	--	--	--	--	--	--	--	194	--
08...	--	--	--	--	--	366	3.56	.50	--	--	--
MAY											
07...	--	--	--	--	--	222	9.83	.30	--	748	32
JUN											
04...	ND	1.5	ND	<1	<1	--	--	--	<.5	41	.49
JUL											
16...	--	--	--	--	--	328	.97	.45	--	46	.14
AUG											
10...	--	--	--	--	--	261	1.27	.36	--	74	.36

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW (CFS)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
NOV												
22...	.5	.30	.29	800	13.2	7.5	18	298	363	0	.03	.03
DEC												
07...	.0	.25	.25	750	12.6	7.4	24	305	372	0	.18	.06
FEB												
28...	.0	1.0	.99	730	11.1	7.6	13	262	320	0	.13	.25
MAR												
29...	.0	1.3	--	560	--	--	--	--	--	--	--	--
29...	.0	--	1.3	560	11.2	7.8	6.3	200	248	0	.21	.58
APR												
20...	7.0	--	1.2	650	10.0	8.1	3.6	230	280	0	.01	.34
MAY												
11...	15.0	--	.33	725	9.7	8.0	5.3	270	330	0	.06	.06
11...	15.0	--	.40	725	--	--	--	--	--	--	--	--
JUN												
27...	20.0	--	2.3	580	6.8	7.2	26	210	260	0	.22	.15
JUL												
13...	16.0	--	.16	500	6.8	7.7	8.0	210	250	0	--	--
13...	16.0	--	.15	500	--	--	--	--	--	--	--	--

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
NOV											
22...	.010	--	--	360	60	84	36	38	.9	19	3.5
DEC											
07...	.020	5.9	7.9	360	53	84	36	37	.9	18	3.2
FEB											
28...	.080	--	--	330	67	79	32	36	.9	19	4.3
MAR											
29...	--	--	--	--	--	--	--	--	--	--	--
29...	.190	6.6	6.4	260	54	62	25	27	.7	18	4.0
APR											
20...	.110	--	--	300	66	69	30	28	.7	17	3.4
MAY											
11...	.020	--	--	340	69	80	34	33	.8	17	3.6
11...	--	--	--	--	--	--	--	--	--	--	--
JUN											
27...	.050	9.0	9.3	270	61	67	26	23	.6	15	4.9
JUL											
13...	--	--	--	260	54	66	23	17	.5	12	3.4
13...	--	--	--	--	--	--	--	--	--	--	--

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	CHLORIDE, DISSOLVED (MG/L AS CL)	SULFATE DISSOLVED (MG/L AS SO4)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	ARSENIC DISSOLVED (UG/L AS AS)	BORON, DISSOLVED (UG/L AS B)	CADMIUM DISSOLVED (UG/L AS CD)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)
NOV											
22...	4.6	150	.2	7.3	--	60	--	--	<10	--	160
DEC											
07...	4.9	140	.2	7.7	<1	50	3	2	20	7	160
FEB											
28...	5.7	140	.2	8.3	--	120	--	--	170	--	130
MAR											
29...	--	--	--	--	--	--	--	--	--	--	--
29...	4.6	110	.2	7.6	1	80	ND	<2	190	2	100
APR											
20...	4.6	120	.2	7.0	--	40	--	--	260	--	120
MAY											
11...	4.9	130	.2	7.4	--	50	--	--	70	--	200
11...	--	--	--	--	--	--	--	--	--	--	--
JUN											
27...	3.3	100	.2	12	2	80	<2	13	70	2	330
JUL											
13...	2.7	73	.2	12	--	80	--	--	60	--	260
13...	--	--	--	--	--	--	--	--	--	--	--

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	NICKEL, DIS-SOLVED (UG/L AS NI)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	ANTI-MONY, DIS-SOLVED (UG/L AS SB)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	MERCURY DIS-SOLVED (UG/L AS HG)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT DIS-CHARGE, SUS-PENDED (T/DAY)
NOV											
22...	--	--	--	--	--	503	.41	.68	--	68	.06
DEC											
07...	2	.4	20	<1	1	498	.34	.68	<.5	21	.01
FEB											
28...	--	--	--	--	--	465	1.26	.63	--	21	.06
MAR											
29...	--	--	--	--	--	--	--	--	--	37	.13
29...	7	.7	ND	<1	<1	365	1.24	.50	<.5	--	--
APR											
20...	--	--	--	--	--	401	1.30	.55	--	34	.11
MAY											
11...	--	--	--	--	--	456	.41	.62	--	--	--
11...	--	--	--	--	--	--	--	--	--	30	.03
JUN											
27...	6	.0	110	--	1	366	2.31	.50	.5	32	.20
JUL											
13...	--	--	--	--	--	321	.14	.44	--	--	--
13...	--	--	--	--	--	--	--	--	--	146	.06

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)
JAN												
24...	--	.09	--	--	--	--	--	--	--	--	--	--
24...	.5	.09	840	10.6	8.1	4.1	260	320	0	.26	.15	.050
APR												
18...	6.5	16	430	--	8.3	1.3	130	160	0	2.3	.03	.010
18...	--	16	--	--	--	--	--	--	--	--	--	--
MAY												
30...	15.5	9.8	420	--	8.5	1.2	190	230	0	.08	.03	.010
JUN												
19...	22.0	1.5	500	--	8.0	4.5	230	280	0	.02	.03	.010
19...	--	1.5	--	--	--	--	--	--	--	--	--	--
19...	--	1.5	--	--	--	--	--	--	--	--	--	--
JUL												
11...	--	--	592	--	--	--	--	--	--	--	--	--
11...	17.5	1.0	592	--	8.5	1.6	250	300	4	<.10	.06	.020
AUG												
01...	--	.34	--	--	--	--	--	--	--	--	--	--
01...	16.0	.34	600	--	8.1	4.1	260	320	0	.01	.03	.010
SEP												
13...	15.0	1.8	310	--	8.2	1.4	110	140	0	.01	.06	.020

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	SULFATE DIS-SOLVED (MG/L AS SO4)
JAN												
24...	--	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	390	130	93	39	42	.9	19	3.0	5.8	210
APR												
18...	--	--	200	73	49	20	17	.5	15	2.7	3.9	88
18...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
30...	--	--	250	57	59	24	17	.5	13	4.4	4.7	79
JUN												
19...	7.9	8.1	270	42	66	26	25	.7	17	2.4	3.0	82
19...	--	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
11...	--	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	280	24	68	26	27	.7	17	2.9	2.7	74
AUG												
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	290	28	70	28	28	.7	17	3.2	2.8	76
SEP												
13...	4.8	4.1	150	33	36	14	6.5	.2	9	1.5	1.1	41

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	ARSENIC DISSOLVED (UG/L AS AS)	ARSENIC SUSPENDED TOTAL (UG/L AS AS)	ARSENIC TOTAL (UG/L AS AS)	BORON, DISSOLVED (UG/L AS B)	CADMIUM DISSOLVED (UG/L AS CD)	CADMIUM SUSPENDED RECOVERABLE (UG/L AS CD)	CADMIUM TOTAL (UG/L AS CD)	COPPER, DISSOLVED (UG/L AS CU)	COPPER, SUSPENDED RECOVERABLE (UG/L AS CU)	COPPER, TOTAL (UG/L AS CU)
JAN												
24...	--	--	--	--	--	--	--	--	--	--	--	--
24...	.2	9.0	--	--	--	60	--	--	--	--	--	--
APR												
18...	.2	7.8	--	--	--	60	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
30...	.2	8.5	--	--	--	50	--	--	--	--	--	--
JUN												
19...	.2	11	1	--	--	70	4	--	--	3	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
11...	--	--	--	--	--	--	--	--	--	--	--	--
11...	.2	10	--	--	--	70	--	--	--	--	--	--
AUG												
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	.2	5.6	--	--	--	80	--	--	--	--	--	--
SEP												
13...	.1	14	1	1	2	<20	<2	2	3	2	4	6

