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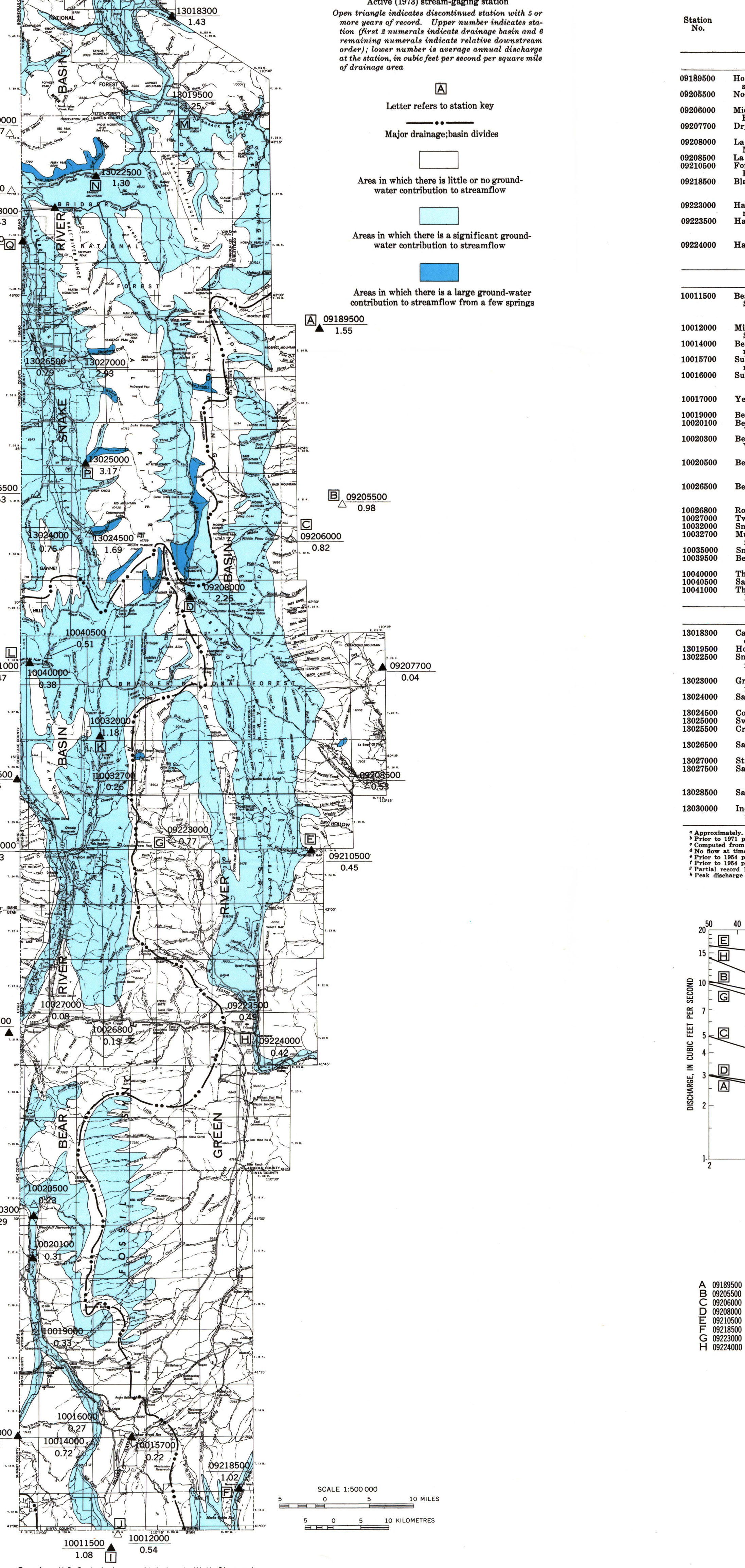


EXPLANATION

▲ 10020300 / 0.29

Active (1973) stream-gaging station

*Open triangle indicates discontinued station with 5 or more years of record. Upper number indicates station (first 2 numerals indicate drainage basin and 6 remaining numerals indicate relative downstream order); lower number is average annual discharge at the station, in cubic feet per second per square mile of drainage area*

[A] Letter refers to station key

Major drainage;basin divides

Area in which there is little or no ground-water contribution to streamflow

Areas in which there is a significant ground-water contribution to streamflow

Areas in which there is a large ground-water contribution to streamflow from a few springs

