# STATISTICAL SUMMARIES OF WATER-QUALITY DATA FOR TWO COAL AREAS OF JACKSON COUNTY, COLORADO

By Gerhard Kuhn

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For additional information
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Colorado District Chief
U.S. Geological Survey, MS 415
Box 25046, Denver Federal Center
Lakewood, CO 80225

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## METRIC CONVERSIONS

The inch-pound units used in this report may be converted to metric (SI) units by using the following conversion factors:

| *Multiply inch-pound units* | *By* | *To obtain metric units* |
|---|---|---|
| acre-foot (acre-ft) | 0.001233 | cubic hectometer |
| cubic foot per second ($ft^3/s$) | 0.02832 | cubic meter per second |
| square mile ($mi^2$) | 2.590 | square kilometer |
| ton (short) | 907.2 | kilogram |
| ton (short) per acre-foot | 1.119 | kilogram per cubic hectometer |
| ton (short) per day (ton/d) | 907.2 | kilogram per day |

# STATISTICAL SUMMARIES OF WATER-QUALITY DATA FOR TWO COAL AREAS OF JACKSON COUNTY, COLORADO

By Gerhard Kuhn

## ABSTRACT

Statistical summaries of water-quality data are compiled for eight streams in two separate coal areas of Jackson County, Colo. The water-quality data were collected from October 1976 to September 1980. For inorganic constituents, the maximum, minimum, and mean concentrations, as well as other statistics, are presented; for minor elements, only the maximum, minimum, and mean values are included. Least-squares equations (regressions) are also given relating specific conductance of the streams to the concentration of the major ions. The observed range of specific conductance was from 85 to 1,150 micromhos per centimeter for the eight sites.

## INTRODUCTION

In October 1976, the U.S. Geological Survey in cooperation with Jackson County established five streamflow-gaging and water-quality stations near Coalmont, in southwestern Jackson County, Colo. (figs. 1 and 2). These stations, located on streams which comprise the headwaters of the North Platte River, provided basic information on the quality of water in the Coalmont study area.

The study of the Canadian River area was established through an agreement made in October 1977 with the U.S. Bureau of Land Management. This agreement initially called for the installation of two streamflow-gaging and water-quality stations on the Canadian River, east and northeast of Walden (figs. 1 and 3). A third station was established in July 1979 on Williams Draw, one of the intermittent tributaries of the Canadian River.

The purposes of this report are twofold: First, to summarize through the use of descriptive statistics, the water-quality data collected from October 1976 to September 1980; and second, to present regression equations as limited predictive tools that can be used to estimate selected water-quality constituents for these stations from a field determination of specific conductance. These summaries and regression equations are intended to assist land-use planners, water administrators, mining engineers, and others in the design or modification of present or future resource-development projects. The data summarized in this report have been published for 1977 through 1980 in the annual series, "Water Resources Data for Colorado" (U.S. Geological Survey, 1978-81).

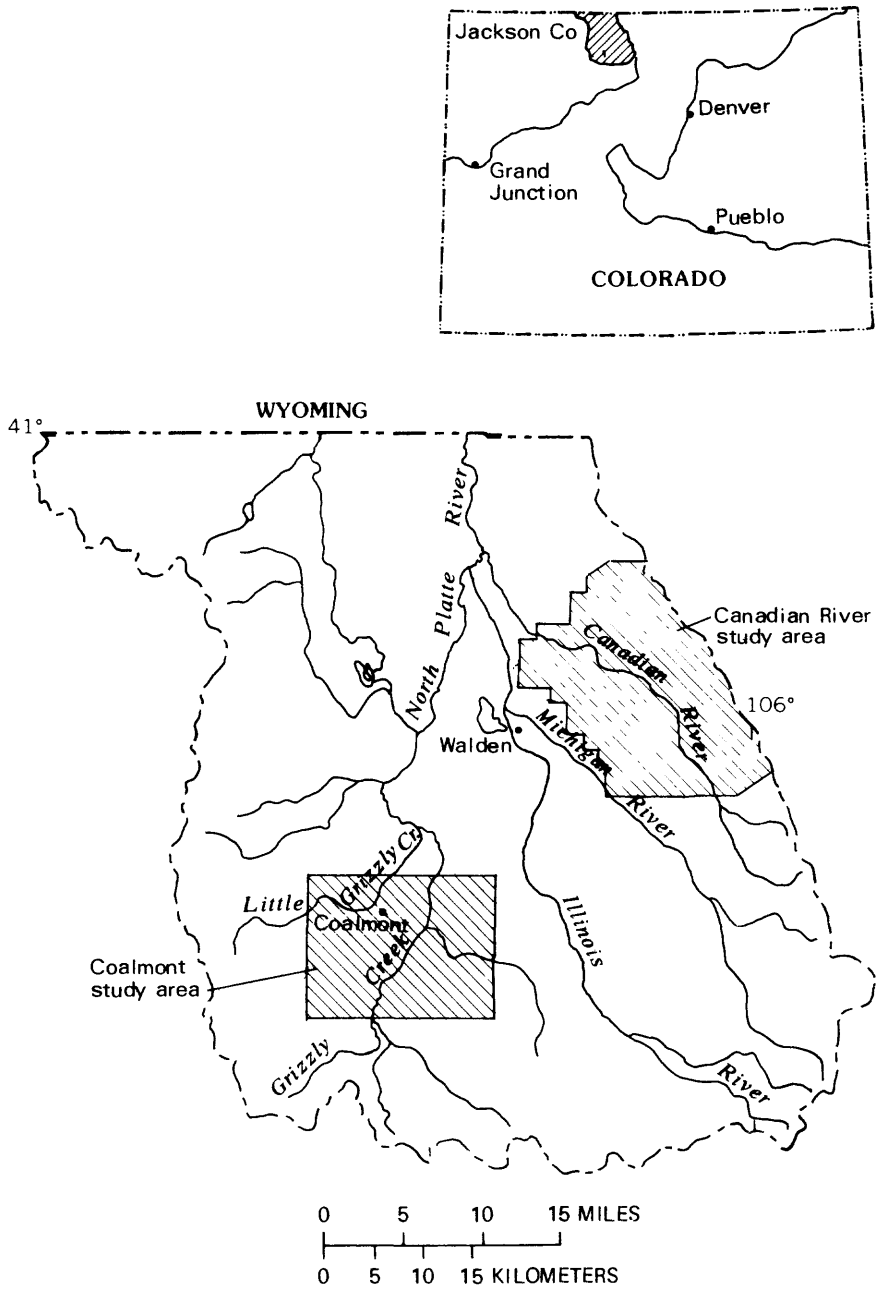


Figure 1.--Location of Jackson County and study areas.

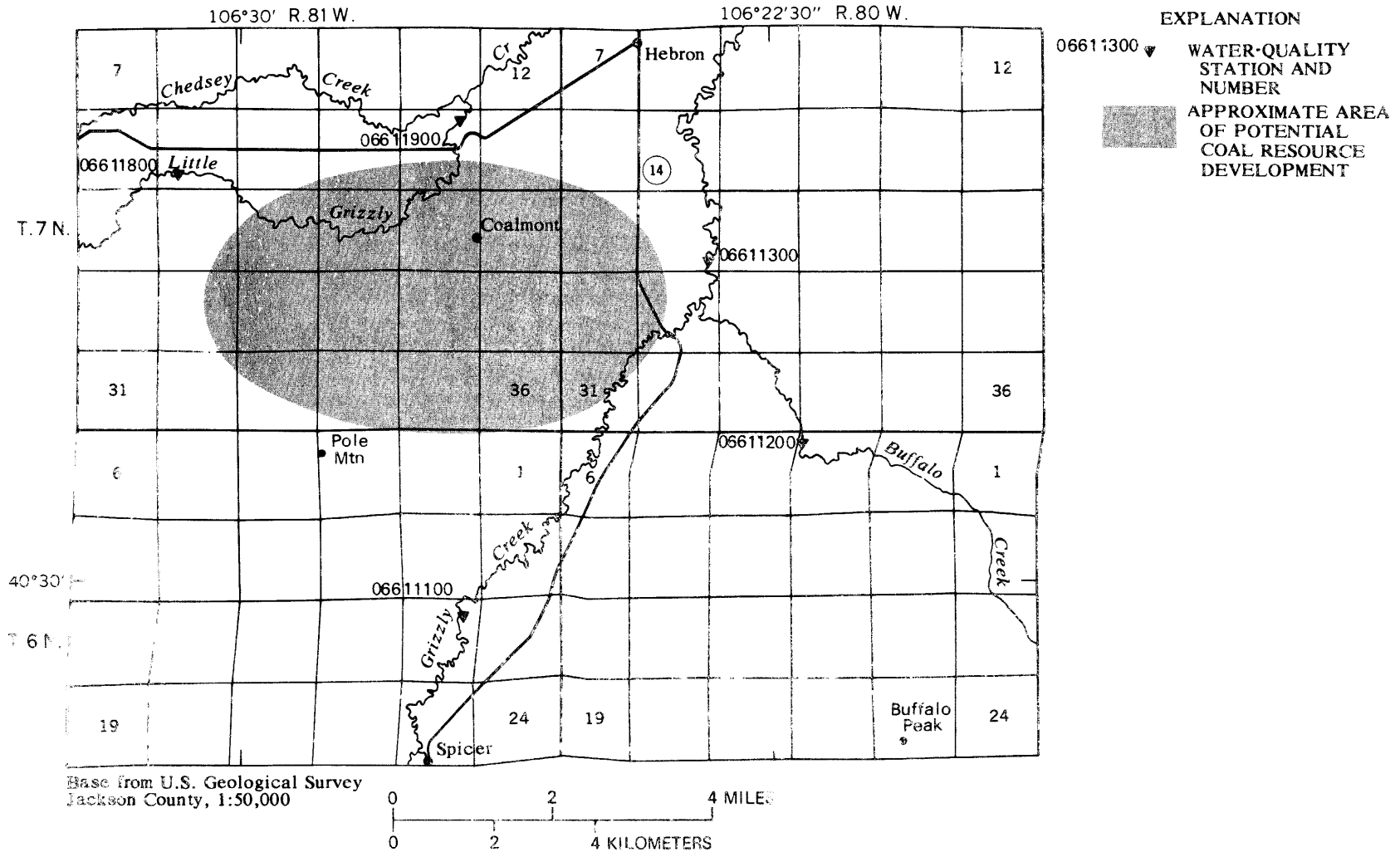


Figure 2 -- Coalmont study area.

