STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES

Technical Publication No. 76

RECONNAISSANCE OF THE QUALITY OF SURFACE WATER IN THE WEBER RIVER BASIN, UTAH

by

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Prepared by
the United States Geological Survey
in cooperation with the
Utah Department of Natural Resources,
Division of Water Rights

1983

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CONVERSION FACTORS

Most values in this report are given in inch-pound units followed by metric units in parentheses. The conversion factors are shown to four significant figures. In the text, however, the metric equivalents are shown only to the number of significant figures consistent with the accuracy of the value in inch-pound units.

Multiply inch-pound unit	By	To obtain metric unit
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3)
foot (ft)	0.3048	meter (m)
inch (in.)	25.40	milliliter (mm)
micromhos per centimeter (μmho/cm)	1.000	microsiemens per centimeter (S/cm)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
ton per day	0.9072	megagram per day (Mg/d)

Chemical concentration and water temperature are given only in metric units. Chemical concentration is given in milligrams per liter (mg/L) or micrograms per liter (μg/L). Milligrams per liter is a unit expressing the concentration of chemical constituents in solution as weight (milligrams) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter. For concentrations less than 7,000 mg/L, the numerical value is about the same as for concentrations in parts per million.

Chemical concentration in terms of ionic interacting values is given in milliequivalents per liter (meq/L). Milliequivalents per liter is numerically equal to equivalents per million.

Water temperature is given in degrees Celsius (°C), which can be converted to degrees Fahrenheit (°F) by the following equation: $°F=1.8(°C)+32$.

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ABSTRACT

This reconnaissance of the quality of surface water in the Weber River basin encompassed an area of 2,080 square miles (5,390 square kilometers). Elevations in the basin range from 4,210 to 11,708 feet (1,280 to 3,568 meters). Data were obtained by the U.S. Geological Survey one or more times at 107 sites in the basin from July 1979 to August 1980.

The water-distribution system on the Weber River is well developed. Numerous irrigation diversions greatly decrease the flow of the river at several locations in the basin. Major reservoirs having a total usable capacity of 518,020 acre-feet (639 cubic hectometers) are used principally for irrigation and some recreation. The largest consumptive use of water in the basin is irrigation.

The principal factors that affect water quality in the Weber River are tributary inflow from both surface- and ground-water sources, irrigation-return flow, and reservoir storage. Dissolved-solids concentrations in the Weber River during winter base-flow periods generally are slightly increased and they fluctuate little except near the mouth of the river. During the spring-runoff periods, water typically has the least dissolved-solids concentrations. Local exceptions are at sites affected by releases from Rockport and Echo Reservoirs. During the summer irrigation period, the river is affected by large diversions for irrigation. Dissolved-solids concentrations tend to increase in a downstream direction, primarily due to both surface and subsurface irrigation-return flow. Transpiration and evaporation cause minor increases in the dissolved-solids concentrations of the river.

From the headwaters of the Weber River to Echo Reservoirs dissolved-solids concentrations are small--generally less than 300 milligrams per liter. The principal water type in this reach is calcium bicarbonate. The two principal water tributaries in this reach, Beaver Creek and Chalk Creek, have dissolved-solids concentrations that generally are greater than the concentrations in the Weber River. Releases from Rockport and Echo Reservoirs may increase or decrease the dissolved-solids concentrations in the river depending on the time of the year.

Lost Creek and East Canyon Creek are the principal tributaries to the Weber River in the reach between Echo Reservoir and Gateway. Dissolved-solids concentrations in Lost Creek generally are less than the dissolved-solids concentrations in the Weber River except during the irrigation season. At times flow in the Weber River downstream from the Stoddard Diversion is

decreased greatly because of diversions into Gateway Canal. A seepage study showed a gaining stream reach from Stoddard Diversion to Gateway, however, water-quality changes in this reach of the Weber River were minor.

The reach between Gateway and the mouth of the Weber River is where the greatest change in water quality was expected to occur. The most intensive irrigation and the largest population centers are located along this reach. During the irrigation season, streamflow is decreased greatly in the vicinity of Plain City, Utah. Dissolved-solids concentrations in the downstream reaches of the Weber River begin to increase rapidly due to irrigation-return flow into the already depleted flow of the river. The increases would be more marked were it not for inflows of fresher water from the Ogden River and discharges of irrigation water directly to Great Salt Lake instead of back to the river.

INTRODUCTION

This report on the reconnaissance of surface-water quality in the Weber River basin was prepared by the U.S. Geological Survey in cooperation with the Utah Department of Natural Resources, Division of Water Rights. The purposes of the reconnaissance were: (1) To obtain information on the general inorganic chemical characteristics of the surface water throughout the Weber River basin and, (2) to determine some of the effects of the natural environment and of present water use on these chemical characteristics.