Base from U.S. Geological Survey, 1967

Hydrology by W. H. Glass and G. C. Lines, 1972–73

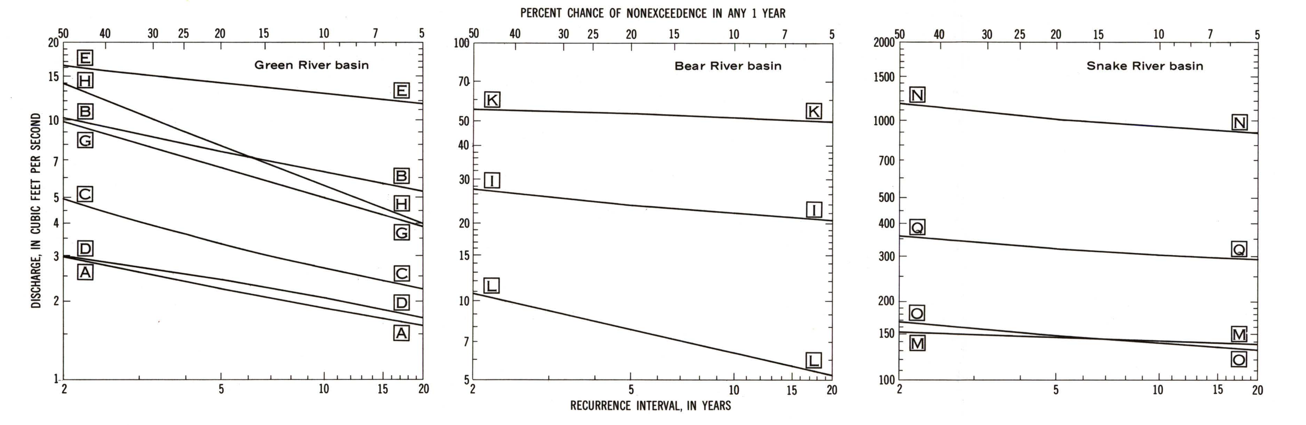
SCALE 1:500 000

MAP SHOWING AVERAGE ANNUAL DISCHARGE AT GAGING STATIONS AND GROUND-WATER CONTRIBUTION TO STREAMFLOW

STREAMFLOW CHARACTERISTICS AT GAGING STATIONS

| Station No. | Station name | Drainage area (sq. mi.) | Records available (water years) | Annual mean discharge (cfs): Average | Annual mean discharge (cfs): Range | Annual mean discharge (cfs): Exceeded 90-percent of years | Annual minimum daily discharge (cfs): Range | Recurrence interval: 2-year | Recurrence interval: 20-year | Maximum instantaneous discharge (cfs) | Magnitude of 25-year flood (cfs) | Factors affecting natural flow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **GREEN RIVER BASIN** | | | | | | | | | | | |
| 09189500 | Horse Creek at Sherman ranger station. | 43.0 | 1955– | 66.6 | 41.3 – 117 | 44 | 1.4 – 4.0 | 2.8 | 1.5 | 1,860 | 1,900 | |
| 09205500 | North Piney Creek near Mason | a 58 | 1916, 1932–1972 | 57.1 | 24.0 – 104 | 36 | 3.1 – 17.0 | 10 | 5.2 | 747 | 660 | Irrigation diversions (about 1,600 acres). |
| 09206000 | Middle Piney Creek below South Fork, near Big Piney. | 34.3 | 1940–1954 | 28.2 | 11.5 – 45.8 | 16 | 1.9 – 11.0 | 5.0 | 2.2 | 254 | 271 | Irrigation diversions (about 400 acres), one reservoir (capacity, 4,200 acre-ft). |
| 09207700 | Dry Piney Creek near Big Piney | 67.0 | 1966– | 2.72 | .62– 8.02 | ------- | 0 | 0 | 0 | 98 | ----- | Irrigation diversion (4.4 cfs adjudicated for about 300 acres). |
| 09208000 | La Barge Creek near La Barge Meadows ranger station. | a 6.3 | 1941, 1942, 1951– | 14.2 | 9.7 – 20.9 | 10 | 1.3 – 3.3 | 3.0 | 1.7 | 192 | 206 | |
| 09208500 | La Barge Creek near Viola | 172 | 1941–1949 | 90.5 | 55.1 – 132 | 52 | 23 – 43 | 33 | ----- | 585 | ----- | Irrigation diversions (about 5,300 acres). |
| 09210500 | Fontenelle Creek near Herschler Ranch, near Fontenelle. | 152 | 1952– | 68.5 | 30.4 – 128 | 48 | 10.0 – 22.0 | 16 | 11 | 821 | 854 | Irrigation diversions (about 4,100 acres). |
| 09218500 | Blacks Fork near Millburne | 156 | 1940– | 159 | 98.8 – 226 | 115 | 12.0 – 35.0 | 22 | 14 | 2,530 | 2,420 | Irrigation diversions (about 2,100 acres). Record reflects conditions prior to construction of Meeks Cabin Reservoir in 1971. |
| 09223000 | Hams Fork below Pole Creek, near Frontier.b | 128 | 1953– | 97.6 | 39.3 – 214 | 55 | 2.0 – 18.0 | 9.6 | 3.0 | 1,520 | 1,160 | Irrigation diversions (about 600 acres). |
| 09223500 | Hams Fork near Frontier | 298 | 1946–1972 | 147 | 34.4 – 302 | 78 | ----- | ----- | ----- | 2,450 | ----- | Irrigation diversions (about 7,000 acres), two reservoirs (total capacity, about 29,058 acre-ft). |
| 09224000 | Hams Fork at Diamondville | 386 | 1918–1932, 1946–1949 | 163 | 34.6 – 278 | 81 | 0 – 25.0 | c 13 | c 2.9 | 3,250 | c 3,160 | Irrigation diversions (about 8,450 acres). Diversion for municipal supply of Kemmerer from reservoir (capacity, 1,058 acre-ft). |
| | **BEAR RIVER BASIN** | | | | | | | | | | | |
| 10011500 | Bear River near Utah-Wyoming State line. | 176 | 1943– | 191 | 110 – 286 | 129 | 18.0 – 37.0 | 28 | 19 | 2,980 | 2,850 | Three irrigation diversions (about 2,860 acres). Flow regulated slightly by Whitney Reservoir (capacity, 4,200 acre-ft) completed in 1966. |
| 10012000 | Mill Creek at Utah-Wyoming State line. | a 59 | 1950–1962 | 32.0 | 17.9 – 51.7 | 18.0 | 1.9 – 7.5 | 3.6 | 1.7 | 690 | ----- | Three small irrigation diversions. |
| 10014000 | Bear River above Sulphur Creek, near Evanston. | 282 | 1947–1956 | 202 | 105 – 313 | 130 | ----- | ----- | ----- | 2,970 | ----- | Irrigation diversions (about 19,000 acres). |
| 10015700 | Sulphur Creek above reservoir, near Evanston. | a 64 | 1958– | 14.1 | 2.90– 29.0 | 3.7 | 0 – 1.7 | ----- | ----- | 1,220 | ----- | Several irrigation diversions. |
| 10016000 | Sulphur Creek near Evanston | 80.5 | 1943–1959 | 22.1 | 12.5 – 49.3 | 13.0 | ----- | ----- | ----- | 1,220 | ----- | Several irrigation diversions. Sulphur Creek Reservoir (capacity, 7,100 acre-ft) completed 1957. |
| 10017000 | Yellow Creek near Evanston | a 80 | 1945, 1950– | 9.64 | 1.87– 25.8 | 2.8 | 0 | 0 | 0 | 477 | ----- | One small irrigation diversion. Barker Reservoir (capacity, 162 acre-ft) completed 1959. |
| 10019000 | Bear River near Evanston | 715 | 1941–1956 | 234 | 50.8 – 422 | 122 | 0 – 28 | 1.9 | 0 | 3,690 | ----- | Irrigation diversions (about 31,000 acres). |
| 10020100 | Bear River above reservoir, near Woodruff, Utah. | a 780 | 1962– | 242 | 118 – 391 | 129 | .10– 3.4 | 2.0 | ----- | 3,340 | ----- | Irrigation diversions (about 43,500 acres). |
| 10020300 | Bear River below reservoir, near Woodruff, Utah. | a 810 | 1962– | 234 | 111 – 349 | ------- | 0 – 12 | ----- | ----- | 3,000 | ----- | Irrigation diversions (about 43,500 acres). Woodruff Narrows Reservoir (capacity, 28,000 acre-ft). |