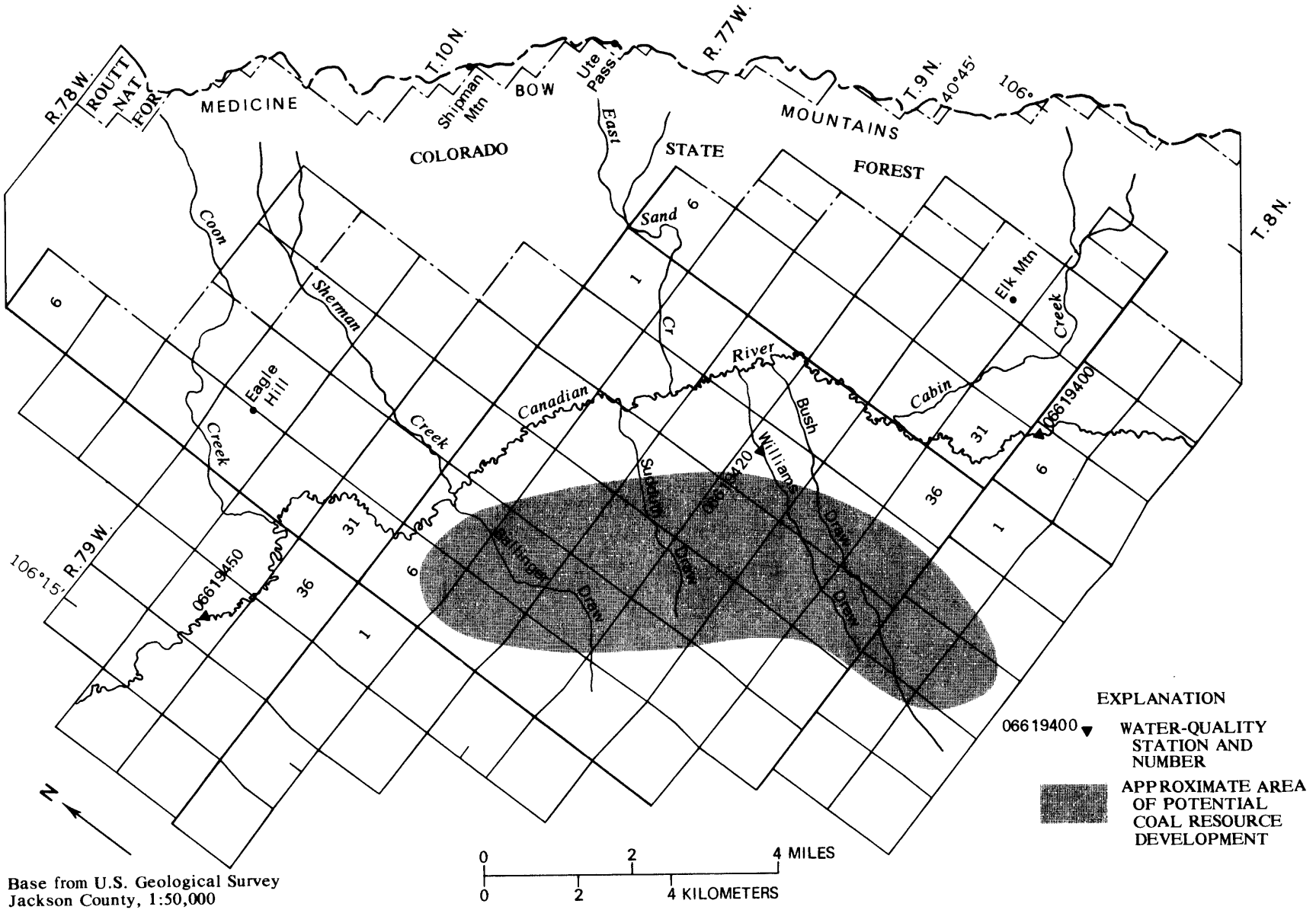


Figure 3.-- Canadian River study area.

## STUDY AREAS

The Coalmont study area (fig. 2) is drained by two major streams, Grizzly Creek and Little Grizzly Creek, which form the North Platte River at their confluence downstream from the study area. Two stations were established on each of these streams, one upstream and one downstream from the proposed coal-development area. A fifth station was established on Buffalo Creek, a tributary entering Grizzly Creek between the two mainstem stations.

The Coalmont area was the scene of infrequent small-scale mining operations, both strip and underground, from 1909 to 1960, when approximately 1.1 million tons of coal were extracted (Jones and Murray, 1976, p. 26). A renewed interest in the development of the coal resources of the area, coupled with the brief operation of a small strip mine in 1975, prompted the initiation of this study. However, no mining occurred during the study period.

In the Canadian River study area (fig. 3), two streamflow-gaging and water-quality stations also were located upstream and downstream from the proposed mining area. The coal area lies southwest of the river valley in gently rolling terrain drained by six intermittent streams which flow generally northeast into the Canadian River. A third partial-record station was established on Williams Draw--one of these intermittent streams. The Canadian River area was also the scene of occasional mining in the past (Jones and Murray, 1976, p. 26) but on an even more limited basis than the Coalmont area. However, the Canadian River area has been actively mined since 1974; production from two mines in the area through June 30, 1979, was more than 2 million tons (Reade and Campbell, 1979).

## DATA COLLECTION AND ANALYSIS

A monthly sampling plan was begun at all of the stations in both study areas, except the one station on Williams Draw where samples were collected only during periods of snowmelt in April, May, and June. At the time of sample collection, field determinations were made of water temperature, dissolved oxygen, pH, and specific conductance. Samples were collected for laboratory analysis of alkalinity, nutrients, and major inorganic constituents. The monthly sampling plan was reduced in scope in the Coalmont area after 1 year and in the Canadian River area after 2 years to cover only the range of water discharge. Semiannual analyses were made for trace elements.

In the Coalmont area, samples for determination of suspended-sediment concentration were collected at nearly the same intervals as the samples for chemical analysis. However, at the two stations on the Canadian River, suspended-sediment data were obtained on a daily basis, beginning in May 1978. The tables present statistics for instantaneous suspended-sediment concentration and instantaneous load at the five Coalmont stations and mean daily concentration and daily load at the two stations on the Canadian River. The suspended-sediment data for the 1980 water year for the latter two stations were not available for this report.

Data collection in the Coalmont study area was discontinued at the end of the 1980 water year (September 30, 1980) but is continuing in the Canadian River study area. All water-quality and suspended-sediment data were collected and analyzed according to U.S. Geological Survey procedures as described in the series, "Techniques of Water-Resources Investigations" (Brown and others, 1970; Guy, 1969; Guy and Norman, 1970; and Porterfield, 1972).

## EXPLANATION OF DESCRIPTIVE STATISTICS AND REGRESSION TABLES

The descriptive statistics and regression equations were generated using Statistical Analysis System[1] (SAS) computer programs. The descriptive statistics for the eight data-collection sites shown in tables 1 through 8 (in the Hydrologic Data section) were computed by the SAS Means procedure (Statistical Analysis System Institute, 1979, p. 303). Columns in these tables are defined as follows:

(1) *N* is the number of water-quality samples used to compute the statistical summary.

(2) Maximum value and minimum value are the extreme values, and mean value is the arithmetic average of the data.

(3) Standard deviation is the square root of the weighted average of the squared deviations from the mean. Standard deviation has the same units as the mean; generally speaking, smaller standard deviations indicate that data points are more clustered around the mean and that large variations from the mean are infrequent (Benjamin and Cornell, 1970, p. 12).

(4) Coefficient of variation is a unitless expression computed by dividing the standard deviation by the mean and multiplying the result by 100. This value gives a quick comparison of the relation between the mean and standard deviation and also facilitates comparison among the variables being measured (Benjamin and Cornell, 1970, p. 139).

(5) Skewness is an indication of the asymmetry of the distribution of a random variable. The skewness for a distribution which tails off to the right is positive; for one which tails off to the left, the skewness is negative. Symmetrical distributions have zero skewness (Benjamin and Cornell, 1970, p. 14, 146).