The reconnaissance was limited in scope and did not include intensive study of the effects of municipal sewage, irrigation, industry, or mining on water quality. The principal objective was to define the general water-quality characteristics of streams in the basin. A secondary objective was to define specific problem areas or stream reaches.

Previous Investigations and Acknowledgments

Although considerable surface-water quality data have been collected by the U.S. Geological Survey, the U.S. Bureau of Reclamation, and other agencies, there has been little interpretation of those data. A study was conducted under the U.S Environmental Protection Agency-sponsored 303(e) Basin Planning Program (Utah State Division of Health, 1975) to identify water-quality problems in the Weber River basin. That study included those parts of the basin in Davis, Morgan, and Weber Counties. Another study was conducted under the Environmental Protection Agency 208 waste water management plan (Mountainland Association of Governments, 1977). That study included the upstream part of the Weber River basin in Summit County. In addition to the above-cited studies, a study was made of the effect of pollution on the Weber River (Smith, 1959). The Water Commissioner for the Weber River, E. Blaine Johnson, gave the author valuable assistance in identifying various canal diversions in the basin. His assistance is appreciated.

Methods of Investigation

This reconnaissance of the Weber River basin was designed primarily to define, seasonally, the general chemical quality of the water in streams. Data were collected during short periods of relatively stable-flow conditions. Water-quality data were collected one or more times by the U.S. Geological Survey at 107 sites in the Weber River basin (pl. 1). Concentrations of

major ions and dissolved solids were determined for all samples. Concentrations of trace elements were determined semiquantitatively once at 17 sites and quantitatively at least once at 14 sites. Concentrations of pesticides in stream-bottom sediments were determined once at three sites downstream from the major irrigated areas. Chemical analyses of samples obtained for this investigation were made by the U.S. Geological Survey's central laboratory, Lakewood, Colorado.

Most of the water-discharge data used in this report were obtained by nonstandard methods using a limited number of stream cross sections for velocity and depth determinations. A fairly reliable approximation of discharge ($\pm$10 percent) was regarded as adequate for this reconnaissance.

Water-quality data obtained specifically for this report and water-quality data obtained as part of the U.S. Geological Survey streamflow-gaging program during September 1979 through August 1980 are presented in table 7. A summary of these data is presented in table 1.

Numbering System for Water-Quality Sampling Sites

Most of the data sites visited during this reconnaissance are numbered sequentially in an upstream order. This numbering system simplifies referencing in the text and tables. The sites also are assigned a location number along with a name, such as "Weber River at Gateway above powerplant at bridge at (A-5-1)27cda," to specifically locate sites in the Weber River basin. This system of numbering sites is based on the cadastral land-survey system of the U.S. Government. The number describes the position of the site in the land net. The land-survey system divides the State into four quadrants by the Salt Lake baseline and meridian. These quadrants are designated by the uppercase letters A, B, C, and D, indicating the northeast, northwest, southwest, and southeast quadrants, respectively. The township and range are designated by the numbers following the quadrant letter, and all are enclosed in parentheses. The number following the parentheses indicates the section and is followed by three letters indicating the quarter section, the quarter-quarter section, and the quarter-quarter-quarter section, respectively. The letter a represents the northeast quarter; b, the northwest quarter; c, the southwest quarter; and d, the southeast quarter of each subdivision. For example, (A-5-1)27cda designates a site in the NE¼SE¼SW¼ sec. 27, T. 5 N., R. 1 E. This numbering system is illustrated in figure 1.