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	IRON, DIS- SOLVED (UG/L AS FE)	IRON, SUS- PENDED RECOV- ERABLE (UG/L AS FE)	IRON, TOTAL (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LEAD, SUS- PENDED RECOV- ERABLE (UG/L AS PB)	LEAD, TOTAL (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	MANGA- NESE, SUS- PENDED RECOV. (UG/L AS MN)	MANGA- NESE, TOTAL (UG/L AS MN)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	MOLYB- DENUM, SUS- PENDED RECOV. (UG/L AS MO)	MOLYB- DENUM, TOTAL (UG/L AS MO)
JAN												
24...	--	--	--	--	--	--	--	--	--	--	--	--
24...	30	--	--	--	--	--	120	--	--	--	--	--
APR												
18...	40	--	--	--	--	--	60	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
30...	620	--	--	--	--	--	140	--	--	--	--	--
JUN												
19...	220	--	--	5	--	--	80	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
11...	--	--	--	--	--	--	--	--	--	--	--	--
11...	50	--	--	--	--	--	50	--	--	--	--	--
AUG												
01...	--	--	--	--	--	--	--	--	--	--	--	--
01...	30	--	--	--	--	--	50	--	--	--	--	--
SEP												
13...	110	3100	3200	ND	18	18	30	40	70	61	5	5

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	NICKEL, DIS-SOLVED (UG/L AS NI)	NICKEL, SUS-PENDED RECOV-ERABLE (UG/L AS NI)	NICKEL, TOTAL (UG/L AS NI)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	ZINC, SUS-PENDED RECOV-ERABLE (UG/L AS ZN)	ZINC, TOTAL (UG/L AS ZN)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ALUM-INUM, SUS-PENDED RECOV. (UG/L AS AL)	ALUMI-NUM, TOTAL (UG/L AS AL)	ANTI-MONY, DIS-SOLVED (UG/L AS SB)
JAN											
24...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
APR											
18...	--	--	--	--	--	--	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	--	--
MAY											
30...	--	--	--	--	--	--	--	--	--	--	--
JUN											
19...	ND	--	--	.4	20	--	--	--	--	--	6
19...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
JUL											
11...	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	--	--	--	--	--	--	--	--
AUG											
01...	--	--	--	--	--	--	--	--	--	--	--
01...	--	--	--	--	--	--	--	--	--	--	--
SEP											
13...	ND	0	ND	--	<20	0	<20	30	2000	2000	--

09243700 - MIDDLE CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	SELENIUM, DISSOLVED (UG/L AS SE)	SELENIUM, SUSPENDED TOTAL (UG/L AS SE)	SELENIUM, TOTAL (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	MERCURY DISSOLVED (UG/L AS HG)	MERCURY SUSPENDED RECOVERABLE (UG/L AS HG)	MERCURY TOTAL (UG/L AS HG)	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
JAN											
24...	--	--	--	--	--	--	--	--	--	15	<.01
24...	--	--	--	561	.14	.76	--	--	--	--	--
APR											
18...	--	--	--	278	12.0	.38	--	--	--	--	--
18...	--	--	--	--	--	--	--	--	--	50	2.2
MAY											
30...	--	--	--	311	8.23	.42	--	--	--	85	2.2
JUN											
19...	1	--	--	354	1.43	.48	<.1	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	9	.04
19...	--	--	--	--	--	--	--	--	--	12	.05
JUL											
11...	--	--	--	--	--	--	--	--	--	--	--
11...	--	--	--	363	1.02	.49	--	--	--	42	.12
AUG											
01...	--	--	--	--	--	--	--	--	--	30	.03
01...	--	--	--	372	.34	.51	--	--	--	--	--
SEP											
13...	<1	0	<1	184	.89	.25	<.1	.0	<.1	--	--

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TEMPER- ATURE, WATER (DEG C)	STREAM- FLOW (CFS)	STREAM- FLOW, INSTAN- TANEOUS (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	ALKA- LINITY (MG/L AS CACO3)	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	PHOS- PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
MAR												
05...	.0	.42	.42	880	9.4	7.8	8.3	269	328	0	.11	.09
APR												
08...	4.0	--	.16	700	8.2	7.8	5.7	184	224	0	.03	.06
MAY												
07...	10.0	--	.71	800	5.5	7.8	8.3	267	326	0	.07	.03
JUN												
04...	13.0	--	.26	800	5.5	7.5	20	326	397	0	6.10	.31

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
MAR											
05...	.030	--	--	430	160	99	45	36	.8	15	3.8
APR											
08...	.020	--	--	280	93	63	29	28	.7	18	3.5
MAY											
07...	.010	--	--	360	95	84	37	25	.6	13	3.1
JUN											
04...	.100	5.0	4.9	410	84	93	43	28	.6	13	2.8

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	SULFATE DIS-SOLVED (MG/L AS SO4)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	ARSENIC DIS-SOLVED (UG/L AS AS)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
MAR											
05...	6.0	210	.2	9.4	2	60	<2	2	40	3	90
APR											
08...	4.2	140	.2	7.8	--	60	--	--	120	--	40
MAY											
07...	5.2	140	.3	7.4	--	50	--	--	40	--	90
JUN											
04...	4.6	46	.4	8.8	1	--	ND	ND	60	ND	290

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	NICKEL, DIS-SOLVED (UG/L AS NI)	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	ANTI-MONY, DIS-SOLVED (UG/L AS SB)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	MERCURY DIS-SOLVED (UG/L AS HG)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT DIS-CHARGE, SUS-PENDED (T/DAY)
MAR											
05...	2	.6	<20	<1	<1	572	.65	.78	<.5	24	.03
APR											
08...	--	--	--	--	--	387	.17	.53	--	102	.04
MAY											
07...	--	--	--	--	--	463	.89	.63	--	54	.10
JUN											
04...	ND	2.1	<20	<1	<1	423	.30	.58	<.5	48	.03

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW (CFS)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)
MAR											
18...	1.0	.10	.10	1050	4.0	7.2	39	320	388	0	.24
APR											
14...	5.0	--	.08	850	6.5	7.2	31	250	310	0	.04
MAY											
11...	5.0	--	.06	1000	3.0	7.1	51	330	400	0	.02

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	PHOS-PHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT
MAR											
18...	.06	.020	11	8.6	550	230	130	54	33	.6	12
APR											
14...	.03	.010	--	--	410	160	98	41	30	.6	13
MAY											
11...	.37	.120	--	--	510	180	120	51	35	.7	13

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	POTASSIUM, DIS-SOLVED (MG/L AS K)	CHLORIDE, DIS-SOLVED (MG/L AS CL)	SULFATE DIS-SOLVED (MG/L AS SO4)	FLUORIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)
MAR										
18...	4.4	6.5	300	.2	9.6	80	<2	4	180	<2
APR										
14...	3.9	6.9	210	.3	8.3	70	--	--	140	--
MAY										
11...	3.8	7.8	240	.2	9.4	100	--	--	100	--

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	MANGANESE, DISSOLVED (UG/L AS MN)	NICKEL, DISSOLVED (UG/L AS NI)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
MAR										
18...	1100	13	.0	20	1	732	.20	1.00	50	.01
APR										
14...	70	--	--	--	--	552	.12	.75	7	.00
MAY										
11...	570	--	--	--	--	666	.11	.91	46	.01

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)
APR											
18...	9.0	4.0	459	8.2	1.6	130	160	0	.46	.09	.030
MAY											
30...	18.5	.84	600	8.2	2.8	230	280	0	.35	.03	.010
JUN											
19...	17.0	.04	700	8.0	5.6	290	350	0	.01	.03	.010
19...	--	.04	--	--	--	--	--	--	--	--	--

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
APR											
18...	--	--	220	87	48	24	15	.4	13	2.9	3.9
MAY											
30...	--	--	310	84	71	33	17	.4	10	2.6	3.8
JUN											
19...	9.2	11	370	86	85	39	21	.5	11	3.1	3.4
19...	--	--	--	--	--	--	--	--	--	--	--