| 10020500 | Bear River near Woodruff, Utah | a 870 | 1942–1961 | 197 | 50.2 – 404 | 81 | 0 – 23 | (d) | (d) | 3,010 | ----- | Record reflects conditions prior to construction of Woodruff Narrows Reservoir in 1962. |
| 10026500 | Bear River near Randolph, Utah | a 1,640 | 1944– | 193 | 22.8 – 433 | 52 | 2.2 – 61 | 12 | 3.3 | 2,660 | ----- | Irrigation diversions (about 94,500 acres), regulation by Woodruff Narrows Reservoir since 1962. |
| 10026800 | Rock Creek near Fossil | 49.0 | 1962–1966 | 6.20 | 4.17– 7.39 | ------- | 20– 2.1 | ----- | ----- | 66 | ----- | Few small irrigation diversions. |
| 10027000 | Twin Creek at Sage | 246 | 1944–1962 | 18.5 | 6.09– 39.1 | 7.5 | 1.0 – 3.9 | 2.0 | ----- | 649 | 853 | Irrigation diversions (about 1,100 acres). |
| 10032000 | Smiths Fork near Border | 165 | 1943– | 195 | 101 – 312 | 137 | 49 – 63 | 55 | 49 | 1,610 | 1,450 | Irrigation diversion (about 200 acres). |
| 10032700 | Muddy Creek above Mill Creek, near Cokeville. | 20.7 | 1965–1969 | 5.43 | 2.11– 10.4 | ------- | ----- | ----- | ----- | 136 | ----- | |
| 10035000 | Smiths Fork at Cokeville | 275 | 1943–1952 | 200 | 140 – 263 | 140 | 26 – 80 | 44 | ----- | 1,320 | ----- | Irrigation diversions (about 9,000 acres). |
| 10039500 | Bear River at Border | 2,490 | 1938– | 410 | 109 – 776 | 188 | 30 – 200 | 91 | 38 | 3,680 | ----- | Irrigation diversions (about 122,000 acres), large reservoir storage. |
| 10040000 | Thomas Fork near Geneva, Idaho | 45.3 | 1940–1951 | 17.2 | 8.20– 30.4 | 8.0 | 1.3 – 3.4 | 2.5 | 1.2 | 418 | ----- | |
| 10040500 | Salt Creek near Geneva, Idaho | 37.6 | 1940–1951 | 19.0 | 5.39– 31.9 | 6.8 | ----- | ----- | ----- | 382 | ----- | |
| 10041000 | Thomas Fork near Wyoming-Idaho State line. | 113 | 1950– | 52.7 | 14.6 – 105 | 25 | 5.4 – 15.0 | 11 | 5.1 | 1,040 | 1,110 | |
| | **SNAKE RIVER BASIN** | | | | | | | | | | | |
| 13018300 | Cache Creek near Jackson (Hydrologic bench-mark station). | a 10 | 1963– | 14.3 | 10.8 – 20.2 | 11 | 3.2 – 4.0 | 3.5 | ----- | 225 | ----- | |
| 13019500 | Hoback River near Jackson | 564 | 1945–1958 | 706 | 496 – 985 | 532 | 90 – 174 | 151 | 103 | 5,900 | 6,190 | Small irrigation diversions. |
| 13022500 | Snake River above reservoir, near Alpine.e | 3,465 | 1938, 1954– | 4,516 | 3,660 –6,587 | 3,660 | 940 –1,550 | 1,140 | 864 | 26,800 | 27,000 | Some diversions from tributaries. Regulation on mainstream by Jackson Lake (capacity, 847,000 acre-ft). |
| 13023000 | Greys River above reservoir, near Apline.f | 448 | g 1917–1918, 1938, 1954– | 644 | 414 –1,022 | 469 | 120 – 200 | 162 | 125 | 7,230 | 5,170 | Irrigation diversions for less than 500 acres. |
| 13024000 | Salt River near Smoot | 47.8 | 1933–1957 | 36.2 | 11.2 – 55.5 | 20 | 0 – 7.4 | 4.1 | ----- | 460 | 404 | 58.2 cfs adjudicated for irrigation of about 4,000 acres. |
| 13024500 | Cottonwood Creek near Smoot | 26.3 | 1933–1957 | 44.5 | 23.6 – 61.6 | 30 | 7.3 – 15 | 12 | 7.5 | h 438 | 398 | Flow regulated by Cottonwood Lake. |
| 13025000 | Swift Creek near Afton | 27.4 | 1943– | 86.9 | 63.4 – 122 | 70 | 20 – 39 | 30 | 22 | 775 | 732 | Less than 3 cfs adjudicated for diversion. |
| 13025500 | Crow Creek near Fairview | a 115 | 1947–1949, 1962–1967 | 60.4 | 47.2 – 85.0 | 49 | 14 – 38 | 27 | ----- | 346 | ----- | Small irrigation diversions. |
| 13026500 | Salt River near Thayne | 570 | 1933, 1962–1967 | 448 | 351 – 564 | 342 | 181 – 242 | ----- | ----- | h 1,860 | ----- | Many irrigation diversions |
| 13027000 | Strawberry Creek near Bedford | 21.3 | 1933–1943 | 62.4 | 47.3 – 86.4 | 52 | 24 – 30 | 28 | ----- | 396 | 382 | One small irrigation diversion. |
| 13027500 | Salt River above reservoir, near Etna. | 829 | 1954– | 736 | 446 –1,247 | 519 | 294 – 458 | 356 | 285 | 3,870 | 2,890 | Diversions for power development, industry, municipal supply and irrigation of about 66,000 acres. |
| 13028500 | Salt River at Wyoming-Idaho State line. | 890 | 1934–1955 | 702 | 358 – 990 | 460 | 220 – 434 | 375 | 280 | 3,520 | ----- | Do. |
| 13030000 | Indian Creek above reservoir, near Alpine, Idaho. | 36.8 | g 1917–1918, 1954–1961 | 13.7 | 6.9 – 21.8 | 7.4 | 0 | 0 | 0 | 350 | ----- | One small irrigation diversion. |

a Approximately.
b Prior to 1971 published as "Hams Fork near Elk Creek ranger station."
c Computed from conditions prior to construction of Utah Power and Light Company Reservoir (capacity, about 28,000 acre-ft) completed in May 1961.
d No flow at times in most years.
e Prior to 1954 published as "Snake River above Greys River, near Alpine."
f Prior to 1954 published as "Greys River near Alpine."
g Partial record 1917, 1918.
h Peak discharge probably exceeded June 1971.