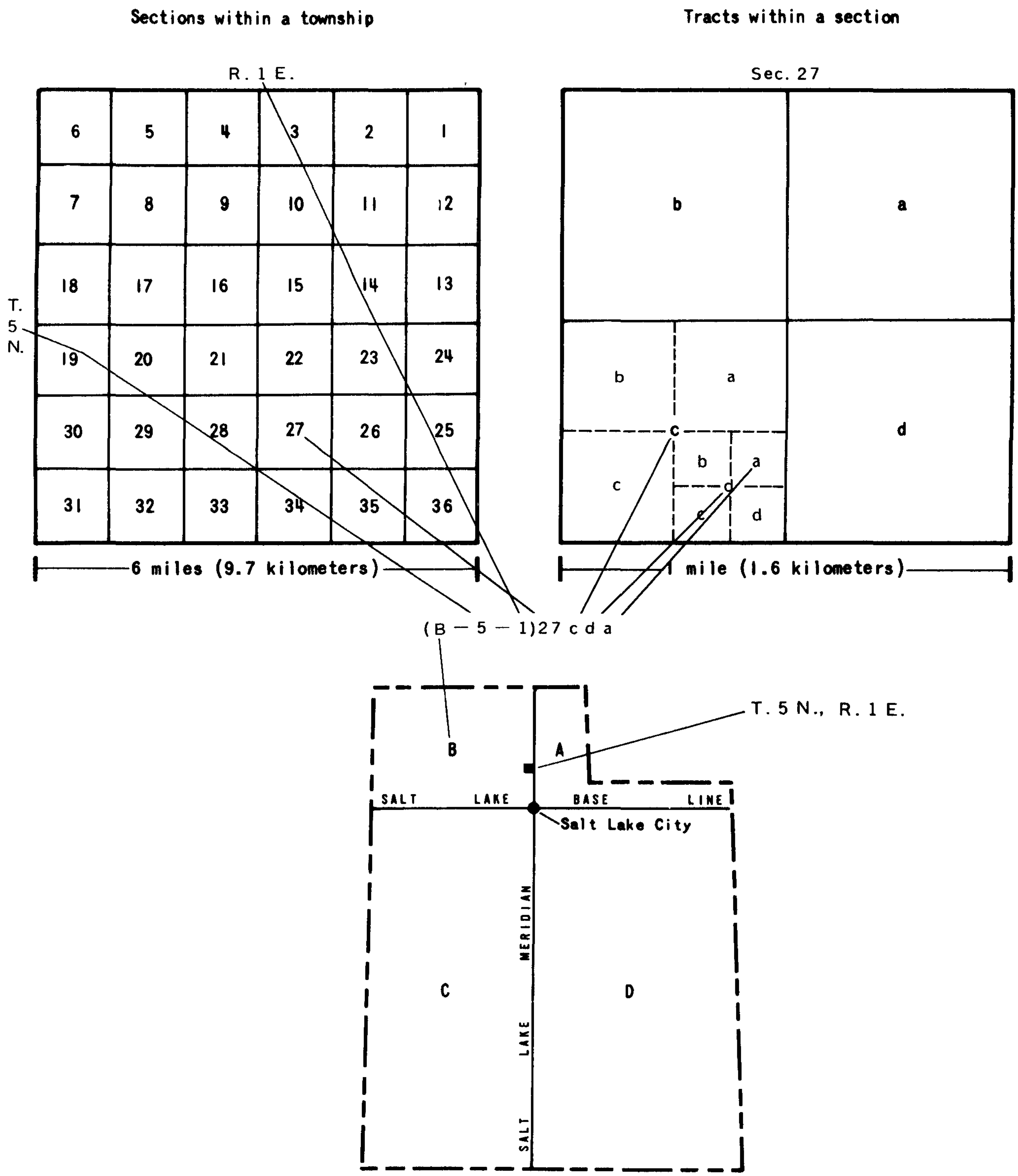


Figure 1.—Numbering system for data sites.

Classification of Water for Public Supply and Irrigation

"The National Interim Primary Drinking Water Regulations * * * were promulgated on December 24, 1975, in accordance with the provisions of the Safe Drinking Water Act (Public Law 93-523) * * * These regulations become effective on June 24, 1977, and become in essence the standards by which all public drinking water supplies are judged" (U.S. Environmental Protection Agency, 1976, preface). The following table lists maximum contaminant levels for inorganic chemicals other than fluoride. The term "maximum contaminant level" is defined as the "maximum permissible level of a contaminant in water which is delivered to the free flowing outlet of the ultimate user of a public water system" (U.S. Environmental Protection Agency, 1976, p. 5).

Contaminant	Level, in milligrams per liter
Arsenic	0.05
Barium	1.0
Cadmium	.010
Chromium	.05
Lead	.05
Mercury	.002
Nitrate (as N)	10.0
Selenium	.01
Silver	.05

When the annual average of the maximum daily air temperatures for the location in which the community water system is situated is the following, the maximum contaminant levels (approval limits) and other recommended control limits for fluoride are (U.S. Environmental Protection Agency, 1976, p. 5):

Temperature		
Degrees Fahrenheit	Degrees Celsius	Approval limit (milligrams per liter)
53.7 and less	12.0 and less	2.4
53.8 to 58.3	12.1 to 14.6	2.2
58.4 to 63.8	14.7 to 17.6	2.0
63.9 to 70.6	17.7 to 21.4	1.8
70.7 to 79.2	21.5 to 26.2	1.6
79.3 to 90.5	26.3 to 32.5	1.4

The hardness of water is conventionally expressed in all water analyses made in the United States in terms of an equivalent quantity of calcium carbonate ($CaCO_3$). Some such convention is needed for hardness because this is a property imparted by several different cations, which may be present in varying proportions. However, the actual presence of the indicated number of milligrams per liter in the form of $CaCO_3$ certainly should not be assumed (Hem, 1970, p. 84).