[1]The use of the brand name in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

The regression equations shown in table 9 (Hydrologic Data section) were computed using the SAS General Linear Models (GLM) procedure (Statistical Analysis System Institute, 1979, p. 245). The GLM procedure computes the slope ($m$) and $y$-intercept ($b$) for the linear equation, $y=mX+b$, by the least-squares method. All of the observation pairs are given equal weight in order to determine the best-fit line such that the sum of the squared deviations of $Y$ from the regression line is as small as possible (Ezekiel and Fox, 1967, p. 16). Aside from the slope and intercept for the equations, the following regression parameters are shown in table 9:

(1) $N$ is the number of observation pairs that was used to compute the regression equation.

(2) The coefficient of determination ($r^2$) is the square of the correlation coefficient. According to Ezekiel and Fox (1967, p. 130), $r^2$ is a meaningful statistic when both $Y$ and $X$ are elements of equal variability, and it is known that the dependent variable is casually related to the independent variable. In this case, the independent variable is specific conductance and the dependent variable is the concentration of a water-quality constituent under consideration. Thus, $r^2$x100 provides a measure of the percentage of the variation of the dependent variable explained by variation of the independent variable (Statistical Analysis System Institute, 1979, p. 238). Generally, the larger the $r^2$ value the more meaningful the regression relations. Low values of $r^2$ indicate increasing scatter of the data points and little or no linear relations.

(3) The standard error of estimate, which has the same units as the dependent variable, is simply the standard deviation of the residuals, the difference between the actual value, and the value predicted from the regression equation. The standard error of estimate indicates how reliably the dependent variable may be estimated from a given value of the independent variable (Ezekiel and Fox, 1967, p. 126).

## DISCUSSION AND SUMMARY

The descriptive statistics for the five water-quality stations in the Coalmont study area are presented in tables 1 through 5 in the Hydrologic Data section. Statistics for the two Canadian River stations and the Williams Draw station are presented in tables 6, 7, and 8 in the Hydrologic Data section. These tables are useful in describing the ranges and variations of selected water-quality constituents sampled during the study. The statistical summaries generally characterize the water quality of the streams sampled in the study area under prevailing land-use and water-management conditions.

Regression equations relating seven water-quality constituents to specific conductance for each of the eight sampling sites are presented in table 9 (Hydrologic Data section). These equations can be used to estimate the seven water-quality constituents by making a field measurement of specific conductance. The user of these equations, however, needs to be cautioned not to use them at other sites, because the regression relation will not necessarily be valid for another site. Also, the use of these equations at some later time if coal development or other types of land-use changes take place is not advocated. Land-use changes could significantly alter the balance of water-quality constituents, and it would become necessary to redefine these regression relations. Furthermore, the user of these equations needs to be cautioned not to use them outside of the range of specific conductances given for each of the eight sites. The linear relation which is defined by the regression equations within the observed range of specific conductance may not necessarily be valid outside that range.

Finally, it is advisable for the user to be aware of the limits of the equations. As an example, take the equation for alkalinity for the station at the Canadian River near Brownlee; the equation has a coefficient of determination of 0.46. This means that only 46 percent of the variability of alkalinity can be explained by changes in the specific conductance, or that 54 percent of that variability cannot be explained by specific conductance. The data presented in this report provide no information as to what variables other than specific conductance might be affecting the regression relations. Therefore, these regression equations, especially those with low coefficients of determination, need to be used with discretion. The $r^2$ value for sulfate (0.09) for Little Grizzly Creek above Coalmont is an anomaly that cannot be explained. In this case, the use of the sulfate mean from table 4 would be more meaningful than the use of the regression equation.

In summary, the user should find the descriptive statistics and regression equations useful in determining and understanding the water quality at these eight streamflow-gaging and water-quality stations under the present land-use activities. With a knowledge of the present system, the land-use planner or water administrator will be better able to manage the resources of the area.

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(page 11 follows)

# HYDROLOGIC DATA

Tables 1 through 8.--*Descriptive statistics of water-quality data*

ABBREVIATIONS

SQ KM=square kilometer
SQ MI=square mile
N=number of water-quality samples
MG/L=milligram per liter
MICROMHOS=micromhos per centimeter at 25° Celsius
CFS=cubic foot per second
DEG C=degree Celsius
T/DAY=ton per day
TON PER AC-FT=ton per acre-foot
UG/L=microgram per liter

TABLE 1.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06611100 NAME: GRIZZLY CREEK NEAR SPICER, CO

LAT 40°29'36" LONG 106°26'57" DRAINAGE AREA: 118 SQ MI (305.6 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 28 | 11.00 | 5.40 | 8.60 | 1.24 | 14.40 | -0.11 |
| PH FIELD (UNITS) | 28 | 8.40 | 7.00 | [1]7.80 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 29 | 270.00 | 105.00 | 186.17 | 45.22 | 24.29 | 0.00 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 35 | 755.00 | 1.30 | 106.35 | 190.27 | 178.92 | 2.45 |
| TEMPERATURE, WATER (DEG C) | 29 | 19.00 | 0.00 | 7.36 | 6.43 | 87.29 | 0.30 |
| ALKALINITY (MG/L AS CACO3) | 28 | 120.00 | 41.00 | 81.86 | 22.40 | 27.36 | -0.16 |
| BICARBONATE (MG/L AS HCO3) | 25 | 150.00 | 50.00 | 101.96 | 27.67 | 27.13 | -0.27 |
| CARBONATE (MG/L AS CO3) | 25 | 0.00 | 0.00 | 0.00 | 0.00 | 181.62 | 1.30 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 25 | 11.00 | 0.70 | 3.35 | 2.81 | 83.99 | 1.40 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 24 | 12.00 | 1.70 | 6.18 | 2.81 | 45.46 | 0.41 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 3 | 12.00 | 7.20 | 9.73 | 2.41 | 24.77 | -0.49 |
| CALCIUM DISSOLVED (MG/L AS CA) | 29 | 36.00 | 15.00 | 24.00 | 5.74 | 23.91 | 0.38 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 28 | 4.50 | 0.50 | 1.32 | 0.73 | 55.11 | 3.29 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 29 | 0.20 | 0.10 | 0.16 | 0.05 | 31.60 | -0.37 |
| HARDNESS (MG/L AS CACO3) | 29 | 130.00 | 48.00 | 82.97 | 20.50 | 24.70 | 0.35 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 28 | 17.00 | 0.00 | 4.07 | 5.48 | 134.68 | 1.33 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 29 | 8.80 | 1.90 | 5.63 | 1.77 | 31.37 | -0.17 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 29 | 0.43 | 0.00 | 0.07 | 0.09 | 132.06 | 2.73 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 29 | 0.43 | 0.00 | 0.13 | 0.10 | 75.53 | 1.28 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 29 | 0.14 | 0.00 | 0.04 | 0.03 | 74.17 | 1.23 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 29 | 3.10 | 0.80 | 2.00 | 0.46 | 23.16 | -0.33 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 29 | 27.00 | 0.80 | 18.70 | 6.92 | 36.99 | -0.64 |
| SODIUM, DISSOLVED (MG/L AS NA) | 29 | 13.00 | 2.70 | 7.25 | 2.41 | 33.17 | 0.01 |
| SODIUM ADSORPTION RATIO | 29 | 0.50 | 0.20 | 0.34 | 0.09 | 25.22 | -0.36 |
| SULFATE DISSOLVED (MG/L AS SO4) | 29 | 30.00 | 7.00 | 14.07 | 5.31 | 37.73 | 1.38 |
| SEDIMENT, SUSPENDED (MG/L) | 21 | 143.00 | 3.00 | 49.05 | 44.41 | 90.55 | 0.79 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 21 | 165.00 | 0.03 | 36.94 | 51.09 | 138.31 | 1.35 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 27 | 173.00 | 70.00 | 123.59 | 29.04 | 23.49 | -0.55 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 27 | 0.24 | 0.10 | 0.17 | 0.04 | 23.70 | -0.46 |

| | DISSOLVED | | | | TOTAL | | |
|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 4 | 60.0 | 10.0 | 27.5 | 4 | 1800.0 | 120.0 | 780.0 |
| ARSENIC | 7 | 1.0 | 0.0 | 0.6 | 3 | 2.0 | 0.0 | 1.0 |
| BORON | 9 | 70.0 | 20.0 | 35.6 | - | ------ | ----- | ------ |
| CADMIUM | 7 | 3.0 | 0.0 | 1.3 | 3 | 1.0 | 0.0 | 0.3 |
| CHROMIUM | - | ------ | ----- | ----- | 1 | 4.0 | 4.0 | 4.0 |
| COBALT | - | ------ | ----- | ----- | 1 | 4.0 | 4.0 | 4.0 |
| COPPER | 7 | 2.0 | 0.0 | 0.7 | 3 | 9.0 | 1.0 | 6.0 |
| IRON | 29 | 1100.0 | 140.0 | 311.7 | 9 | 3200.0 | 480.0 | 1418.9 |
| LEAD | 7 | 22.0 | 0.0 | 7.7 | 4 | 130.0 | 0.0 | 36.3 |
| MANGANESE | 29 | 220.0 | 20.0 | 60.3 | 9 | 150.0 | 30.0 | 63.3 |
| MERCURY | 7 | 0.0 | 0.0 | 0.0 | 3 | 0.1 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 0.0 | 5.0 | 3 | 3.0 | 0.0 | 1.7 |
| NICKEL | 7 | 6.0 | 0.0 | 2.1 | 3 | 13.0 | 0.0 | 6.7 |
| SELENIUM | 7 | 3.0 | 0.0 | 0.9 | 3 | 1.0 | 0.0 | 0.3 |
| ZINC | 7 | 20.0 | 3.0 | 9.4 | 4 | 40.0 | 0.0 | 20.0 |