FREQUENCY CURVES OF ANNUAL LOWEST MEAN DISCHARGE FOR 3 CONSECUTIVE DAYS AT SELECTED SITES IN THE GREEN, BEAR, AND SNAKE RIVER BASIN

STATION KEY

GREEN RIVER BASIN

A 09189500 Horse Creek at Sherman ranger station
B 09205500 North Piney Creek near Mason
C 09206000 Middle Piney Creek below South Fork, near Big Piney
D 09208000 LaBarge Creek near LaBarge Meadows ranger station
E 09210500 Fontenelle Creek near Herschler Ranch, near Fontenelle
F 09218500 Blacks Fork near Millburne
G 09223000 Hams Fork below Pole Creek, near Frontier
H 09224000 Hams Fork at Diamondville

BEAR RIVER BASIN

I 10011500 Bear River near Utah—Wyoming State line
J 10012000 Mill Creek at Utah—Wyoming State line
K 10032000 Smiths Fork near Border
L 10041000 Thomas Fork near Wyoming—Idaho State line

SNAKE RIVER BASIN

M 13019500 Hoback River near Jackson
N 13022500 Snake River above reservoir, near Alpine
O 13023000 Greys River above reservoir, near Alpine
P 13025000 Swift Creek near Afton
Q 13027500 Salt River above reservoir, near Etna

## STREAMFLOW

Headwaters of three major drainage basins are located within the report area: Green River basin, tributary to the Colorado River; Bear River basin, part of the Great Basin; and Snake River basin. Surface water generally is abundant, but its availability for use within the report area is subject to provisions of interstate compacts for each of the major basins.

Surface water information for water planning and design is described by various streamflow characteristics, such as mean annual flow, 20-year minimum daily low flow, and 50-year flood. Characteristics of streamflow for mountainous regions of Wyoming have been found to be significantly related to a number of basin parameters such as drainage area, mean basin elevation, mean annual precipitation, main channel slope, area of lakes and ponds, forest cover, and latitude of drainage basin (Wahl, 1970). These basin parameters, and thus streamflow characteristics, vary greatly throughout the thrust belt. Selected streamflow characteristics are listed in a table for streamgaging sites in the thrust belt that have at least 5 years of record. Factors that affect the natural flow of these sites are also listed.

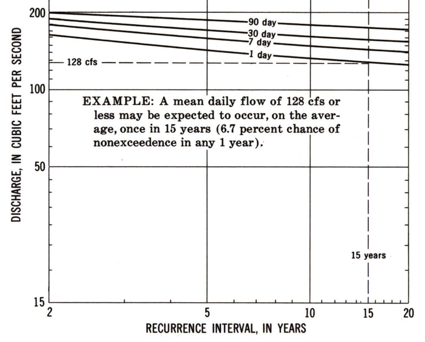
### MEAN ANNUAL FLOW

The mean annual flow, in cubic feet per second per square mile, at gaging stations is shown on the map to give an idea of areal variation of drainage-basin yields. Wahl's (1970) report may be used to estimate mean annual flow at ungaged sites in mountainous drainages. Moore (1968) has developed a method to estimate mean annual flow at ungaged sites in semiarid areas. Moore's method, although untried in Wyoming, might be applied to the nonmountainous areas of the thrust belt with some accuracy limitations. For this report, mountain streams are defined to be those that originate and obtain most of their flow from mountainous drainage (altitude above approx. 7,500 ft). Nonmountainous streams are those that do not meet this criterion.

### LOW FLOW

The low flow of unregulated streams is dependent upon ground-water discharge. Ground-water contribution to streamflow, as shown on the map, is based on the number, discharge, and topographic location of springs, aquifer characteristics, low-flow data at gaging stations, precipitation data, and field observations of flow of ungaged streams. Most streams in the area receive ground-water discharge in a part of their drainage basins; thus, most streams are perennial. Streams such as Chicken, Sheep, and Byrne Creeks that head along the divide between the Green and Bear River basins southwest of Kemmerer receive most of their ground-water discharge along their upper reaches. These streams have periods of no flow along their lower reaches where little or no ground-water discharge is received. Water from their upper reaches is lost by infiltration and evapotranspiration.

Low-flow-frequency curves are helpful in determining whether streamflow is adequate for expected demands. A family of curves for the station Greys River above reservoir, near Alpine (13023000) illustrates the increase in discharge that can be expected at certain recurrence intervals as the considered period of consecutive days is increased. Other curves show the 3-day low-flow frequency at selected sites in the Green, Bear, and Snake River basins. The ranges of annual minimum daily flow at streamgaging stations during their period of record are listed in the table of streamflow characteristics at gaging stations. The computed values for the 2- and 20-year recurrence intervals (50 percent and 5 percent chance, respectively, of being less than the given value in any 1 year) are also listed in the table.

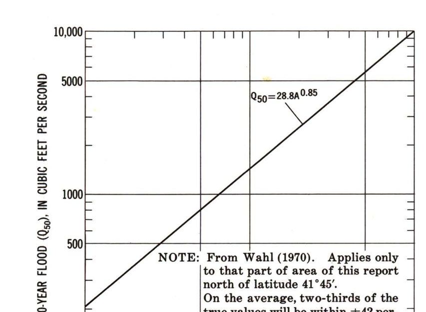



FREQUENCY CURVES OF ANNUAL LOWEST MEAN DISCHARGE FOR SELECTED PERIODS OF CONSECUTIVE DAY AT GREYS RIVER ABOVE RESERVOIR, NEAR ALPINE (13023000)

### FLOOD FLOW

Peak flows for most streams in the report area (with the possible exception of nonmountainous streams in the Fossil Syncline and along the eastern edge of the thrust belt) are normally the result of snowmelt or rain on snow. Estimated discharges of 25-year floods are listed in the table of streamflow characteristics at gaging stations for those sites that have a sufficient length of record and are without significant regulation. The 25-year flood is the peak discharge that will be exceeded, on the average, once in 25 years (4 percent chance of occurring in any 1 year).