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	SULFATE DIS- SOLVED (MG/L AS SO4)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	ARSENIC DIS- SOLVED (UG/L AS AS)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM DIS- SOLVED (UG/L AS CD)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	NICKEL, DIS- SOLVED (UG/L AS NI)
APR											
18...	120	.2	6.7	--	80	--	--	50	--	$10	--
MAY											
30...	100	.3	9.4	--	70	--	--	280	--	70	--
JUN											
19...	100	.3	11	2	90	2	4	320	8	230	ND
19...	--	--	--	--	--	--	--	--	--	--	--

09243800 - FOIDEL CREEK NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	MERCURY DISSOLVED (UG/L AS HG)	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
APR											
18...	--	--	--	--	302	3.26	.41	95	--	37	.40
MAY											
30...	--	--	--	--	377	.86	.51	--	--	33	.07
JUN											
19...	.0	20	<1	<1	436	.05	.59	--	<.1	--	--
19...	--	--	--	--	--	--	--	--	--	29	<.01

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW (CFS)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)
JAN 26...	1.0	.05	.05	1300	11.4	8.2	--	--	--	--	--
FEB 05...	1.0	.15	.15	1400	9.8	7.9	--	--	--	--	--
MAR 05...	.0	5.8	5.8	980	8.4	7.4	--	--	--	--	--
APR 08...	5.0	--	5.8	1150	7.5	8.0	4.2	217	265	0	1.9
MAY 07...	15.0	2.4	2.4	1200	6.8	8.1	--	--	--	--	--
JUN 04...	17.0	--	.42	1200	7.0	7.6	13	255	311	0	.74

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
JAN											
26...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	--	--	--	--	--	--	--	--	--	--	--
MAR											
05...	--	--	--	--	--	--	--	--	--	--	--
APR											
08...	.12	.040	--	530	310	120	55	53	1.0	18	4.5
MAY											
07...	--	--	--	--	--	--	--	--	--	--	--
JUN											
04...	.15	.050	4.1	570	310	120	65	48	.9	15	3.0

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CHLORIDE, DIS-SOLVED (MG/L AS CL)	SULFATE DIS-SOLVED (MG/L AS SO4)	FLUORIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	ARSENIC DIS-SOLVED (UG/L AS AS)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)
JAN										
26...	--	--	--	--	--	--	--	--	--	--
FEB										
05...	--	--	--	--	--	--	--	--	--	--
MAR										
05...	--	--	--	--	--	--	--	--	--	--
APR										
08...	7.5	410	.2	8.0	--	80	--	--	<10	--
MAY										
07...	--	--	--	--	--	--	--	--	--	--
JUN										
04...	7.5	380	.5	3.4	1	--	ND	<2	30	ND

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	MANGANESE, DISSOLVED (UG/L AS MN)	NICKEL, DISSOLVED (UG/L AS NI)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	MERCURY DISSOLVED (UG/L AS HG)
JAN										
26...	--	--	--	--	--	--	--	--	--	--
FEB										
05...	--	--	--	--	--	--	--	--	--	--
MAR										
05...	--	--	--	--	--	--	--	--	--	--
APR										
08...	260	--	--	--	--	--	798	25.9	1.09	--
MAY										
07...	--	--	--	--	--	--	--	--	--	--
JUN										
04...	440	ND	3.7	<20	<1	<1	785	.89	1.07	<.5

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
MAR											
18...	.0	.40	600	5.0	8.5	.9	150	184	0	1.2	.28
APR											
14...	10.5	.41	1260	10.2	7.8	9.1	300	360	0	.02	.03
15...	4.5	--	925	--	--	--	--	--	--	--	--
MAY											
11...	11.5	.08	1100	8.3	7.9	7.7	310	380	0	.02	.09

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
MAR											
18...	.090	15	13	270	120	69	23	31	.8	20	7.3
APR											
14...	.010	--	--	560	260	130	57	70	1.3	21	4.8
15...	--	--	--	--	--	--	--	--	--	--	--
MAY											
11...	.030	--	--	500	190	120	49	53	1.0	19	3.4

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	CHLORIDE, DISSOLVED (MG/L AS CL)	SULFATE DISSOLVED (MG/L AS SO4)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	ARSENIC DISSOLVED (UG/L AS AS)	BORON, DISSOLVED (UG/L AS B)	CADMIUM DISSOLVED (UG/L AS CD)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)
MAR										
18...	7.1	150	.1	7.1	2	60	3	8	210	7
APR										
14...	11	370	.2	6.4	--	80	--	--	120	--
15...	--	--	--	--	--	--	--	--	--	--
MAY										
11...	8.6	290	.2	8.4	--	50	--	--	120	--

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	MANGANESE, DISSOLVED (UG/L AS MN)	NICKEL, DISSOLVED (UG/L AS NI)	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	MERCURY DISSOLVED (UG/L AS HG)
MAR										
18...	200	13	.3	<20	<1	1	391	.42	.53	<.5
APR										
14...	210	--	--	--	--	--	827	.92	1.12	--
15...	--	--	--	--	--	--	--	--	--	--
MAY										
11...	840	--	--	--	--	--	721	.16	.98	--

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)
APR											
06...	--	13	--	--	--	--	--	--	--	--	--
07...	--	23	--	--	--	--	--	--	--	--	--
09...	--	32	--	--	--	--	--	--	--	--	--
18...	7.0	10	960	8.3	1.5	160	190	0	5.0	.15	.050
MAY											
30...	19.5	2.2	720	8.4	1.9	246	300	0	3.2	.03	.010
JUN											
19...	21.0	.48	1000	8.0	4.5	230	280	0	1.2	.00	$.010
JUL											
11...	22.0	.01	900	8.2	2.9	240	290	0	.01	.06	.020

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	SODIUM PERCENT	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
APR											
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--	--
18...	--	--	480	320	110	49	31	.6	12	4.0	5.4
MAY											
30...	--	--	370	120	87	36	33	.8	16	3.5	7.3
JUN											
19...	13	12	500	270	110	55	50	1.0	18	3.4	7.4
JUL											
11...	--	--	420	180	91	47	53	1.1	21	2.1	6.8

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	SULFATE DIS-SOLVED (MG/L AS SO4)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	ARSENIC DIS-SOLVED (UG/L AS AS)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	NICKEL, DIS-SOLVED (UG/L AS NI)
APR											
06...	--	--	--	--	--	--	--	--	--	--	--
07...	--	--	--	--	--	--	--	--	--	--	--
09...	--	--	--	--	--	--	--	--	--	--	--
18...	340	.2	7.1	--	100	--	--	50	--	60	--
MAY											
30...	150	.3	4.4	--	80	--	--	--	--	80	--
JUN											
19...	320	.2	--	1	90	5	6	190	9	20	ND
JUL											
11...	260	.2	3.2	--	70	--	--	70	--	610	--

09243900 - FOIDEL CREEK AT MOUTH, NEAR OAK CREEK, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	MERCURY DISSOLVED (UG/L AS HG)	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
APR											
06...	--	--	--	--	--	--	--	92	--	422	15
07...	--	--	--	--	--	--	--	89	--	407	25
09...	--	--	--	--	--	--	--	94	--	249	22
18...	--	--	--	--	663	18.6	.90	--	--	--	--
MAY											
30...	--	--	--	--	484	2.87	.66	--	--	--	--
JUN											
19...	.0	20	6	1	--	.89	--	--	§.1	--	--
JUL											
11...	--	--	--	--	607	.02	.83	--	--	--	--