[1] The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 2.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06611200 NAME: BUFFALO CREEK NEAR HEBRON, CO

LAT 40°31'23" LONG 106°22'07" DRAINAGE AREA: 56.3 SQ MI (145.8 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 28 | 12.60 | 5.00 | 8.15 | 1.63 | 19.95 | 0.80 |
| PH FIELD (UNITS) | 29 | 8.40 | 7.20 | [1]7.90 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 29 | 740.00 | 180.00 | 394.38 | 138.36 | 35.08 | 0.39 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 35 | 140.00 | 0.10 | 12.10 | 26.31 | 217.46 | 3.83 |
| TEMPERATURE, WATER (DEG C) | 29 | 21.50 | 0.00 | 8.24 | 7.37 | 89.45 | 0.25 |
| ALKALINITY (MG/L AS CACO3) | 29 | 280.00 | 89.00 | 171.72 | 59.73 | 34.78 | 0.18 |
| BICARBONATE (MG/L AS HCO3) | 26 | 340.00 | 100.00 | 215.85 | 72.69 | 33.68 | -0.07 |
| CARBONATE (MG/L AS CO3) | 26 | 5.00 | 0.00 | 0.23 | 0.99 | 429.98 | 4.82 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 26 | 14.00 | 1.30 | 5.04 | 3.05 | 60.48 | 1.26 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 24 | 30.00 | 2.30 | 10.33 | 6.68 | 64.67 | 1.44 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 3 | 31.00 | 13.00 | 24.00 | 9.64 | 40.18 | -1.55 |
| CALCIUM DISSOLVED (MG/L AS CA) | 29 | 63.00 | 23.00 | 41.55 | 12.39 | 29.81 | 0.25 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 29 | 15.00 | 1.30 | 4.69 | 2.85 | 60.79 | 1.75 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 29 | 0.90 | 0.20 | 0.39 | 0.16 | 41.94 | 1.21 |
| HARDNESS (MG/L AS CACO3) | 29 | 240.00 | 78.00 | 160.79 | 50.80 | 31.60 | 0.03 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 29 | 54.00 | 0.00 | 2.72 | 10.11 | 371.12 | 5.00 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 29 | 22.00 | 4.90 | 13.65 | 5.19 | 37.99 | -0.04 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 29 | 0.33 | 0.00 | 0.06 | 0.08 | 125.46 | 2.21 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 28 | 1.00 | 0.00 | 0.23 | 0.20 | 87.44 | 2.48 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 28 | 0.33 | 0.00 | 0.07 | 0.06 | 87.20 | 2.53 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 29 | 12.00 | 1.50 | 3.66 | 2.13 | 58.19 | 2.50 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 29 | 32.00 | 9.80 | 23.30 | 5.20 | 22.32 | -0.70 |
| SODIUM, DISSOLVED (MG/L AS NA) | 29 | 93.00 | 9.60 | 27.98 | 16.91 | 60.43 | 2.10 |
| SODIUM ADSORPTION RATIO | 29 | 2.70 | 0.40 | 0.93 | 0.46 | 49.23 | 2.10 |
| SULFATE DISSOLVED (MG/L AS SO4) | 29 | 130.00 | 8.70 | 38.54 | 25.31 | 65.67 | 1.66 |
| SEDIMENT, SUSPENDED (MG/L) | 22 | 66.00 | 6.00 | 28.59 | 15.42 | 53.93 | 0.57 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 21 | 6.70 | 0.00 | 0.86 | 1.59 | 185.90 | 2.91 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 29 | 509.00 | 131.00 | 255.34 | 90.18 | 35.32 | 0.71 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 29 | 0.69 | 0.18 | 0.35 | 0.12 | 35.15 | 0.70 |

| | DISSOLVED | | | | TOTAL | | |
|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 4 | 60.0 | 0.0 | 27.5 | 4 | 370.0 | 200.0 | 312.5 |
| ARSENIC | 7 | 2.0 | 0.0 | 1.0 | 3 | 2.0 | 1.0 | 1.3 |
| BORON | 9 | 110.0 | 0.0 | 43.3 | - | ----- | ----- | ----- |
| CADMIUM | 7 | 1.0 | 1.0 | 1.0 | 3 | 1.0 | 0.0 | 0.3 |
| CHROMIUM | - | ----- | ----- | ----- | 1 | 0.0 | 0.0 | 0.0 |
| COBALT | - | ----- | ----- | ----- | 1 | 0.0 | 0.0 | 0.0 |
| COPPER | 7 | 4.0 | 0.0 | 1.0 | 3 | 4.0 | 0.0 | 1.3 |
| IRON | 29 | 450.0 | 30.0 | 170.7 | 9 | 1600.0 | 450.0 | 967.8 |
| LEAD | 7 | 38.0 | 0.0 | 8.1 | 4 | 59.0 | 0.0 | 17.8 |
| MANGANESE | 29 | 360.0 | 20.0 | 115.9 | 9 | 200.0 | 30.0 | 98.9 |
| MERCURY | 7 | 0.1 | 0.0 | 0.0 | 3 | 0.1 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 0.0 | 5.0 | 2 | 2.0 | 0.0 | 1.0 |
| NICKEL | 7 | 4.0 | 0.0 | 1.3 | 3 | 6.0 | 0.0 | 3.3 |
| SELENIUM | 7 | 4.0 | 0.0 | 0.6 | 3 | 0.0 | 0.0 | 0.0 |
| ZINC | 7 | 10.0 | 0.0 | 7.0 | 4 | 30.0 | 0.0 | 12.5 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 3.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06611300 NAME: GRIZZLY CREEK NEAR HEBRON, CO

LAT 40°33'27" LONG 106°23'22" DRAINAGE AREA: 223 SQ MI (577.6 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 29 | 11.00 | 6.40 | 8.78 | 1.18 | 13.45 | -0.04 |
| PH FIELD (UNITS) | 28 | 8.40 | 6.90 | [1]7.75 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 30 | 500.00 | 140.00 | 256.97 | 74.36 | 28.94 | 1.17 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 43 | 810.00 | 1.40 | 80.87 | 165.47 | 204.61 | 3.10 |
| TEMPERATURE, WATER (DEG C) | 30 | 25.00 | 0.00 | 8.68 | 7.27 | 83.72 | 0.24 |
| ALKALINITY (MG/L AS CACO3) | 29 | 160.00 | 51.00 | 110.03 | 28.94 | 26.30 | 0.26 |
| BICARBONATE (MG/L AS HCO3) | 26 | 200.00 | 62.00 | 136.54 | 36.33 | 26.60 | -0.02 |
| CARBONATE (MG/L AS CO3) | 25 | 2.00 | 0.00 | 0.16 | 0.47 | 295.36 | 3.14 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 24 | 13.00 | 0.90 | 4.79 | 3.75 | 78.32 | 0.90 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 24 | 13.00 | 1.60 | 6.78 | 3.27 | 48.31 | 0.61 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 4 | 19.00 | 6.40 | 12.10 | 5.21 | 43.03 | 0.67 |
| CALCIUM DISSOLVED (MG/L AS CA) | 29 | 43.00 | 18.00 | 28.97 | 6.49 | 22.40 | 0.35 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 29 | 5.90 | 1.00 | 2.55 | 1.39 | 54.46 | 1.07 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 29 | 0.40 | 0.10 | 0.21 | 0.06 | 26.48 | 1.39 |
| HARDNESS (MG/L AS CACO3) | 29 | 160.00 | 62.00 | 107.10 | 25.71 | 24.00 | 0.36 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 29 | 11.00 | 0.00 | 1.83 | 3.04 | 166.14 | 1.71 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 29 | 16.00 | 4.10 | 8.45 | 2.54 | 30.03 | 0.72 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 29 | 0.23 | 0.00 | 0.05 | 0.05 | 117.98 | 2.01 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 29 | 9.00 | 0.00 | 0.44 | 1.65 | 373.76 | 5.33 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 29 | 0.30 | 0.00 | 0.05 | 0.06 | 117.51 | 2.70 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 29 | 6.80 | 1.20 | 2.67 | 1.03 | 38.72 | 2.56 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 29 | 27.00 | 10.00 | 18.62 | 4.97 | 26.71 | 0.04 |
| SODIUM, DISSOLVED (MG/L AS NA) | 29 | 49.00 | 6.00 | 15.43 | 8.62 | 55.88 | 2.26 |
| SODIUM ADSORPTION RATIO | 29 | 1.70 | 0.30 | 0.63 | 0.29 | 46.63 | 2.20 |
| SULFATE DISSOLVED (MG/L AS SO4) | 29 | 95.00 | 9.20 | 25.18 | 17.26 | 68.57 | 2.71 |
| SEDIMENT, SUSPENDED (MG/L) | 30 | 85.00 | 1.00 | 30.47 | 22.66 | 74.38 | 0.98 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 29 | 113.00 | 0.00 | 14.35 | 28.14 | 196.11 | 2.29 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 29 | 319.00 | 85.00 | 169.55 | 45.79 | 27.01 | 1.04 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 29 | 0.43 | 0.12 | 0.23 | 0.06 | 26.62 | 1.01 |