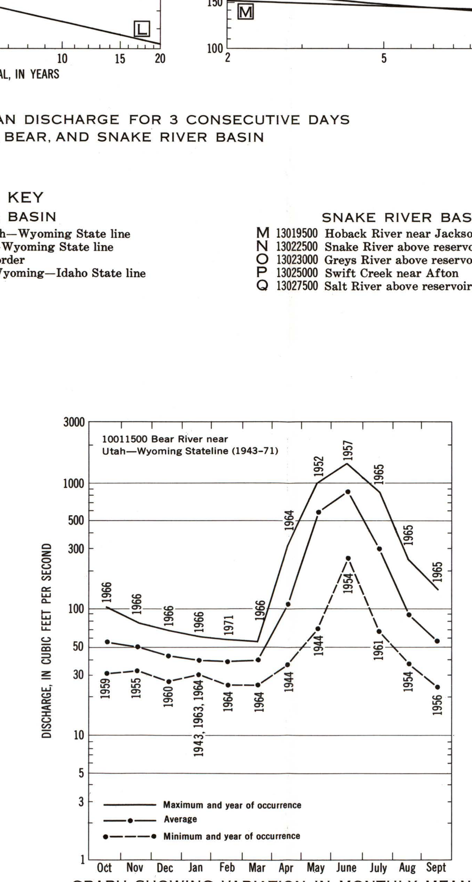
The graph showing relation of 50-year flood to drainage area can be used to estimate the 50-year flood (2 percent chance of occurring in any 1 year) in that part of the study area north of latitude 41°45ʹ by measuring drainage area. Flood plains of floods of this magnitude may include agricultural or urban areas susceptible to damage. For methods of estimating the magnitudes of floods for other frequencies north of latitude 41°45ʹ and the magnitudes and frequencies of floods south of latitude 41°45ʹ, see Wahl (1970).




GRAPH SHOWING RELATION OF 50-YEAR FLOOD TO DRAINAGE AREA

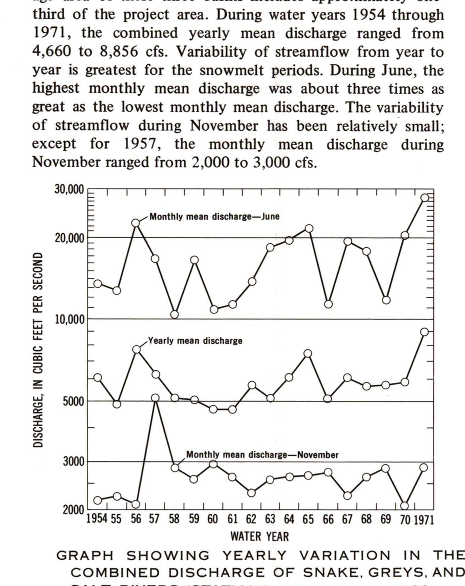
### VARIABILITY OF FLOW

Seasonal variation of streamflow is illustrated by hydrographs for Bear River near the Utah-Wyoming State line (10011500). Maximum and minimum monthly mean discharges during the period of record and the year of occurrence are shown on the hydrographs along with the average for the period of record. Flow at this site on the Bear River is virtually unregulated. Streamflow increases greatly during the snowmelt period of April through June and then declines until the next snowmelt period. The period of snowmelt may be different for different drainage basins. In general, the higher the mean basin altitude the later the period of runoff. Abnormal temperature and (or) rainfall will also affect the timing of peak runoff.