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)
OCT												
09...	16.0	.02	1450	9.7	8.5	--	--	--	--	--	--	--
FEB												
09...	1.0	6.1	560	12.4	8.4	1.5	191	233	0	.66	.61	.200
13...	.5	.14	--	--	--	--	--	--	--	--	--	--
26...	1.0	.12	--	--	--	--	--	--	--	--	--	--
27...	2.0	.62	975	--	--	--	--	--	--	--	--	--
MAR												
01...	4.0	.08	975	9.6	8.1	5.1	330	402	0	.20	.18	.060
MAY												
27...	20.0	.01	--	--	--	--	--	--	--	--	--	--
JUN												
03...	23.0	.03	--	--	--	--	--	--	--	--	--	--
10...	23.0	.06	1150	8.4	8.2	3.8	308	375	0	.01	.00	$.010
17...	16.5	.08	--	--	--	--	--	--	--	--	--	--
23...	18.0	.10	--	--	--	--	--	--	--	--	--	--
30...	27.0	.10	--	--	--	--	--	--	--	--	--	--
JUL												
09...	19.0	.12	1100	6.9	8.1	4.7	300	366	0	.01	.00	$.010
30...	24.0	.05	--	--	--	--	--	--	--	--	--	--
AUG												
09...	18.0	.05	1200	7.5	--	--	337	362	24	.01	.03	.010
19...	16.0	.01	--	--	--	--	--	--	--	--	--	--
19...	16.0	.01	--	--	--	--	--	--	--	--	--	--
SEP												
01...	12.0	.01	1300	7.9	8.2	4.6	371	452	0	.02	.03	.010
09...	16.5	.01	--	--	--	--	--	--	--	--	--	--
22...	11.5	.01	--	--	--	--	--	--	--	--	--	--

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT											
09...	--	--	--	--	--	--	--	--	--	--	--
FEB											
09...	--	--	260	66	47	34	24	.7	16	12	10
13...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAR											
01...	15	15	470	140	81	65	43	.9	16	11	19
MAY											
27...	--	--	--	--	--	--	--	--	--	--	--
JUN											
03...	--	--	--	--	--	--	--	--	--	--	--
10...	8.5	5.2	530	230	74	85	45	.8	15	6.0	20
17...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
JUL											
09...	--	--	530	230	69	87	47	.9	16	6.0	22
30...	--	--	--	--	--	--	--	--	--	--	--
AUG											
09...	--	--	570	230	68	97	64	1.2	19	7.4	29
19...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
SEP											
01...	--	11	590	220	71	100	77	1.4	22	8.6	34
09...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	SULFATE DIS-SOLVED (MG/L AS SO4)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	ARSENIC DIS-SOLVED (UG/L AS AS)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	NICKEL, DIS-SOLVED (UG/L AS NI)
OCT											
09...	--	--	--	--	--	--	--	--	--	--	--
FEB											
09...	120	.2	6.3	--	160	--	--	100	--	40	--
13...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAR											
01...	210	.4	8.7	1	90	<2	7	30	3	40	2
MAY											
27...	--	--	--	--	--	--	--	--	--	--	--
JUN											
03...	--	--	--	--	--	--	--	--	--	--	--
10...	260	.4	5.8	<1	--	ND	3	20	ND	<10	ND
17...	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--
JUL											
09...	270	.6	8.7	--	110	--	--	130	--	<10	--
30...	--	--	--	--	--	--	--	--	--	--	--
AUG											
09...	340	.4	11	--	120	--	--	30	--	<10	--
19...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
SEP											
01...	330	.4	10	1	120	4	5	20	ND	<10	2
09...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	MERCURY DISSOLVED (UG/L AS HG)	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
OCT											
09...	--	--	--	--	--	--	--	--	--	44	.00
FEB											
09...	--	--	--	--	372	6.13	.51	99	--	456	7.5
13...	--	--	--	--	--	--	--	--	--	619	.23
26...	--	--	--	--	--	--	--	--	--	62	.02
27...	--	--	--	--	--	--	--	93	--	677	1.1
MAR											
01...	3.5	<20	<1	1	638	.14	.87	--	<.5	203	.04
MAY											
27...	--	--	--	--	--	--	--	--	--	214	.01
JUN											
03...	--	--	--	--	--	--	--	--	--	199	.02
10...	1.0	<20	<1	<1	681	.11	.93	--	<.5	168	.03
17...	--	--	--	--	--	--	--	--	--	208	.04
23...	--	--	--	--	--	--	--	--	--	209	.06
30...	--	--	--	--	--	--	--	--	--	193	.05
JUL											
09...	--	--	--	--	691	.22	.94	--	--	161	.05
30...	--	--	--	--	--	--	--	--	--	97	.01
AUG											
09...	--	--	--	--	819	.11	1.11	--	--	7	.00
19...	--	--	--	--	--	--	--	--	--	84	.00
19...	--	--	--	--	--	--	--	--	--	84	.00
SEP											
01...	1.4	<20	<1	1	854	.02	1.16	--	<.5	4	.00
09...	--	--	--	--	--	--	--	--	--	34	.00
22...	--	--	--	--	--	--	--	--	--	14	.00

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TEMPER- ATURE, WATER (DEG C)	STREAM- FLOW (CFS)	STREAM- FLOW, INSTAN- TANEOUS (CFS)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	OXYGEN, DIS- SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	ALKA- LINITY (MG/L AS CACO3)	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	PHOS- PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT												
15...	3.0	--	--	1300	--	--	--	--	--	--	--	--
15...	3.0	--	.01	1300	--	8.2	--	--	--	--	--	--
15...	3.0	--	.01	1300	10.5	8.2	5.0	410	500	0	.02	.06
NOV												
05...	3.0	--	--	1060	--	--	--	--	--	--	--	--
05...	3.0	--	.01	1060	8.6	8.1	5.7	365	445	0	6.10	.03
MAR												
23...	10.0	--	--	530	--	--	--	--	--	--	--	--
23...	10.0	--	.01	530	6.1	8.1	2.9	190	227	0	.05	.12
24...	--	.03	.03	--	--	--	--	--	--	--	--	--

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	SULFATE DIS-SOLVED (MG/L AS SO4)
OCT											
15...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	--	--
15...	.020	680	270	92	110	74	1.2	19	9.2	39	350
NOV											
05...	--	--	--	--	--	--	--	--	--	--	--
05...	.010	570	200	78	90	57	1.0	18	7.8	25	300
MAR											
23...	--	--	--	--	--	--	--	--	--	--	--
23...	.040	240	51	34	37	24	.7	17	7.2	12	92
24...	--	--	--	--	--	--	--	--	--	--	--

09250510 - TAYLOR CREEK AT MOUTH NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	BORON, DISSOLVED (UG/L AS B)	IRON, DISSOLVED (UG/L AS FE)	MANGANESE, DISSOLVED (UG/L AS MN)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
OCT											
15...	--	--	--	--	--	--	--	--	--	--	--
15...	--	--	--	--	--	--	--	--	--	9	.00
15...	.5	12	120	30	<10	934	.03	1.27	--	--	--
NOV											
05...	--	--	--	--	--	--	--	--	--	--	--
05...	.3	11	100	30	<10	789	.02	1.07	--	131	.00
MAR											
23...	--	--	--	--	--	--	--	--	--	--	--
23...	.4	8.0	80	60	40	327	.01	.44	--	--	--
24...	--	--	--	--	--	--	--	--	100	242	.02