| | DISSOLVED | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 5 | 60.0 | 20.0 | 40.0 | 5 | 640.0 | 170.0 | 374.0 |
| ARSENIC | 7 | 1.0 | 0.0 | 0.7 | 4 | 2.0 | 1.0 | 1.5 |
| BORON | 9 | 70.0 | 0.0 | 34.4 | - | ------ | ----- | ----- |
| CADMIUM | 7 | 3.0 | 0.0 | 1.0 | 3 | 1.0 | 0.0 | 0.3 |
| CHROMIUM | - | ----- | ---- | ----- | 2 | 6.0 | 5.0 | 5.5 |
| COBALT | - | ----- | ---- | ----- | 2 | 4.0 | 0.0 | 2.0 |
| COPPER | 7 | 4.0 | 0.0 | 1.3 | 4 | 7.0 | 0.0 | 3.3 |
| IRON | 29 | 800.0 | 70.0 | 272.1 | 9 | 1900.0 | 650.0 | 1121.1 |
| LEAD | 8 | 40.0 | 0.0 | 6.8 | 5 | 63.0 | 0.0 | 14.8 |
| MANGANESE | 29 | 350.0 | 5.1 | 84.7 | 9 | 150.0 | 30.0 | 77.8 |
| MERCURY | 7 | 0.1 | 0.0 | 0.0 | 3 | 0.0 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 0.0 | 5.0 | 3 | 1.0 | 0.0 | 0.3 |
| NICKEL | 7 | 4.0 | 0.0 | 2.3 | 3 | 8.0 | 0.0 | 4.7 |
| SELENIUM | 7 | 0.0 | 0.0 | 0.0 | 3 | 0.0 | 0.0 | 0.0 |
| ZINC | 8 | 100.0 | 0.0 | 17.9 | 5 | 60.0 | 0.0 | 22.0 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 4.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06611800 NAME: LITTLE GRIZZLY CREEK ABOVE COALMONT, CO

LAT 40°34'24" LONG 106°30'34" DRAINAGE AREA: 35.4 SQ MI (91.69 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 27 | 10.20 | 6.80 | 8.69 | 0.99 | 11.43 | -0.42 |
| PH FIELD (UNITS) | 29 | 8.20 | 7.10 | [1]7.70 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 29 | 260.00 | 85.00 | 192.17 | 57.53 | 29.94 | -0.77 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 34 | 317.00 | 1.30 | 43.27 | 73.02 | 168.78 | 2.41 |
| TEMPERATURE, WATER (DEG C) | 29 | 17.00 | 0.00 | 7.69 | 6.28 | 81.61 | -0.03 |
| ALKALINITY (MG/L AS CACO3) | 29 | 140.00 | 30.00 | 89.07 | 32.60 | 36.60 | -0.42 |
| BICARBONATE (MG/L AS HCO3) | 26 | 170.00 | 36.00 | 109.85 | 40.43 | 36.81 | -0.45 |
| CARBONATE (MG/L AS CO3) | 26 | 0.00 | 0.00 | 0.00 | 0.00 | 186.19 | 1.36 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 26 | 17.00 | 0.90 | 4.32 | 4.07 | 94.13 | 1.92 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 24 | 27.00 | 2.30 | 6.90 | 4.85 | 70.28 | 3.25 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 4 | 10.00 | 5.70 | 8.73 | 2.05 | 23.51 | -1.81 |
| CALCIUM DISSOLVED (MG/L AS CA) | 29 | 38.00 | 13.00 | 28.03 | 8.35 | 29.79 | -0.81 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 29 | 3.00 | 0.40 | 1.17 | 0.48 | 40.78 | 1.99 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 29 | 0.20 | 0.10 | 0.17 | 0.05 | 29.23 | -0.69 |
| HARDNESS (MG/L AS CACO3) | 29 | 120.00 | 39.00 | 89.38 | 27.51 | 30.78 | -0.77 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 29 | 15.00 | 0.00 | 3.52 | 5.28 | 150.18 | 1.16 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 29 | 6.50 | 1.70 | 4.61 | 1.57 | 34.07 | -0.70 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 29 | 0.24 | 0.00 | 0.06 | 0.05 | 91.07 | 1.42 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 29 | 0.40 | 0.00 | 0.06 | 0.08 | 138.51 | 3.59 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 29 | 0.13 | 0.00 | 0.02 | 0.02 | 136.46 | 3.52 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 29 | 2.60 | 0.60 | 1.33 | 0.41 | 30.72 | 0.81 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 29 | 13.00 | 5.80 | 9.64 | 2.16 | 22.43 | -0.22 |
| SODIUM, DISSOLVED (MG/L AS NA) | 29 | 9.50 | 2.10 | 6.18 | 2.36 | 38.26 | -0.58 |
| SODIUM ADSORPTION RATIO | 29 | 0.40 | 0.10 | 0.28 | 0.08 | 28.50 | -0.48 |
| SULFATE DISSOLVED (MG/L AS SO4) | 29 | 24.00 | 4.30 | 11.58 | 4.79 | 41.38 | 0.68 |
| SEDIMENT, SUSPENDED (MG/L) | 22 | 200.00 | 2.00 | 36.59 | 49.65 | 135.69 | 2.45 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 22 | 123.00 | 0.03 | 11.31 | 27.32 | 241.53 | 3.61 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 29 | 157.00 | 50.00 | 116.90 | 34.93 | 29.88 | -0.77 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 29 | 0.21 | 0.07 | 0.16 | 0.05 | 30.10 | -0.79 |

| | DISSOLVED | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 4 | 50.0 | 20.0 | 35.0 | 4 | 510.0 | 100.0 | 252.5 |
| ARSENIC | 6 | 1.0 | 0.0 | 0.7 | 3 | 2.0 | 1.0 | 1.7 |
| BORON | 9 | 50.0 | 6.0 | 28.4 | - | ----- | ----- | ----- |
| CADMIUM | 6 | 3.0 | 1.0 | 1.7 | 2 | 0.0 | 0.0 | 0.0 |
| CHROMIUM | - | ----- | ----- | ----- | 1 | 5.0 | 5.0 | 5.0 |
| COBALT | - | ----- | ----- | ----- | 1 | 0.0 | 0.0 | 0.0 |
| COPPER | 6 | 2.0 | 0.0 | 0.8 | 3 | 4.0 | 0.0 | 2.7 |
| IRON | 28 | 710.0 | 40.0 | 358.9 | 9 | 3200.0 | 650.0 | 1238.9 |
| LEAD | 7 | 63.0 | 0.0 | 13.4 | 4 | 57.0 | 0.0 | 16.5 |
| MANGANESE | 29 | 180.0 | 10.0 | 90.3 | 9 | 160.0 | 20.0 | 92.2 |
| MERCURY | 6 | 0.1 | 0.0 | 0.0 | 2 | 0.0 | 0.0 | 0.0 |
| MOLYBDENUM | 3 | 10.0 | 0.0 | 3.3 | 2 | 2.0 | 0.0 | 1.0 |
| NICKEL | 6 | 6.0 | 0.0 | 2.0 | 2 | 7.0 | 0.0 | 3.5 |
| SELENIUM | 6 | 0.0 | 0.0 | 0.0 | 2 | 0.0 | 0.0 | 0.0 |
| ZINC | 7 | 10.0 | 3.0 | 7.1 | 4 | 20.0 | 0.0 | 10.0 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 5.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06611900 NAME: LITTLE GRIZZLY CREEK ABOVE HEBRON, CO

LAT 40°34'57" LONG 106°26'58" DRAINAGE AREA: 52.2 SQ MI (135.2 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 28 | 10.40 | 3.80 | 8.19 | 1.36 | 16.62 | -1.29 |
| PH FIELD (UNITS) | 28 | 8.60 | 6.60 | [1]7.60 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 30 | 450.00 | 120.00 | 236.70 | 66.27 | 28.00 | 0.66 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 35 | 335.00 | 1.50 | 55.18 | 87.79 | 159.11 | 1.97 |
| TEMPERATURE, WATER (DEG C) | 30 | 19.00 | 0.00 | 8.02 | 7.15 | 89.19 | 0.21 |
| ALKALINITY (MG/L AS CACO3) | 30 | 150.00 | 44.00 | 99.73 | 29.12 | 29.20 | -0.31 |
| BICARBONATE (MG/L AS HCO3) | 26 | 180.00 | 54.00 | 124.04 | 36.15 | 29.14 | -0.46 |
| CARBONATE (MG/L AS CO3) | 26 | 2.00 | 0.00 | 0.15 | 0.46 | 301.66 | 3.22 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 24 | 42.00 | 0.30 | 7.58 | 9.45 | 124.66 | 2.44 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 25 | 16.00 | 2.30 | 8.01 | 3.71 | 46.37 | 0.25 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 5 | 16.00 | 7.70 | 12.14 | 3.14 | 25.85 | -0.34 |
| CALCIUM DISSOLVED (MG/L AS CA) | 30 | 41.00 | 17.00 | 31.03 | 7.60 | 24.47 | -0.66 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 30 | 4.90 | 0.60 | 2.00 | 1.01 | 50.38 | 1.21 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 30 | 0.50 | 0.10 | 0.24 | 0.09 | 35.93 | 1.35 |
| HARDNESS (MG/L AS CACO3) | 30 | 170.00 | 55.00 | 104.83 | 28.56 | 27.25 | -0.29 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 30 | 25.00 | 0.00 | 6.10 | 6.76 | 110.88 | 1.15 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 30 | 16.00 | 0.50 | 6.56 | 2.62 | 39.89 | 1.05 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 30 | 0.47 | 0.00 | 0.09 | 0.10 | 119.51 | 2.05 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 30 | 0.40 | 0.00 | 0.07 | 0.08 | 108.73 | 2.68 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 30 | 0.13 | 0.00 | 0.02 | 0.03 | 106.85 | 2.64 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 30 | 3.40 | 0.80 | 1.70 | 0.66 | 38.80 | 1.33 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 30 | 13.00 | 0.60 | 8.69 | 2.56 | 29.42 | -0.79 |
| SODIUM, DISSOLVED (MG/L AS NA) | 30 | 38.00 | 4.00 | 11.40 | 6.00 | 52.58 | 3.04 |
| SODIUM ADSORPTION RATIO | 30 | 1.30 | 0.20 | 0.47 | 0.20 | 42.59 | 2.45 |
| SULFATE DISSOLVED (MG/L AS SO4) | 30 | 81.00 | 7.30 | 23.21 | 14.77 | 63.63 | 2.29 |
| SEDIMENT, SUSPENDED (MG/L) | 23 | 314.00 | 2.00 | 46.65 | 66.86 | 143.31 | 3.28 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 23 | 51.00 | 0.01 | 11.70 | 16.87 | 144.18 | 1.49 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 30 | 278.00 | 72.00 | 145.97 | 41.41 | 28.37 | 0.50 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 30 | 0.38 | 0.10 | 0.20 | 0.06 | 28.03 | 0.62 |