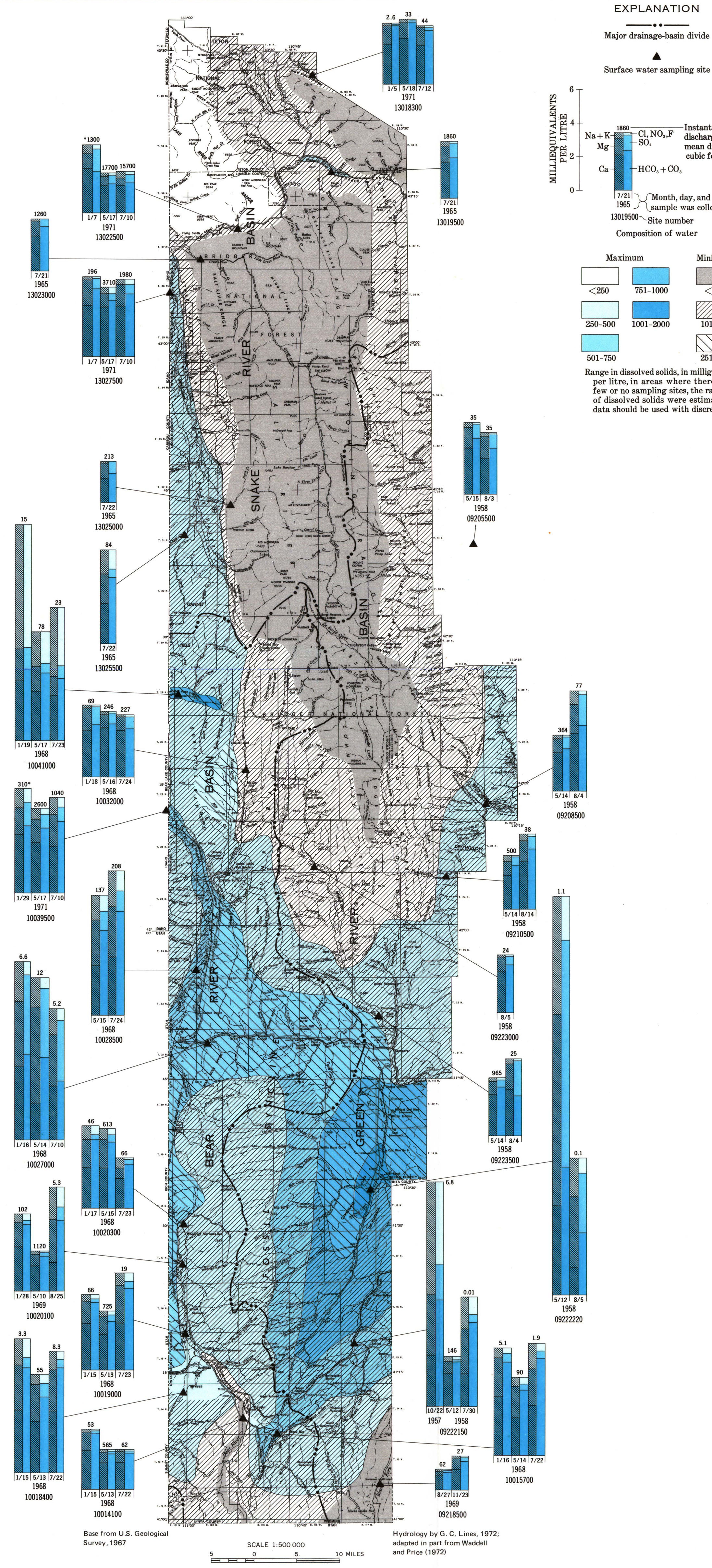



GRAPH SHOWING VARIATION IN MONTHLY MEAN DISCHARGE OF BEAR RIVER

Yearly variation of streamflow is illustrated by hydrographs that show the combined yearly mean discharge and the combined monthly mean discharges (June and November) of the Snake, Greys, and Salt Rivers at stations 13022500, 13023000, and 13027500. The combined drainage area of these three basins includes approximately one-third of the project area. During water years 1954 through 1971, the combined yearly mean discharge ranged from 4,660 to 8,856 cfs. Variability of streamflow from year to year is greatest for the snowmelt periods. During June, the highest monthly mean discharge was about three times as great as the lowest monthly mean discharge. The variability of streamflow during November has been relatively small; except for 1957, the monthly mean discharge during November ranged from 2,000 to 3,000 cfs.




GRAPH SHOWING YEARLY VARIATION IN THE COMBINED DISCHARGE OF SNAKE, GREYS, AND SALT RIVERS (STATIONS 13022500, 13023000, AND 13027500)



EXPLANATION

Major drainage-basin divide

▲ Surface water sampling site

MILLEQUIVALENTS PER LITRE

Na+K, Mg, Ca; Cl, $NO_3$, F; $SO_4$; $HCO_3+CO_3$

1860 — Instantaneous discharge (*daily mean discharge), in cubic feet per second

7/21 1965 — Month, day, and year sample was collected

13019500 — Site number

Composition of water

| Maximum | | Minimum |
|---|---|---|
| <250 | 751-1000 | <100 |
| 250-500 | 1001-2000 | 101-250 |
| 501-750 | | 251-500 |

Range in dissolved solids, in milligrams per litre, in areas where there are few or no sampling sites, the ranges of dissolved solids were estimated; data should be used with discretion.

Base from U.S. Geological Survey, 1967

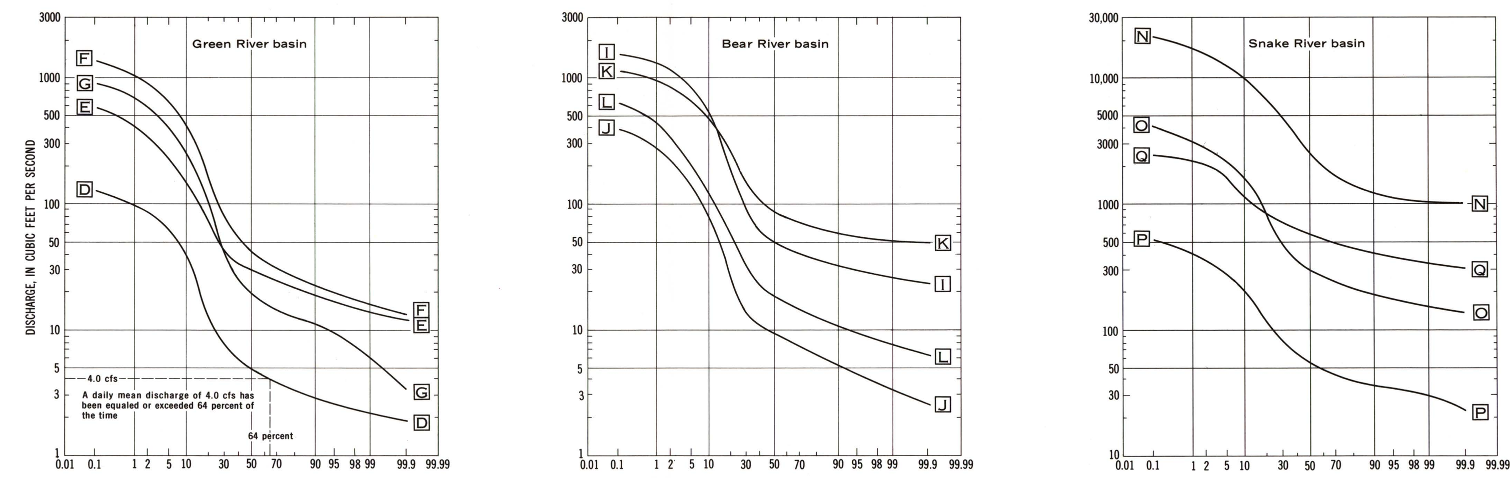
Hydrology by G. C. Lines, 1972; adapted in part from Waddell and Price (1972)

SCALE 1:500 000

MAP SHOWING RANGE IN TOTAL DISSOLVED SOLIDS AND COMPOSITION OF SURFACE WATER

### FLOW DURATION

Flow-duration curves show the distribution of flow during the period of record. The slope of a flow-duration curve gives an indication of the hydrologic characteristics of a drainage basin. The curves illustrated all have moderate slopes at their upper ends, which indicate peak flows of the streams are caused by snowmelt. As previously mentioned, little information is available for the nonmountainous streams in the Fossil Syncline. Streams originating in this area of low precipitation and relatively low basin altitude are generally ephemeral and flow only in response to snowmelt or infrequent rains. A stream of this type would have a flow-duration curve with a steep slope throughout its range of discharge. Flat slopes in the medium- and low-flow parts of flow-duration curves for unregulated streams indicate streams whose flows are sustained by ground-water discharge. Examples of this sustained flow are E, Fontenelle Creek (station 09210500); K, Smiths Fork (station 10032000); and P, Swift Creek (station 13025000).