09250600 - WILSON CREEK NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)
OCT												
09...	9.0	.45	2600	10.4	7.5	27	434	529	0	.36	.03	.010
09...	9.0	--	--	--	--	--	--	--	--	--	--	--
NOV												
11...	5.0	.61	2100	11.6	8.5	2.6	421	513	0	.38	.03	.010
12...	--	.55	--	--	--	--	--	--	--	--	--	--
20...	4.0	.53	--	--	--	--	--	--	--	--	--	--
DEC												
03...	2.0	.82	1800	8.4	8.5	2.5	410	500	0	.91	.06	.020
03...	2.0	.82	--	--	--	--	--	--	--	--	--	--
16...	3.0	.70	--	--	--	--	--	--	--	--	--	--
24...	3.0	.70	--	--	--	--	--	--	--	--	--	--
JAN												
02...	.5	.41	--	--	--	--	--	--	--	--	--	--
08...	1.0	1.2	1900	10.2	8.1	6.5	417	509	0	.94	.03	.010
14...	.5	1.1	--	--	--	--	--	--	--	--	--	--
22...	.5	1.3	--	--	--	--	--	--	--	--	--	--
28...	3.0	1.2	--	--	--	--	--	--	--	--	--	--
FEB												
05...	.0	1.2	1480	9.6	8.1	6.3	409	499	0	.95	.09	.030
09...	1.5	12	--	--	--	--	--	--	--	--	--	--
13...	4.5	1.4	--	--	--	--	--	--	--	--	--	--
19...	4.0	.91	--	--	--	--	--	--	--	--	--	--
26...	4.5	2.5	--	--	--	--	--	--	--	--	--	--
27...	1.5	18	--	--	--	--	--	--	--	--	--	--
MAR												
01...	5.0	.88	1200	9.7	8.0	5.9	303	370	0	.85	.18	.060
APR												
08...	7.0	1.4	1880	8.8	8.1	6.2	398	485	0	.66	.00	$.010
MAY												
06...	10.0	3.3	1500	8.1	8.2	3.8	311	379	0	.61	.06	.020
JUN												
10...	16.0	2.2	1700	8.3	8.1	5.0	325	396	0	.65	.03	.010
JUL												
09...	21.0	1.7	1700	9.0	8.1	5.0	322	392	0	.39	.03	.010
AUG												
09...	18.0	.81	2000	8.3	8.2	4.6	376	458	0	.30	.03	.010
SEP												
01...	14.0	.32	2200	8.2	8.2	4.8	393	479	0	.52	.06	.020

09250600 - WILSON CREEK NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	CYANIDE TOTAL (MG/L AS CN)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
OCT												
09...	16	5.6	.00	840	400	120	130	180	2.7	32	11	180
09...	--	--	--	--	--	--	--	--	--	--	--	--
NOV												
11...	--	--	--	700	280	84	120	190	3.1	37	10	58
12...	--	--	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--	--	--
DEC												
03...	--	14	.00	750	340	120	110	180	2.9	34	13	150
03...	--	--	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--	--
JAN												
02...	--	--	--	--	--	--	--	--	--	--	--	--
08...	--	--	--	790	380	120	120	140	2.2	27	9.6	130
14...	--	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--	--
FEB												
05...	--	--	--	690	280	110	100	150	2.5	32	9.2	140
09...	--	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--	--
MAR												
01...	13	13	--	500	200	86	70	100	1.9	30	9.5	96
APR												
08...	--	--	--	700	310	120	98	150	2.5	31	9.4	150
MAY												
06...	--	--	--	550	240	100	72	130	2.4	34	8.0	180
JUN												
10...	15	4.3	--	630	300	110	86	150	2.6	34	7.5	180
JUL												
09...	--	--	--	630	300	92	96	160	2.8	35	9.0	170
AUG												
09...	--	--	--	730	350	110	110	170	2.7	33	9.9	170
SEP												
01...	15	4.8	--	840	440	120	130	190	2.9	33	10	180

09250600 - WILSON CREEK NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	SULFATE DIS-SOLVED (MG/L AS SO4)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	ARSENIC DIS-SOLVED (UG/L AS AS)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM DIS-SOLVED (UG/L AS CD)	COPPER, DIS-SOLVED (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	NICKEL, DIS-SOLVED (UG/L AS NI)
OCT											
09...	540	.6	14	1	220	<2	--	<10	ND	90	4
09...	--	--	--	--	--	--	--	--	--	--	--
NOV											
11...	600	.5	13	--	220	--	--	90	--	100	--
12...	--	--	--	--	--	--	--	--	--	--	--
20...	--	--	--	--	--	--	--	--	--	--	--
DEC											
03...	500	.5	15	<1	190	<2	--	<10	6	70	<2
03...	--	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
JAN											
02...	--	--	--	--	--	--	--	--	--	--	--
08...	440	.4	15	--	180	--	--	<10	--	80	--
14...	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--
FEB											
05...	410	.5	14	--	200	--	--	20	--	100	--
09...	--	--	--	--	--	--	--	--	--	--	--
13...	--	--	--	--	--	--	--	--	--	--	--
19...	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--
MAR											
01...	280	.4	11	1	140	<2	7	30	6	80	4
APR											
08...	390	.5	13	--	140	--	--	40	--	80	--
MAY											
06...	290	.4	10	--	110	--	--	<10	--	60	--
JUN											
10...	310	.5	14	1	--	ND	5	280	ND	40	ND
JUL											
09...	350	.6	14	--	200	--	--	40	--	20	--
AUG											
09...	520	.5	13	--	200	--	--	20	--	70	--
SEP											
01...	560	.5	15	<1	210	2	2	20	ND	90	2

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	VANADIUM, DISSOLVED (UG/L AS V)	ZINC, DISSOLVED (UG/L AS ZN)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	MERCURY DISSOLVED (UG/L AS HG)	SEDIMENT, SUSPENDED (MG/L)	SEDIMENT DISCHARGE, SUSPENDED (T/DAY)
OCT											
09...	--	30	<1	--	1440	1.75	1.96	--	<.5	20	.02
09...	--	--	--	--	--	--	--	--	--	--	--
NOV											
11...	--	--	--	--	1330	2.19	1.81	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	47	.07
20...	--	--	--	--	--	--	--	--	--	34	.05
DEC											
03...	--	<20	<1	--	1340	2.97	1.82	--	<.5	57	.13
03...	--	--	--	--	--	--	--	--	--	57	.13
16...	--	--	--	--	--	--	--	--	--	69	.13
24...	--	--	--	--	--	--	--	--	--	35	.07
JAN											
02...	--	--	--	--	--	--	--	--	--	118	.13
08...	--	--	--	--	1230	3.99	1.67	--	--	56	.18
14...	--	--	--	--	--	--	--	--	--	246	.73
22...	--	--	--	--	--	--	--	--	--	300	1.1
28...	--	--	--	--	--	--	--	--	--	75	.24
FEB											
05...	--	--	--	--	1180	3.82	1.60	--	--	93	.30
09...	--	--	--	--	--	--	--	79	--	1540	50
13...	--	--	--	--	--	--	--	84	--	1450	5.5
19...	--	--	--	--	--	--	--	--	--	213	.52
26...	--	--	--	--	--	--	--	96	--	5280	36
27...	--	--	--	--	--	--	--	--	--	40900	1990
MAR											
01...	3.7	<20	<1	4	840	2.00	1.14	--	<.5	1820	4.3
APR											
08...	--	--	--	--	1170	4.42	1.59	--	--	--	--
MAY											
06...	--	--	--	--	980	8.73	1.33	--	--	--	--
JUN											
10...	3.8	20	<1	4	1060	6.35	1.44	--	<.5	--	--
JUL											
09...	--	--	--	--	1090	5.00	1.48	--	--	--	--
AUG											
09...	--	--	--	--	1330	2.91	1.81	--	--	--	--
SEP											
01...	2.7	ND	<1	9	1440	1.24	1.96	--	<.5	--	--

09250600 - WILSON CREEK NEAR AXIAL, CO.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT											
15...	6.5	.42	2100	10.5	8.2	5.0	404	493	0	.40	.06
NOV											
05...	10.0	.36	1900	9.5	8.0	7.6	388	473	0	.33	.06
DEC											
09...	3.5	.47	2100	9.8	8.2	5.3	431	526	0	.52	.00
JAN											
06...	.5	.12	2050	10.6	8.1	6.8	440	536	0	.46	.03
FEB											
07...	2.0	.63	1990	8.7	8.2	5.1	414	505	0	.36	.03
MAR											
10...	3.0	.70	1800	12.8	8.1	6.2	399	486	0	.25	.09
APR											
07...	10.0	.93	1750	10.4	8.2	4.3	350	430	0	.26	.12
MAY											
05...	14.0	.34	2100	9.6	8.2	4.8	390	480	0	.19	.12
JUN											
08...	16.0	.36	2000	8.2	8.1	6.4	410	500	0	.43	.03
JUL											
08...	16.0	.38	1900	9.9	8.1	6.0	390	470	0	.32	.03
AUG											
18...	15.0	.37	1910	11.0	8.2	4.6	380	460	0	.18	.03
SEP											
19...	15.5	.36	2000	11.2	8.2	4.9	400	490	0	.25	.03