| | DISSOLVED | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 6 | 50.0 | 0.0 | 28.3 | 5 | 580.0 | 40.0 | 344.0 |
| ARSENIC | 7 | 1.0 | 0.0 | 0.9 | 4 | 2.0 | 1.0 | 1.5 |
| BORON | 10 | 60.0 | 10.0 | 31.0 | - | ----- | ----- | ----- |
| CADMIUM | 7 | 3.0 | 0.0 | 1.4 | 3 | 1.0 | 0.0 | 0.3 |
| CHROMIUM | - | ----- | ----- | ----- | 2 | 8.0 | 7.0 | 7.5 |
| COBALT | - | ----- | ----- | ----- | 2 | 0.0 | 0.0 | 0.0 |
| COPPER | 7 | 2.0 | 0.0 | 1.1 | 4 | 12.0 | 1.0 | 6.8 |
| IRON | 30 | 1500.0 | 40.0 | 321.0 | 10 | 2900.0 | 680.0 | 1335.0 |
| LEAD | 8 | 100.0 | 0.0 | 15.4 | 5 | 53.0 | 0.0 | 12.8 |
| MANGANESE | 30 | 400.0 | 10.0 | 91.3 | 10 | 190.0 | 40.0 | 95.0 |
| MERCURY | 7 | 0.2 | 0.0 | 0.0 | 3 | 0.1 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 0.0 | 5.0 | 3 | 1.0 | 0.0 | 0.3 |
| NICKEL | 6 | 6.0 | 0.0 | 2.7 | 3 | 11.0 | 0.0 | 5.7 |
| SELENIUM | 7 | 1.0 | 0.0 | 0.3 | 7 | 1.0 | 0.0 | 0.3 |
| ZINC | 8 | 430.0 | 0.0 | 59.1 | 4 | 70.0 | 0.0 | 22.5 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 6.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06619400 NAME: CANADIAN RIVER NEAR LINDLAND, CO

LAT 40°41'53" LONG 106°03'56" DRAINAGE AREA: 44 SQ MI (114 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 29 | 11.20 | 7.00 | 9.31 | 1.12 | 12.02 | -0.09 |
| PH FIELD (UNITS) | 31 | 8.40 | 6.80 | [1]7.50 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 31 | 250.00 | 105.00 | 177.26 | 43.59 | 24.59 | -0.33 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 33 | 119.00 | 4.00 | 26.55 | 28.33 | 106.70 | 1.53 |
| TEMPERATURE, WATER (DEG C) | 31 | 19.50 | 0.00 | 5.40 | 5.87 | 108.67 | 0.82 |
| ALKALINITY (MG/L AS CACO3) | 30 | 74.00 | 36.00 | 56.13 | 10.04 | 17.88 | -0.29 |
| BICARBONATE (MG/L AS HCO3) | 23 | 90.00 | 44.00 | 68.83 | 12.81 | 18.62 | -0.23 |
| CARBONATE (MG/L AS CO3) | 23 | 0.00 | 0.00 | 0.00 | 0.00 | 194.00 | 1.47 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 23 | 11.00 | 0.30 | 3.75 | 2.65 | 70.54 | 1.00 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 10 | 14.00 | 3.60 | 7.12 | 3.10 | 43.55 | 1.21 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 8 | 13.00 | 3.70 | 6.91 | 3.21 | 46.47 | 0.95 |
| CALCIUM DISSOLVED (MG/L AS CA) | 29 | 37.00 | 14.00 | 24.14 | 7.05 | 29.20 | 0.11 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 30 | 3.00 | 0.10 | 0.87 | 0.61 | 69.85 | 2.37 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 30 | 0.10 | 0.00 | 0.10 | 0.02 | 18.89 | -5.48 |
| HARDNESS (MG/L AS CACO3) | 29 | 120.00 | 48.00 | 81.83 | 22.56 | 27.57 | -0.02 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 29 | 54.00 | 0.00 | 26.55 | 15.20 | 57.26 | -0.06 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 29 | 7.90 | 2.40 | 5.34 | 1.44 | 26.89 | -0.28 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 30 | 0.70 | 0.00 | 0.07 | 0.13 | 185.85 | 4.10 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 29 | 0.43 | 0.00 | 0.06 | 0.08 | 139.54 | 3.46 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 29 | 0.14 | 0.00 | 0.02 | 0.03 | 137.65 | 3.40 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 30 | 5.80 | 0.50 | 1.39 | 1.05 | 75.32 | 3.41 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 29 | 10.00 | 0.70 | 8.17 | 1.82 | 22.29 | -2.53 |
| SODIUM, DISSOLVED (MG/L AS NA) | 29 | 9.30 | 1.70 | 4.64 | 1.52 | 32.72 | 0.87 |
| SODIUM ADSORPTION RATIO | 29 | 0.50 | 0.10 | 0.23 | 0.08 | 32.93 | 2.01 |
| SULFATE DISSOLVED (MG/L AS SO4) | 30 | 56.00 | 8.00 | 33.35 | 15.21 | 45.60 | -0.39 |
| SEDIMENT, SUSPENDED (MG/L) (MEAN DAILY) | 356 | 132.00 | 2.00 | 17.65 | 16.31 | 92.41 | 2.60 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 496 | 27.00 | 0.02 | 1.63 | 3.24 | 198.47 | 3.66 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 29 | 160.00 | 64.00 | 111.93 | 30.32 | 27.09 | -0.27 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 29 | 0.22 | 0.09 | 0.15 | 0.04 | 27.44 | -0.27 |

| | DISSOLVED | | | | TOTAL | | |
|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 7 | 40.0 | 0.0 | 22.9 | 7 | 500.0 | 100.0 | 212.9 |
| ARSENIC | 6 | 1.0 | 0.0 | 0.3 | 4 | 2.0 | 0.0 | 0.8 |
| BORON | 30 | 70.0 | 0.0 | 29.7 | - | ----- | ----- | ----- |
| CADMIUM | 6 | 2.0 | 0.0 | 1.0 | 4 | 1.0 | 0.0 | 0.3 |
| CHROMIUM | - | ----- | ----- | ----- | 2 | 5.0 | 5.0 | 5.0 |
| COBALT | - | ----- | ----- | ----- | 2 | 0.0 | 0.0 | 0.0 |
| COPPER | 6 | 2.0 | 0.0 | 0.5 | 5 | 3.0 | 0.0 | 2.0 |
| IRON | 28 | 610.0 | 40.0 | 376.1 | 21 | 3100.0 | 500.0 | 996.7 |
| LEAD | 9 | 62.0 | 0.0 | 9.2 | 7 | 61.0 | 0.0 | 11.7 |
| MANGANESE | 29 | 140.0 | 10.0 | 40.7 | 21 | 220.0 | 20.0 | 60.5 |
| MERCURY | 6 | 0.0 | 0.0 | 0.0 | 3 | 0.0 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 0.0 | 5.0 | 4 | 3.0 | 0.0 | 0.8 |
| NICKEL | 6 | 3.0 | 0.0 | 1.0 | 4 | 6.0 | 0.0 | 2.8 |
| SELENIUM | 6 | 0.0 | 0.0 | 0.0 | 3 | 0.0 | 0.0 | 0.0 |
| ZINC | 9 | 20.0 | 0.0 | 4.7 | 7 | 50.0 | 0.0 | 15.7 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 7.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06619450 NAME: CANADIAN RIVER NEAR BROWNLEE, CO