DURATION CURVES OF DAILY FLOW AT SELECTED SITES IN THE GREEN RIVER, BEAR RIVER, AND SNAKE RIVER BASINS

## CHEMICAL QUALITY

The chemical quality of surface water varies considerably throughout the thrust belt as indicated by the bar graphs on the map. Where data are available, more than one bar graph is shown at a sampling site to show the quality of water during different periods of the year. Water in the upper reaches of streams that originate in the mountains is a calcium bicarbonate type and is low in dissolved solids. (See 13018300, Cache Creek near Jackson; 10032000, Smiths Fork near Border; and 10014100, Bear River above Sulphur Creek, near Evanston.) The chemical quality of water in these mountain streams is relatively constant throughout the year.

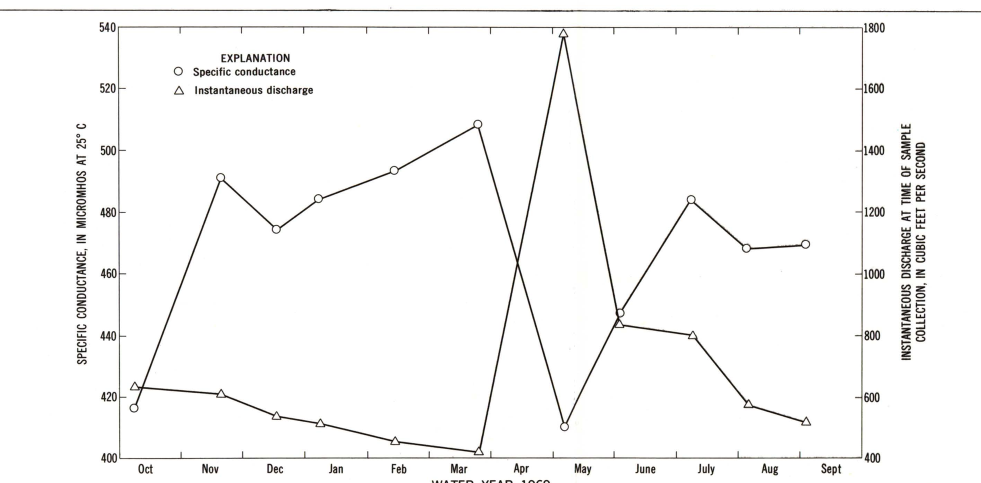
Water in streams that drain the Fossil Syncline in the southern part of the area contains larger concentrations of magnesium, sodium, sulfate, and chloride than water in mountain streams. Tertiary rocks that underlie the Fossil Syncline contain few evaporite deposits; however, because of the low precipitation, high rates of evapotranspiration, and poor drainage, the salts generally accumulate in the soil and along the banks of streams. The salts are flushed into the streams during periods of high runoff.

Water in Thomas Fork near the Wyoming-Idaho State line (10041000) is a sodium chloride or sodium bicarbonate chloride type during periods of low and intermediate streamflow. Much of the Thomas Fork drainage basin is underlain by the Preuss Redbeds, which contain halite or rock salt (NaCl). Water from springs that issue from the Preuss is a sodium chloride or sodium chloride bicarbonate type.

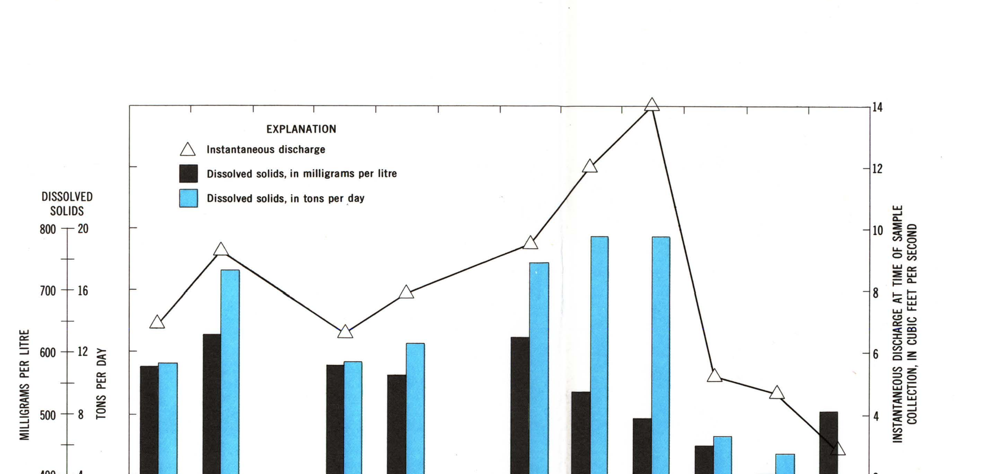
The areal range in concentration of dissolved solids in surface water is shown on the map. At sampling sites, the concentration of dissolved solids is usually inversely related to stream discharge. This relation is illustrated for the Salt River above reservoir, near Etna (13027500). When the discharge of the Salt River is largest, most of the water is derived from snowmelt and the water has a low specific conductance (low concentration of dissolved solids). When the river's discharge is small, most of the water is derived from springs and return flow from irrigation, and the water has a higher specific conductance (higher concentration of dissolved solids). During most of the year in the Twin Creek drainage, the relation of stream discharge to concentration of dissolved solids deviates from the typical inverse relation that occurs elsewhere. As shown in the illustration for Twin Creek at Sage (10027000), the concentration of dissolved solids is directly related to stream discharge during most of the year. During the period of high snowmelt in April, May, and June, the concentration of dissolved solids decreases because of dilution, but the total load of salts flushed from the Twin Creek basin increases.

Most surface water in the thrust belt has concentrations of individual dissolved constituents that are less than the maximum levels recommended by the U.S. Public Health Service (1962, p. 7 and 8) for drinking water. Much of the time, however, one or more dissolved constituents exceeds the recommended limits in reaches of Muddy, Little Muddy, and Twin Creeks and Thomas Fork. Water-quality criteria for industrial use varies considerably, depending upon use; however, water that is suitable for drinking water is also suitable for many industrial uses. Extremes of dissolved solids, hardness, alkalinity, and pH at selected sampling sites are listed in the adjacent table. All surface water in the area is rated as good to fair (usable) for livestock use based on a classification by Beath and others (1953, p. 86). Using the classification developed by the U.S. Salinity Laboratory Staff (1954, p. 75–82) for evaluating irrigation water, most surface water in the area has a low to medium salinity hazard and a low sodium (alkali) hazard. However, during periods of high flow on Little Muddy Creek and periods of low flow on Thomas Fork, the waters have high to very high salinity hazards.