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	PHOS-PHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
OCT											
15...	.020	--	--	790	390	120	120	180	2.8	33	10
NOV											
05...	.020	--	--	810	420	110	130	180	2.8	32	9.9
DEC											
09...	<.010	2.6	147	880	440	120	140	170	2.5	29	11
JAN											
06...	.010	--	--	810	370	110	130	180	2.8	32	9.8
FEB											
07...	.010	--	--	770	350	110	120	180	2.8	33	9.7
MAR											
10...	.030	--	--	740	350	100	120	170	2.7	33	9.0
APR											
07...	.040	6.3	5.5	660	310	100	100	150	2.5	33	9.1
MAY											
05...	.040	--	--	740	350	100	120	180	2.9	34	10
JUN											
08...	.010	--	--	770	360	110	120	180	2.8	33	10
JUL											
08...	.010	4.0	4.4	770	380	110	120	180	2.8	33	9.0
AUG											
18...	.010	--	--	770	390	110	120	150	2.4	29	11
SEP											
19...	.010	--	--	740	340	100	120	160	2.6	32	9.5

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	CHLORIDE, DISSOLVED (MG/L AS CL)	SULFATE DISSOLVED (MG/L AS SO4)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	ARSENIC DISSOLVED (UG/L AS AS)	BORON, DISSOLVED (UG/L AS B)	CADMIUM DISSOLVED (UG/L AS CD)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)
OCT										
15...	160	540	.5	15	--	200	--	--	30	--
NOV										
05...	160	540	.4	15	--	210	--	--	30	--
DEC										
09...	160	520	.6	14	1	220	ND	$2	40	ND
JAN										
06...	160	510	.6	17	--	200	--	--	30	--
FEB										
07...	160	530	.5	15	--	220	--	--	50	--
MAR										
10...	150	480	.6	12	--	200	--	--	90	--
APR										
07...	130	420	.5	11	$1	200	$2	4	60	$2
MAY										
05...	160	500	.7	14	--	210	--	--	70	--
JUN										
08...	150	500	.7	15	--	220	--	--	20	--
JUL										
08...	150	490	.6	14	$1	210	$2	$2	40	3
AUG										
18...	150	490	.6	15	--	230	--	--	$10	--
SEP										
19...	130	520	.6	15	--	260	--	--	30	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	MANGANESE, DIS-SOLVED (UG/L AS MN)	NICKEL, DIS-SOLVED (UG/L AS NI)	VANADIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	ANTIMONY, DIS-SOLVED (UG/L AS SB)	SELENIUM, DIS-SOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	MERCURY DIS-SOLVED (UG/L AS HG)
OCT										
15...	70	--	--	--	--	--	1390	1.58	1.89	--
NOV										
05...	60	--	--	--	--	--	1380	1.34	1.88	--
DEC										
09...	100	2	1.0	<20	1	6	1400	1.78	1.90	<.5
JAN										
06...	80	--	--	--	--	--	1380	.45	1.88	--
FEB										
07...	100	--	--	--	--	--	1380	2.35	1.88	--
MAR										
10...	60	--	--	--	--	--	1280	2.42	1.74	--
APR										
07...	110	3	1.1	<20	<1	5	1130	2.84	1.54	<.5
MAY										
05...	50	--	--	--	--	--	1320	1.21	1.80	--
JUN										
08...	90	--	--	--	--	--	1330	1.29	1.81	--
JUL										
08...	40	6	1.3	ND	--	8	1310	1.34	1.78	<.5
AUG										
18...	30	--	--	--	--	--	1270	1.27	1.73	--
SEP										
19...	40	--	--	--	--	--	1300	1.26	1.77	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT											
27...	7.0	.39	2000	11.2	8.3	4.0	410	500	0	.44	.03
NOV											
28...	6.0	.37	2000	--	8.2	5.0	410	500	0	.41	.03
JAN											
05...	4.0	.36	1800	10.6	8.1	6.4	410	500	0	--	.00
FEB											
02...	5.0	.35	1900	--	8.1	6.1	390	480	0	.28	.03
MAR											
08...	8.0	.38	2000	10.2	8.1	6.4	410	500	0	.39	.00
APR											
17...	9.0	.53	1900	10.2	8.1	6.6	430	520	0	.33	.03
MAY											
15...	18.5	6.3	1200	7.0	8.3	2.2	230	280	0	1.1	.03
JUL											
05...	21.0	1.1	1700	8.9	8.5	1.8	290	350	1	.22	.06
24...	21.5	.73	1700	9.4	8.2	--	--	--	0	.13	.03
AUG											
17...	20.5	.34	1850	9.3	8.3	3.6	370	450	0	.19	.03
SEP											
30...	12.5	.26	1880	12.2	8.2	4.7	390	470	0	.16	.00

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
OCT											
27...	.010	--	--	770	360	110	120	180	2.8	33	10
NOV											
28...	.010	--	--	770	360	110	120	190	3.0	35	10
JAN											
05...	--	5.5	3.8	810	400	110	130	180	2.8	32	9.5
FEB											
02...	.010	--	--	770	380	110	120	180	2.8	33	9.5
MAR											
08...	<.010	--	--	810	400	110	130	170	2.6	31	9.9
APR											
17...	.010	--	--	770	340	110	120	170	2.7	32	10
MAY											
15...	.010	--	--	410	180	80	50	93	2.0	33	7.0
JUL											
05...	.020	--	--	620	330	95	93	160	2.8	36	9.0
24...	.010	--	--	600	--	91	90	160	2.8	36	8.9
AUG											
17...	.010	--	--	690	320	96	110	160	2.6	33	10
SEP											
30...	<.010	2.9	3.4	730	340	110	110	170	2.7	33	9.2

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	CHLORIDE, DISSOLVED (MG/L AS CL)	SULFATE DISSOLVED (MG/L AS SO4)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	ARSENIC DISSOLVED (UG/L AS AS)	ARSENIC TOTAL (UG/L AS AS)	BORON, DISSOLVED (UG/L AS B)	CADMIUM DISSOLVED (UG/L AS CD)	CADMIUM SUSPENDED RECOVERABLE (UG/L AS CD)	CADMIUM TOTAL (UG/L AS CD)	COPPER, DISSOLVED (UG/L AS CU)
OCT											
27...	160	510	.7	16	--	--	220	--	--	--	--
NOV											
28...	150	520	.6	16	--	--	230	--	--	--	--
JAN											
05...	160	520	.3	17	1	--	220	ND	--	--	ND
FEB											
02...	150	480	.6	16	--	--	220	--	--	--	--
MAR											
08...	170	500	.6	14	--	--	220	--	--	--	--
APR											
17...	160	430	.6	14	--	--	210	--	--	--	--
MAY											
15...	110	210	.4	10	--	--	--	--	--	--	--
JUL											
05...	170	340	.5	10	--	--	190	--	--	--	--
24...	160	370	.5	15	--	--	200	--	--	--	--
AUG											
17...	160	440	.6	15	--	--	230	--	--	--	--
SEP											
30...	150	450	.6	16	<1	<1	280	ND	2	2	<2