LAT 40°28'29" LONG 106°14'09" DRAINAGE AREA: 158 SQ MI (409.2 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 28 | 10.90 | 3.40 | 7.58 | 1.97 | 25.93 | -0.65 |
| PH FIELD (UNITS) | 29 | 8.70 | 7.10 | [1]7.80 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 30 | 370.00 | 200.00 | 282.37 | 41.02 | 14.53 | -0.49 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 33 | 322.00 | 2.44 | 45.39 | 69.63 | 153.42 | 2.63 |
| TEMPERATURE, WATER (DEG C) | 30 | 22.00 | 0.00 | 7.27 | 7.70 | 105.95 | 0.53 |
| ALKALINITY (MG/L AS CACO3) | 29 | 150.00 | 74.00 | 105.21 | 17.11 | 16.26 | 0.27 |
| BICARBONATE (MG/L AS HCO3) | 23 | 180.00 | 92.00 | 130.74 | 21.78 | 16.66 | 0.15 |
| CARBONATE (MG/L AS CO3) | 23 | 1.00 | 0.00 | 0.04 | 0.21 | 479.57 | 4.80 |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 23 | 14.00 | 0.60 | 5.38 | 4.32 | 80.21 | 0.62 |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 9 | 16.00 | 3.30 | 8.24 | 4.52 | 54.78 | 0.60 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 9 | 17.00 | 3.20 | 9.20 | 5.07 | 55.15 | 0.39 |
| CALCIUM DISSOLVED (MG/L AS CA) | 29 | 47.00 | 24.00 | 35.93 | 6.08 | 16.93 | -0.43 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 29 | 11.0 | 0.80 | 1.89 | 1.82 | 96.38 | 4.75 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 29 | 0.20 | 0.10 | 0.19 | 0.03 | 13.35 | -3.59 |
| HARDNESS (MG/L AS CACO3) | 29 | 160.00 | 85.00 | 127.59 | 19.93 | 15.62 | -0.51 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 29 | 49.00 | 0.00 | 22.03 | 12.95 | 58.77 | -0.02 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 29 | 12.00 | 6.00 | 9.20 | 1.45 | 15.78 | -0.37 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 29 | 0.47 | 0.00 | 0.09 | 0.10 | 118.62 | 2.30 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 28 | 0.31 | 0.00 | 0.06 | 0.07 | 125.98 | 2.17 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 28 | 0.10 | 0.00 | 0.02 | 0.02 | 124.58 | 2.11 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 29 | 5.00 | 1.10 | 1.92 | 0.90 | 46.89 | 2.45 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 28 | 14.00 | 6.20 | 10.29 | 1.90 | 18.50 | -0.12 |
| SODIUM, DISSOLVED (MG/L AS NA) | 29 | 21.00 | 6.60 | 10.36 | 2.73 | 26.37 | 2.03 |
| SODIUM ADSORPTION RATIO | 29 | 0.80 | 0.30 | 0.40 | 0.10 | 25.00 | 2.53 |
| SULFATE DISSOLVED (MG/L AS SO4) | 29 | 72.00 | 15.00 | 40.24 | 13.82 | 34.35 | -0.17 |
| SEDIMENT, SUSPENDED (MG/L) (MEAN DAILY) | 325 | 248.00 | 2.00 | 44.24 | 44.94 | 101.60 | 1.63 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 494 | 101.00 | 0.02 | 7.27 | 14.63 | 201.25 | 3.03 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 28 | 229.00 | 113.00 | 173.43 | 28.25 | 16.29 | -0.42 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 28 | 0.31 | 0.15 | 0.24 | 0.04 | 16.24 | -0.48 |

| | DISSOLVED | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 7 | 70.0 | 0.0 | 32.9 | 7 | 360.0 | 0.0 | 191.4 |
| ARSENIC | 6 | 3.0 | 0.0 | 0.8 | 4 | 2.0 | 0.0 | 1.0 |
| BORON | 29 | 80.0 | 0.0 | 43.4 | - | ----- | ----- | ----- |
| CADMIUM | 6 | 2.0 | 0.0 | 1.0 | 4 | 1.0 | 0.0 | 0.3 |
| CHROMIUM | - | ----- | ----- | ----- | 2 | 7.0 | 5.0 | 6.0 |
| COBALT | - | ----- | ----- | ----- | 2 | 0.0 | 0.0 | 0.0 |
| COPPER | 6 | 3.0 | 0.0 | 1.0 | 5 | 4.0 | 0.0 | 2.6 |
| IRON | 29 | 520.0 | 30.0 | 190.3 | 20 | 2000.0 | 290.0 | 751.0 |
| LEAD | 9 | 24.0 | 0.0 | 6.0 | 7 | 80.0 | 0.0 | 13.4 |
| MANGANESE | 29 | 240.0 | 10.0 | 45.2 | 20 | 300.0 | 20.0 | 69.0 |
| MERCURY | 6 | 0.0 | 0.0 | 0.0 | 3 | 0.0 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 0.0 | 5.0 | 4 | 4.0 | 0.0 | 1.0 |
| NICKEL | 6 | 3.0 | 0.0 | 1.2 | 4 | 9.0 | 0.0 | 4.3 |
| SELENIUM | 6 | 0.0 | 0.0 | 0.0 | 3 | 0.0 | 0.0 | 0.0 |
| ZINC | 9 | 20.0 | 0.0 | 4.9 | 7 | 60.0 | 0.0 | 17.0 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

TABLE 8.--DESCRIPTIVE STATISTICS OF WATER-QUALITY DATA

STATION NUMBER: 06619420 NAME: WILLIAMS DRAW NEAR WALDEN, CO

LAT 40°44'18" LONG 106°06'49" DRAINAGE AREA: 3.95 SQ MI (10.23 SQ KM)

| PROPERTY OR CONSTITUENT | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | STANDARD DEVIATION | COEFFICIENT OF VARIATION | SKEWNESS |
|---|---|---|---|---|---|---|---|
| OXYGEN, DISSOLVED (MG/L) | 1 | 9.40 | 9.40 | 9.40 | ------ | ------ | ---- |
| PH FIELD (UNITS) | 5 | 8.30 | 7.20 | [1]7.80 | ------ | ------ | ---- |
| SPECIFIC CONDUCTANCE (MICROMHOS) | 5 | 1150.00 | 110.00 | 446.80 | 406.89 | 91.07 | 1.86 |
| STREAMFLOW, INSTANTANEOUS (CFS) | 5 | 16.00 | 0.12 | 4.02 | 6.75 | 167.90 | 2.15 |
| TEMPERATURE, WATER (DEG C) | 4 | 23.00 | 0.50 | 8.50 | 10.17 | 119.69 | 1.47 |
| ALKALINITY (MG/L AS CACO3) | 5 | 420.00 | 40.00 | 150.80 | 153.36 | 101.70 | 2.03 |
| BICARBONATE (MG/L AS CO3) | 1 | 120.00 | 120.00 | 120.00 | ------ | ------ | ---- |
| CARBONATE (MG/L AS CO3) | 1 | 0.00 | 0.00 | 0.00 | ------ | ------ | ---- |
| CARBON DIOXIDE DISSOLVED (MG/L AS CO2) | 1 | 3.00 | 3.00 | 3.00 | ------ | ------ | ---- |
| CARBON, ORGANIC DISSOLVED (MG/L AS C) | 3 | 14.00 | 13.00 | 13.33 | 0.58 | 4.33 | 1.73 |
| CARBON, ORGANIC TOTAL (MG/L AS C) | 3 | 13.00 | 11.00 | 12.33 | 1.15 | 9.36 | -1.73 |
| CALCIUM DISSOLVED (MG/L AS CA) | 5 | 97.00 | 11.00 | 36.80 | 34.64 | 94.14 | 1.93 |
| CHLORIDE, DISSOLVED (MG/L AS CL) | 5 | 7.10 | 2.00 | 3.94 | 2.06 | 52.28 | 1.03 |
| FLUORIDE, DISSOLVED (MG/L AS F) | 5 | 0.80 | 0.20 | 0.42 | 0.23 | 54.29 | 1.49 |
| HARDNESS (MG/L AS CACO3) | 5 | 480.00 | 48.00 | 174.80 | 174.79 | 99.99 | 1.97 |
| HARDNESS, NONCARBONATE (MG/L CACO3) | 5 | 61.00 | 0.00 | 23.60 | 23.52 | 99.67 | 1.13 |
| MAGNESIUM, DISSOLVED (MG/L AS MG) | 5 | 58.00 | 4.90 | 20.02 | 21.63 | 108.07 | 2.03 |
| NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N) | 4 | 2.20 | 0.01 | 0.61 | 1.07 | 176.29 | 1.96 |
| PHOSPHATE, ORTHO, DISSOLVED (MG/L AS PO4) | 4 | 0.64 | 0.25 | 0.48 | 0.18 | 37.44 | -0.76 |
| PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P) | 4 | 0.21 | 0.08 | 0.16 | 0.06 | 38.23 | -0.76 |
| POTASSIUM, DISSOLVED (MG/L AS K) | 5 | 6.40 | 3.10 | 4.22 | 1.32 | 31.32 | 1.47 |
| SILICA, DISSOLVED (MG/L AS SIO2) | 5 | 17.00 | 5.90 | 9.96 | 4.19 | 42.09 | 1.55 |
| SODIUM, DISSOLVED (MG/L AS NA) | 5 | 110.00 | 8.10 | 38.02 | 41.09 | 108.06 | 2.01 |
| SODIUM ADSORPTION RATIO | 5 | 2.20 | 0.50 | 1.12 | 0.65 | 57.66 | 1.53 |
| SULFATE DISSOLVED (MG/L AS SO4) | 5 | 250.00 | 18.00 | 91.40 | 92.75 | 101.47 | 1.77 |
| SEDIMENT, SUSPENDED (MG/L) | 3 | 35.00 | 14.00 | 26.00 | 10.82 | 41.60 | -1.15 |
| SEDIMENT DISCHARGE, SUSPENDED (T/DAY) | 3 | 0.23 | 0.03 | 0.11 | 0.11 | 101.12 | 1.58 |
| SOLIDS, SUM OF DISS. CONSTITUENTS (MG/L) | 5 | 809.00 | 80.00 | 298.00 | 293.37 | 98.45 | 1.95 |
| SOLIDS, DISSOLVED (TONS PER AC-FT) | 5 | 1.10 | 0.11 | 0.40 | 0.40 | 98.80 | 1.96 |