Few sediment data have been collected in the area to date (1973), and additional sediment-sampling sites should be established in the Fossil Syncline and western Green River basin. Although many of the streams that drain these two areas are ephemeral, they probably transport large loads of sediment during the snowmelt period and after thunderstorms.




GRAPH SHOWING SPECIFIC CONDUCTANCE OF WATER AND DISCHARGE OF SALT RIVER ABOVE RESERVOIR, NEAR ETNA, WYOMING (13027500)




GRAPH SHOWING RELATION OF STREAM DISCHARGE TO CONCENTRATION AND LOAD OF DISSOLVED SOLIDS AT TWIN CREEK AT SAGE (10027000)

EXTREMES OF DISSOLVED SOLIDS, HARDNESS, ALKALINITY, PH, AND SODIUM-ADSORPTION RATIO MEASURED AT SELECTED SURFACE-WATER SITES THROUGH 1970

[Frequency of sampling: I, irregularly; M, monthly; D, daily]

| Site No. | Site name | Frequency of sampling, water year, and (number of analyses) | Dissolved solids Min. | Dissolved solids Max. | Hardness as $CaCO_3$ Min. | Hardness as $CaCO_3$ Max. | Alkalinity as $CaCO_3$ Min. | Alkalinity as $CaCO_3$ Max. | pH Min. | pH Max. | Sodium-adsorption ratio Min. | Sodium-adsorption ratio Max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 09208500 | La Barge Creek near Viola | I, 47(2), 58(3) | 181 | 326 | 154 | 254 | 126 | 197 | 7.4 | 8.3 | 0.1 | 0.5 |
| 09210500 | Fontenelle Creek near Herschler Ranch, near Fontenelle | I, 58(3) | 1 180 | 1 250 | 144 | 221 | 134 | 185 | 7.6 | 7.8 | .2 | .4 |
| 09218500 | Blacks Fork near Millburne | I, 39(1), 41(1), 58(3), 69(1), 70(2) | 58 | 122 | 50 | 86 | 49 | 74 | 7.3 | 7.9 | .1 | .2 |
| 09222150 | Muddy Creek near Leroy | I, 57(1), 58(3) | 158 | 740 | 138 | 336 | 135 | 317 | 7.9 | 8.1 | .2 | 3.4 |
| 09222220 | Little Muddy Creek above Albert Creek, near Brilliant | I, 58(3) | 454 | 1,390 | 298 | 840 | 190 | 382 | 7.9 | 8.0 | 1.3 | 2.4 |
| 09223500 | Hams Fork near Frontier | I, 58(3) | 184 | 1 300 | 163 | 512 | 122 | 148 | 7.9 | 8.2 | .1 | .2 |
| 10014100 | Bear River at State Highway 150, near Evanston 2 | I, 68(3) | 126 | 1 190 | 114 | 172 | 109 | 169 | 7.5 | 7.8 | --- | .1 |
| 10015700 | Sulphur Creek above reservoir, near Evanston | I, 68(3) | 236 | 346 | 208 | 290 | 194 | 289 | 7.9 | 8.0 | .3 | 1.0 |
| 10018400 | Yellow Creek below diversion, near Evanston | I, 68(3) | 350 | 450 | 260 | 320 | 223 | 317 | 7.8 | 8.1 | .4 | .9 |
| 10019000 | Bear River near Evanston | I, 68(3) | 178 | 289 | 156 | 250 | 144 | 243 | 7.7 | 8.1 | .2 | .5 |
| 10020100 | Bear River above reservoir, near Woodruff, Utah | M, 69(11), 70(9) | 104 | 324 | 94 | 260 | 89 | 250 | 7.2 | 8.6 | .2 | 1.2 |
| 10020300 | Bear River below reservoir, near Woodruff, Utah | I, 65(1), 68(3), 70(3) | 132 | 279 | 118 | 228 | 116 | 213 | 7.4 | 8.4 | .2 | .8 |
| 10027000 | Twin Creek at Sage | I, 67(1); M, 68(10), 69(7) | 400 | 641 | 284 | 420 | 162 | 255 | 7.3 | 8.3 | .7 | 1.4 |
| 10028500 | Bear River below Pixley Dam, near Cokeville | I, 65(1), 67(1), 68(2) | 104 | 507 | 94 | 336 | 89 | 312 | 7.3 | 8.6 | .1 | 1.4 |
| 10032000 | Smiths Fork near Border | I, 66(1), 67(1), 68(3) | 200 | 220 | 182 | 208 | 145 | 157 | 7.6 | 8.2 | --- | .1 |
| 10039500 | Bear River at Border | D, 66, 67, 68, 69, 70 | 219 | 538 | 159 | 330 | 125 | 280 | 7.3 | 8.5 | .4 | 1.5 |
| 10041000 | Thomas Fork near Wyoming-Idaho State line | I, 66(1), 67(1), 68(3), 70(3) | 350 | 821 | 190 | 276 | 184 | 218 | 7.8 | 8.4 | 1.4 | 5.4 |
| 13018300 | Cache Creek near Jackson | I, 65(3); M, 66(11), 67(7), 68(10), 69(12), 70(12) | 136 | 232 | 134 | 194 | 131 | 187 | 7.6 | 8.6 | .0 | .2 |
| 13022500 | Snake River above reservoir, near Alpine | I, 65(2); D, 66; M, 67(12), 68(10), 69(11), 70(11) | 120 | 248 | 90 | 198 | 78 | 130 | 6.8 | 8.4 | .2 | .5 |
| 13027500 | Salt River above reservoir, near Etna | D, 66; M, 67(12), 68(11), 69(11), 70(11) | 217 | 320 | 179 | 251 | 157 | 210 | 7.3 | 8.4 | .1 | .8 |

1 Estimated from specific conductance.
2 Prior to 1973, published as Bear River above Sulphur Creek, near Evanston.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1975

Interior—Geological Survey, Reston, Va.—1975