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	COPPER, SUS-PENDED RECOV-ERABLE (UG/L AS CU)	COPPER, TOTAL (UG/L AS CU)	IRON, DIS-SOLVED (UG/L AS FE)	IRON, SUS-PENDED RECOV-ERABLE (UG/L AS FE)	IRON, TOTAL (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	LEAD, SUS-PENDED RECOV-ERABLE (UG/L AS PB)	LEAD, TOTAL (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MANGA-NESE, SUS-PENDED RECOV. (UG/L AS MN)	MANGA-NESE, TOTAL (UG/L AS MN)
OCT											
27...	--	--	<10	--	--	--	--	--	80	--	--
NOV											
28...	--	--	30	--	--	--	--	--	80	--	--
JAN											
05...	--	--	--	--	--	2	--	--	90	--	--
FEB											
02...	--	--	30	--	--	--	--	--	80	--	--
MAR											
08...	--	--	120	--	--	--	--	--	90	--	--
APR											
17...	--	--	20	--	--	--	--	--	80	--	--
MAY											
15...	--	--	20	--	--	--	--	--	70	--	--
JUL											
05...	--	--	30	--	--	--	--	--	40	--	--
24...	--	--	20	--	--	--	--	--	30	--	--
AUG											
17...	--	--	<10	--	--	--	--	--	40	--	--
SEP											
30...	0	<2	20	120	140	3	5	8	40	0	40

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO)	MOLYB- DENUM, SUS- PENDED RECOV. (UG/L AS MO)	MOLYB- DENUM, TOTAL (UG/L AS MO)	NICKEL, DIS- SOLVED (UG/L AS NI)	NICKEL, SUS- PENDED RECOV- ERABLE (UG/L AS NI)	NICKEL, TOTAL (UG/L AS NI)	ZINC, DIS- SOLVED (UG/L AS ZN)	ZINC, SUS- PENDED RECOV- ERABLE (UG/L AS ZN)	ZINC, TOTAL (UG/L AS ZN)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ALUM- INUM, SUS- PENDED RECOV. (UG/L AS AL)
OCT											
27...	--	--	--	--	--	--	--	--	--	--	--
NOV											
28...	--	--	--	--	--	--	--	--	--	--	--
JAN											
05...	--	--	--	ND	--	--	--	--	--	--	--
FEB											
02...	--	--	--	--	--	--	--	--	--	--	--
MAR											
08...	--	--	--	--	--	--	--	--	--	--	--
APR											
17...	--	--	--	--	--	--	--	--	--	--	--
MAY											
15...	--	--	--	--	--	--	--	--	--	--	--
JUL											
05...	--	--	--	--	--	--	--	--	--	--	--
24...	--	--	--	--	--	--	--	--	--	--	--
AUG											
17...	--	--	--	--	--	--	--	--	--	--	--
SEP											
30...	2	3	5	ND	10	10	<20	10	20	<100	40

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	ALUMINUM, TOTAL (UG/L AS AL)	ANTIMONY, DISSOLVED (UG/L AS SB)	SELENIUM, DISSOLVED (UG/L AS SE)	SELENIUM, SUSPENDED TOTAL (UG/L AS SE)	SELENIUM, TOTAL (UG/L AS SE)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	SOLIDS, DISSOLVED (TONS PER DAY)	SOLIDS, DISSOLVED (TONS PER AC-FT)	MERCURY DISSOLVED (UG/L AS HG)	MERCURY SUSPENDED RECOVERABLE (UG/L AS HG)	MERCURY TOTAL (UG/L AS HG)
OCT											
27...	--	--	--	--	--	1360	1.43	1.85	--	--	--
NOV											
28...	--	--	--	--	--	1370	1.37	1.86	--	--	--
JAN											
05...	--	2	6	--	--	1370	1.33	1.86	<.1	--	--
FEB											
02...	--	--	--	--	--	1300	1.23	1.77	--	--	--
MAR											
08...	--	--	--	--	--	1350	1.39	1.84	--	--	--
APR											
17...	--	--	--	--	--	1270	1.82	1.73	--	--	--
MAY											
15...	--	--	--	--	--	703	12.0	.96	--	--	--
JUL											
05...	--	--	--	--	--	1050	3.12	1.43	--	--	--
24...	--	--	--	--	--	--	--	1.41	--	--	--
AUG											
17...	--	--	--	--	--	1210	1.11	1.65	--	--	--
SEP											
30...	40	--	8	0	6	1250	.88	1.70	<.1	.0	<.1

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW (CFS)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT												
09...	8.0	--	.12	2000	9.8	7.8	15	499	608	0	6.10	.00
NOV												
12...	.5	.05	.05	2100	10.1	8.4	4.3	556	678	0	.06	.03
FEB												
09...	.5	--	5.5	420	12.4	8.1	1.8	116	142	0	.44	.46
13...	.5	--	.80	--	--	--	--	--	--	--	--	--
26...	2.0	--	.05	--	--	--	--	--	--	--	--	--
MAR												
01...	5.0	--	.38	950	10.4	8.2	4.0	325	396	0	.06	.15
10...	1.0	--	.09	--	--	--	--	--	--	--	--	--
16...	.5	--	.05	--	--	--	--	--	--	--	--	--
25...	.5	--	.08	--	--	--	--	--	--	--	--	--
APR												
01...	1.0	--	.11	--	--	--	--	--	--	--	--	--
14...	11.0	--	.07	--	--	--	--	--	--	--	--	--
22...	10.0	--	.07	1500	--	--	--	--	--	--	--	--
28...	16.0	--	.07	--	--	--	--	--	--	--	--	--
MAY												
06...	10.0	--	.06	1500	9.0	8.1	6.9	442	539	0	--	--
14...	27.0	--	.07	--	--	--	--	--	--	--	--	--
21...	10.0	--	.10	--	--	--	--	--	--	--	--	--
27...	17.0	--	.14	--	--	--	--	--	--	--	--	--
JUN												
10...	14.0	--	.16	1450	6.9	8.2	5.5	445	543	--	.05	.00
17...	17.0	--	.22	1325	--	--	--	--	--	--	--	--
23...	20.0	--	.22	--	--	--	--	--	--	--	--	--
30...	28.0	--	.34	--	--	--	--	--	--	--	--	--
JUL												
06...	17.0	--	.12	1700	6.0	8.1	6.0	390	475	0	.02	.00
30...	20.0	--	.07	--	--	--	--	--	--	--	--	--
AUG												
09...	14.0	--	.11	1550	7.6	8.2	5.4	439	535	0	.01	.06
19...	13.5	--	.07	--	--	--	--	--	--	--	--	--
SEP												
01...	10.0	--	.05	1620	7.8	8.1	6.7	433	528	0	.01	.09
09...	16.0	--	.07	--	--	--	--	--	--	--	--	--
22...	10.0	--	.07	--	--	--	--	--	--	--	--	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	PHOS-PHORUS, ORTHOPHOSPHATE DISSOL. (MG/L AS P)	CARBON, ORGANIC TOTAL (MG/L AS C)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C)	CYANIDE TOTAL (MG/L AS CN)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
OCT												
09...	<.010	11	9.1	.01	910	410	100	160	92	1.3	18	9.7
NOV												
12...	.010	--	--	--	1000	470	130	170	120	1.6	20	11
FEB												
09...	.150	--	--	--	170	51	26	25	18	.6	18	8.7
13...	--	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--	--
MAR												
01...	.050	9.8	8.5	--	470	140	71	71	41	.8	16	7.9
10...	--	--	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
01...	--	--	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
06...	--	--	--	--	760	320	90	130	89	1.4	20	5.7
14...	--	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--	--
JUN												
10...	<.010	27	9.4	--	780	330	98	130	58	.9	14	5.5
17...	--	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
06...	<.010	--	--	--	720	330	72	130	68	1.1	17	4.6
30...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
09...	.020	--	--	--	800	360	88	140	66	1.0	15	6.7
19...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
01...	.030	7.4	6.9	--	820	390	82	150	87	1.3	19	5.8
09...	--	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	CHLORIDE, DISSOLVED (MG/L AS CL)	SULFATE DISSOLVED (MG/L AS SO4)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO2)	ARSENIC DISSOLVED (UG/L AS AS)	BORON, DISSOLVED (UG/L AS B)	CADMIUM DISSOLVED (UG/L AS CD)	COPPER, DISSOLVED (UG/L AS CU)	IRON, DISSOLVED (UG/L AS FE)	LEAD, DISSOLVED (UG/L AS PB)	MANGANESE, DISSOLVED (UG/L AS MN)	NICKEL, DISSOLVED (UG/L AS NI)
OCT												
09...	42	520	.4	11	1	150	<2	--	<10	2	<10	5
NOV												
12...	--	670	.4	15	--	180	--	--	120	--	<10	--
FEB												
09...	7.4	94	.2	3.4	--	180	--	--	160	--	<10	--
13...	--	--	--	--	--	--	--	--	--	--	--	--
26...	--	--	--	--	--	--	--	--	--	--	--	--
MAR												
01...	19	230	.3	8.5	1	100	<2	4	80	10	40	2
10...	--	--	--	--	--	--	--	--	--	--	--	--
16...	--	--	--	--	--	--	--	--	--	--	--	--
25...	--	--	--	--	--	--	--	--	--	--	--	--
APR												
01...	--	--	--	--	--	--	--	--	--	--	--	--
14...	--	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--	--
28...	--	--	--	--	--	--	--	--	--	--	--	--
MAY												
06...	33	--	.4	8.7	--	120	--	--	<10	--	20	--
14...	--	--	--	--	--	--	--	--	--	--	--	--
21...	--	--	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--	--	--
JUN												
10...	30	380	.4	12	1	--	<2	2	40	ND	120	ND
17...	--	--	--	--	--	--	--	--	--	--	--	--
23...	--	--	--	--	--	--	--	--	--	--	--	--
30...	--	--	--	--	--	--	--	--	--	--	--	--
JUL												
06...	33	390	.4	14	--	70	--	--	70	--	<10	--
30...	--	--	--	--	--	--	--	--	--	--	--	--
AUG												
09...	40	400	.3	13	--	160	--	--	20	--	<10	--
19...	--	--	--	--	--	--	--	--	--	--	--	--
SEP												
01...	39	500	.3	12	<1	150	2	4	60	ND	<10	2
09...	--	--	--	--	--	--	--	--	--	--	--	--
22...	--	--	--	--	--	--	--	--	--	--	--	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1975 TO SEPTEMBER 1976