| | DISSOLVED | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|
| MINOR ELEMENTS (UG/L) | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN | N | MAXIMUM VALUE | MINIMUM VALUE | MEAN |
| ALUMINUM | 5 | 150.0 | 30.0 | 72.0 | 5 | 2200.0 | 250.0 | 912.0 |
| ARSENIC | 4 | 2.0 | 1.0 | 1.3 | 5 | 3.0 | 1.0 | 2.0 |
| BORON | 5 | 290.0 | 10.0 | 128.0 | - | ----- | ----- | ----- |
| CADMIUM | 4 | 1.0 | 1.0 | 1.0 | 4 | 2.0 | 0.0 | 1.0 |
| CHROMIUM | - | ----- | ----- | ----- | 4 | 5.0 | 1.0 | 3.5 |
| COBALT | - | ----- | ----- | ----- | 2 | 0.0 | 0.0 | 0.0 |
| COPPER | 4 | 5.0 | 1.0 | 2.8 | 5 | 20.0 | 2.0 | 6.8 |
| IRON | 5 | 490.0 | 100.0 | 232.0 | 5 | 5100.0 | 230.0 | 1790.0 |
| LEAD | 5 | 4.0 | 0.0 | 1.8 | 5 | 64.0 | 1.0 | 19.4 |
| MANGANESE | 5 | 250.0 | 10.0 | 86.0 | 5 | 230.0 | 30.0 | 122.0 |
| MERCURY | 4 | 0.2 | 0.0 | 0.1 | 4 | 0.0 | 0.0 | 0.0 |
| MOLYBDENUM | 4 | 10.0 | 10.0 | 10.0 | 4 | 2.0 | 0.0 | 0.8 |
| NICKEL | 4 | 3.0 | 0.0 | 1.0 | 4 | 9.0 | 3.0 | 6.0 |
| SELENIUM | 4 | 1.0 | 0.0 | 0.3 | 4 | 1.0 | 0.0 | 0.5 |
| ZINC | 5 | 20.0 | 4.0 | 10.8 | 5 | 60.0 | 10.0 | 30.0 |

[1]The value for pH is the median, defined as the middle value if N is odd, or the average of the two middle values if N is even.

Table 9.--*Regression equations and statistics of major ions versus specific conductance*

ABBREVIATIONS

mg/L=milligram per liter
N=number of observation pairs used to compute regression equation
K=specific conductance
µmhos/cm=micromhos per centimeter at 25° Celsius

Table 9.--*Regression equations and statistics of major ions versus specific conductance*--Continued

| Constituent (mg/L) | Regression equation | *N* | Coefficient of determination, $r^2$ | Standard error of estimate (mg/L) |
|---|---|---|---|---|
| | **Grizzly Creek near Spicer** | | | |
| Alkalinity (as $CaCO_3$) | = (0.461 x K) -3.38 | 28 | 0.88 | 8.1 |
| Bicarbonate | = ( .562 x K) -4.02 | 25 | .88 | 9.8 |
| Calcium | = ( .118 x K) +2.02 | 29 | .87 | 2.1 |
| Magnesium | = ( .032 x K) -.30 | 29 | .66 | 1.0 |
| Sodium | = ( .047 x K) -1.50 | 29 | .78 | 1.1 |
| Sulfate | = ( .070 x K) +1.01 | 29 | .36 | 4.3 |
| Dissolved solids | = ( .588 x K) +14.4 | 27 | .86 | 11 |
| | Range of specific conductance: 105-270 µmhos/cm | | | |
| | **Buffalo Creek near Hebron** | | | |
| Alkalinity (as $CaCO_3$) | = (0.400 x K) +14.2 | 29 | 0.86 | 23 |
| Bicarbonate | = ( .474 x K) +22.9 | 26 | .84 | 30 |
| Calcium | = ( .077 x K) +11.1 | 29 | .74 | 6.4 |
| Magnesium | = ( .036 x K) -.73 | 29 | .95 | 1.2 |
| Sodium | = ( .108 x K) -14.4 | 29 | .77 | 8.2 |
| Sulfate | = ( .152 x K) -21.3 | 29 | .69 | 14 |
| Dissolved solids | = ( .628 x K) +7.68 | 29 | .93 | 25 |
| | Range of specific conductance: 180-740 µmhos/cm | | | |
| | **Grizzly Creek near Hebron** | | | |
| Alkalinity (as $CaCO_3$) | = (0.337 x K) +22.5 | 29 | 0.75 | 15 |
| Bicarbonate | = ( .412 x K) +29.4 | 26 | .77 | 18 |
| Calcium | = ( .069 x K) +10.9 | 29 | .63 | 4.0 |
| Magnesium | = ( .033 x K) -.06 | 29 | .92 | .7 |
| Sodium | = ( .106 x K) -12.1 | 29 | .83 | 3.6 |
| Sulfate | = ( .191 x K) -24.4 | 29 | .67 | 10 |
| Dissolved solids | = ( .598 x K) +14.4 | 29 | .94 | 12 |
| | Range of specific conductance: 140-500 µmhos/cm | | | |
| | **Little Grizzly Creek above Coalmont** | | | |
| Alkalinity (as $CaCO_3$) | = (0.546 x K) -15.8 | 29 | 0.93 | 9.0 |
| Bicarbonate | = ( .678 x K) -21.5 | 26 | .93 | 11 |
| Calcium | = ( .142 x K) +.70 | 29 | .96 | 1.7 |
| Magnesium | = ( .027 x K) -.49 | 29 | .95 | .4 |
| Sodium | = ( .035 x K) -.64 | 29 | .75 | 1.2 |
| Sulfate | = ( .025 x K) +6.79 | 29 | .09 | 4.7 |
| Dissolved solids | = ( .596 x K) +2.39 | 29 | .96 | 6.8 |
| | Range of specific conductance: 85-260 µmhos/cm | | | |

Table 9.--*Regression equations and statistics of major ions versus specific conductance*--Continued

| Constituent (mg/L) | Regression equation | *N* | Coefficient of determination, $r^2$ | Standard error of estimate (mg/L) |
|---|---|---|---|---|
| | **Little Grizzly Creek above Hebron** | | | |
| Alkalinity (as $CaCO_3$) | = (0.362 x K) +14.1 | 30 | 0.68 | 17 |
| Bicarbonate | = ( .438 x K) +19.7 | 26 | .66 | 21 |
| Calcium | = ( .094 x K) +8.79 | 30 | .67 | 4.4 |
| Magnesium | = ( .036 x K) -2.06 | 30 | .85 | 1.0 |
| Sodium | = ( .077 x K) -6.72 | 30 | .72 | 3.2 |
| Sulfate | = ( .158 x K) -14.2 | 30 | .50 | 11 |
| Dissolved solids | = ( .608 x K) +2.06 | 30 | .95 | 9.7 |
| | Range of specific conductance: 120-450 µmhos/cm | | | |
| | **Canadian River near Lindland** | | | |
| Alkalinity (as $CaCO_3$) | = (0.175 x K) +24.8 | 30 | 0.56 | 6.8 |
| Bicarbonate | = ( .223 x K) +28.4 | 23 | .60 | 8.3 |
| Calcium | = ( .155 x K) -3.48 | 29 | .90 | 2.3 |
| Magnesium | = ( .032 x K) -.31 | 29 | .91 | .4 |
| Sodium | = ( .019 x K) +1.20 | 29 | .30 | 1.3 |
| Sulfate | = ( .342 x K) -27.9 | 30 | .94 | 3.9 |
| Dissolved solids | = ( .694 x K) -11.4 | 29 | .97 | 5.2 |
| | Range of specific conductance: 105-250 µmhos/cm | | | |
| | **Canadian River near Brownlee** | | | |
| Alkalinity (as $CaCO_3$) | = (0.279 x K) +26.2 | 29 | 0.46 | 13 |
| Bicarbonate | = ( .360 x K) +27.8 | 23 | .53 | 15 |
| Calcium | = ( .127 x K) +.08 | 29 | .75 | 3.1 |
| Magnesium | = ( .032 x K) +.19 | 29 | .83 | .6 |
| Sodium | = ( .040 x K) -.99 | 29 | .37 | 2.2 |
| Sulfate | = ( .240 x K) -27.6 | 29 | .52 | 9.8 |
| Dissolved solids | = ( .643 x K) -8.33 | 28 | .92 | 8.0 |
| | Range of specific conductance: 200-370 µmhos/cm | | | |
| | **Williams Draw near Walden** | | | |
| Alkalinity (as $CaCO_3$) | = (0.376 x K) -17.2 | 5 | 0.99 | 13 |
| Calcium | = ( .085 x K) -1.12 | 5 | .99 | 3.2 |
| Magnesium | = ( .053 x K) -3.61 | 5 | .99 | 2.6 |
| Sodium | = ( .101 x K) -6.98 | 5 | .99 | 3.4 |
| Sulfate | = ( .226 x K) -9.36 | 5 | .98 | 16 |
| Dissolved solids | = ( .718 x K) -22.9 | 5 | .99 | 30 |
| | Range of specific conductance: 110-1,150 µmhos/cm | | | |



GPO 834-469