DATE	VANA-DIUM, DIS-SOLVED (UG/L AS V)	ZINC, DIS-SOLVED (UG/L AS ZN)	ANTI-MONY, DIS-SOLVED (UG/L AS SB)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	MERCURY DIS-SOLVED (UG/L AS HG)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT DIS-CHARGE, SUS-PENDED (T/DAY)
OCT											
09...	--	20	<1	--	1240	.40	1.69	--	<.5	--	--
NOV											
12...	--	--	--	--	--	.20	2.05	--	--	--	--
FEB											
09...	--	--	--	--	255	3.79	.35	83	--	1240	18
13...	--	--	--	--	--	--	--	--	--	241	.52
26...	--	--	--	--	--	--	--	--	--	67	.01
MAR											
01...	1.6	50	<1	1	645	.66	.88	95	<.5	601	.62
10...	--	--	--	--	--	--	--	--	--	22	.01
16...	--	--	--	--	--	--	--	--	--	144	.02
25...	--	--	--	--	--	--	--	--	--	215	.05
APR											
01...	--	--	--	--	--	--	--	--	--	53	.02
14...	--	--	--	--	--	--	--	--	--	50	.01
22...	--	--	--	--	--	--	--	--	--	22	.00
28...	--	--	--	--	--	--	--	--	--	9	.00
MAY											
06...	--	--	--	--	1060	.17	1.44	--	--	7	.00
14...	--	--	--	--	--	--	--	--	--	30	.01
21...	--	--	--	--	--	--	--	--	--	220	.06
27...	--	--	--	--	--	--	--	--	--	139	.05
JUN											
10...	3.5	<20	<1	<1	982	.42	1.34	--	<.5	838	.36
17...	--	--	--	--	--	--	--	--	--	164	.10
23...	--	--	--	--	--	--	--	--	--	206	.12
30...	--	--	--	--	--	--	--	--	--	189	.17
JUL											
06...	--	--	--	--	946	.31	1.29	--	--	69	.02
30...	--	--	--	--	--	--	--	--	--	11	.00
AUG											
09...	--	--	--	--	1020	.30	1.39	--	--	20	.01
19...	--	--	--	--	--	--	--	--	--	18	.00
SEP											
01...	2.1	ND	<1	2	1140	.15	1.55	--	<.5	7	.00
09...	--	--	--	--	--	--	--	--	--	4	.00
22...	--	--	--	--	--	--	--	--	--	9	.00

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT											
15...	.5	.07	1600	11.0	8.2	5.1	418	510	0	.02	.03
NOV											
05...	2.0	.05	1600	10.6	8.1	7.1	459	560	0	.02	.03
05...	--	.05	--	--	--	--	--	--	--	--	--
12...	.5	.05	--	--	--	--	--	--	--	--	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	SODIUM PERCENT	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	SULFATE DIS-SOLVED (MG/L AS SO4)
OCT											
15...	.010	850	430	93	150	89	1.3	18	6.4	39	500
NOV											
05...	.010	940	480	96	170	92	1.3	17	7.3	38	550
05...	--	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	--	--	--

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1976 TO SEPTEMBER 1977

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	BORON, DIS-SOLVED (UG/L AS B)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER DAY)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT DIS-CHARGE, SUS-PENDED (T/DAY)
OCT										
15...	.3	12	130	30	<10	1140	.22	1.55	7	.00
NOV										
05...	.2	14	200	40	<10	1240	.17	1.69	--	--
05...	--	--	--	--	--	--	--	--	--	--
12...	--	--	--	--	--	--	--	--	65	.01

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	TEMPER-ATURE, WATER (DEG C)	STREAM-FLOW, INSTAN-TANEOUS (CFS)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	OXYGEN, DIS-SOLVED (MG/L)	PH FIELD (UNITS)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	ALKA-LINITY (MG/L AS CACO3)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS PO4)
OCT											
21...	--	--	--	--	--	--	--	--	--	--	--
21...	6.0	.01	1700	9.3	8.5	2.8	450	520	13	.04	.03
NOV											
28...	.5	<.01	2120	--	8.1	12	500	610	0	.10	15
28...	--	--	--	--	--	--	--	--	--	--	--
APR											
17...	9.0	.01	1625	10.0	8.1	6.9	440	540	0	.02	.03
MAY											
15...	16.0	<.01	1800	7.9	8.5	2.8	450	530	12	<.10	.09

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	PHOS- PHORUS, ORTHOPH OSPHATE DISSOL. (MG/L AS P)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	SODIUM PERCENT	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
OCT										
21...	--	--	--	--	--	--	--	--	--	--
21...	.010	840	390	72	160	110	1.7	22	8.8	40
NOV										
28...	.010	1200	700	150	190	120	1.5	18	15	--
28...	--	--	--	--	--	--	--	--	--	--
APR										
17...	.010	810	370	78	150	98	1.5	21	5.6	40
MAY										
15...	.030	860	410	65	170	120	1.8	23	6.0	39

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WATER-QUALITY DATA, WATER YEAR OCTOBER 1977 TO SEPTEMBER 1978

DATE	SULFATE DIS- SOLVED (MG/L AS SO4)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	BORON, DIS- SOLVED (UG/L AS B)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER DAY)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SEDI- MENT, SUS- PENDED (MG/L)
OCT										
21...	--	--	--	--	--	--	--	--	--	46
21...	590	.4	9.6	170	20	20	1260	.03	1.71	--
NOV										
28...	830	.6	14	310	40	220	--	.04	--	--
28...	--	--	--	--	--	--	--	--	--	4
APR										
17...	490	.3	6.5	150	30	<10	1140	.03	1.55	--
MAY										
15...	560	.3	1.7	200	110	<10	1240	.01	1.69	--