In practical water analysis, the hardness is computed by multiplying the sum of milliequivalents per liter of calcium and magnesium by 50. The hardness value resulting generally is entitled "hardness as $CaCO_3$"..... or "total hardness." If the hardness exceeds the alkalinity (in milligrams per liter of $CaCO_3$ or other equivalent units), the excess is termed "noncarbonate hardness"..... (Hem, 1970, p. 224-225).

Durfor and Becker (1964, p. 27) use the following classification for hardness:

Hardness range (milligrams per liter of $CaCO_3$)	Description
0-60	Soft
61-120	Moderately hard
121-180	Hard
More than 180	Very hard

A classification for the dissolved-solids hazard in irrigation waters has been prepared by the U.S. Environmental Protection Agency (1977, table 16). This classification is shown below:

Dissolved-solids concentration, in milligrams per liter	Effects or limitation
Less than 500	Usually none
500 - 1,000	Can be detrimental to some sensitive crops
1,000 - 2,000	May have adverse effects on many crops and requires careful management
2,000 - 5,000	Can be used for tolerant plants on permeable soils; requires careful management practices

The salinity and sodium hazards of water used for irrigation were classified using a diagram developed by the U.S. Salinity Laboratory Staff (1954, p. 80). The assumption is made that the water will be used under average conditions. If a large deviation from average conditions occurred, water could become unsafe for use even though under average conditions the use of the same water would be considered safe. (See table 1.)

The terms "salinity" and "dissolved solids" commonly are used synonymously. Classifications for both dissolved solids and salinity are used for comparative purposes.

Because the occurrence of boron may be a limiting factor in certain irrigation waters, it is necessary to consider this element in assessing water quality. The National Academy of Science and National Academy of Engineering, 1973 (p. 341) recommends a maximum concentration of 750 micrograms per liter of boron for the most boron-sensitive plants.

To provide a basis of judgment, other than regulatory use, for several programs that are associated with water quality the U.S. Environmental Protection Agency developed a group of quality criteria for water. The following is a list of selected recommended limits (U.S. Environmental Protection Agency, 1977):

Constituent	Concentration	
	Milligrams per liter	Micrograms per liter
Beryllium	--	100
Chlorides (dissolved solids)	250	--
Copper	--	1,000
Dissolved oxygen	5	--
Iron	--	300
Manganese	--	50
Sulfates (dissolved solids)	250	--

Water types have been characterized in this report using a system developed by Davis and DeWiest (1966, p. 119). Major ions present in amounts less than 20 percent of the total milliequivalents per liter of cations or anions are not used to name the water type. If any ion represents more than 60 percent of the total milliequivalents per liter of either cations or anions this ion is used alone to represent the dominant ion type. In mixed water-types, ions present in greater than 20 percent but less than 60 percent of the cations or anions are listed in the order of their abundance. For example, water at site 61 on August 1, 1979 contained cations equal to 63 percent calcium, 22 percent magnesium, 1 percent potassium, and 14 percent sodium, and anions equal to 58 percent bicarbonate, 28 percent sulfate, and 14 percent chloride. This water was of the calcium bicarbonate sulfate type.

PHYSICAL AND HYDROLOGIC SETTING

The Weber River basin, in Morgan, Weber, Davis, and Summit Counties in northern Utah, has a total drainage area of about 2,080 square miles (5,390 km^2). The river heads in the Uinta Mountains and generally flows northwestward through the Wasatch Range to where it enters the Wasatch Front near Ogden, Utah (pl. 1). About 9 miles (14 km) west of Ogden, the river flows into the Great Salt Lake, which is very saline and has no outlets.

Elevations in the Weber River basin range from about 4,210 feet (1,280 m) at the mouth of the Weber River at the Ogden Bay Waterfowl Management Area dikes west of Ogden to 11,708 feet (3,568 m) at Reids Peak near the headwaters of the Weber River. There are five major tributaries to the Weber River--Ogden River and East Canyon, Lost, Chalk, and Beaver Creeks. The Ogden River is the largest tributary, with a drainage area of about 360 square miles (930 km^2). In addition there are numerous small tributaries to the Weber River, some of which flow only during the spring and early summer.

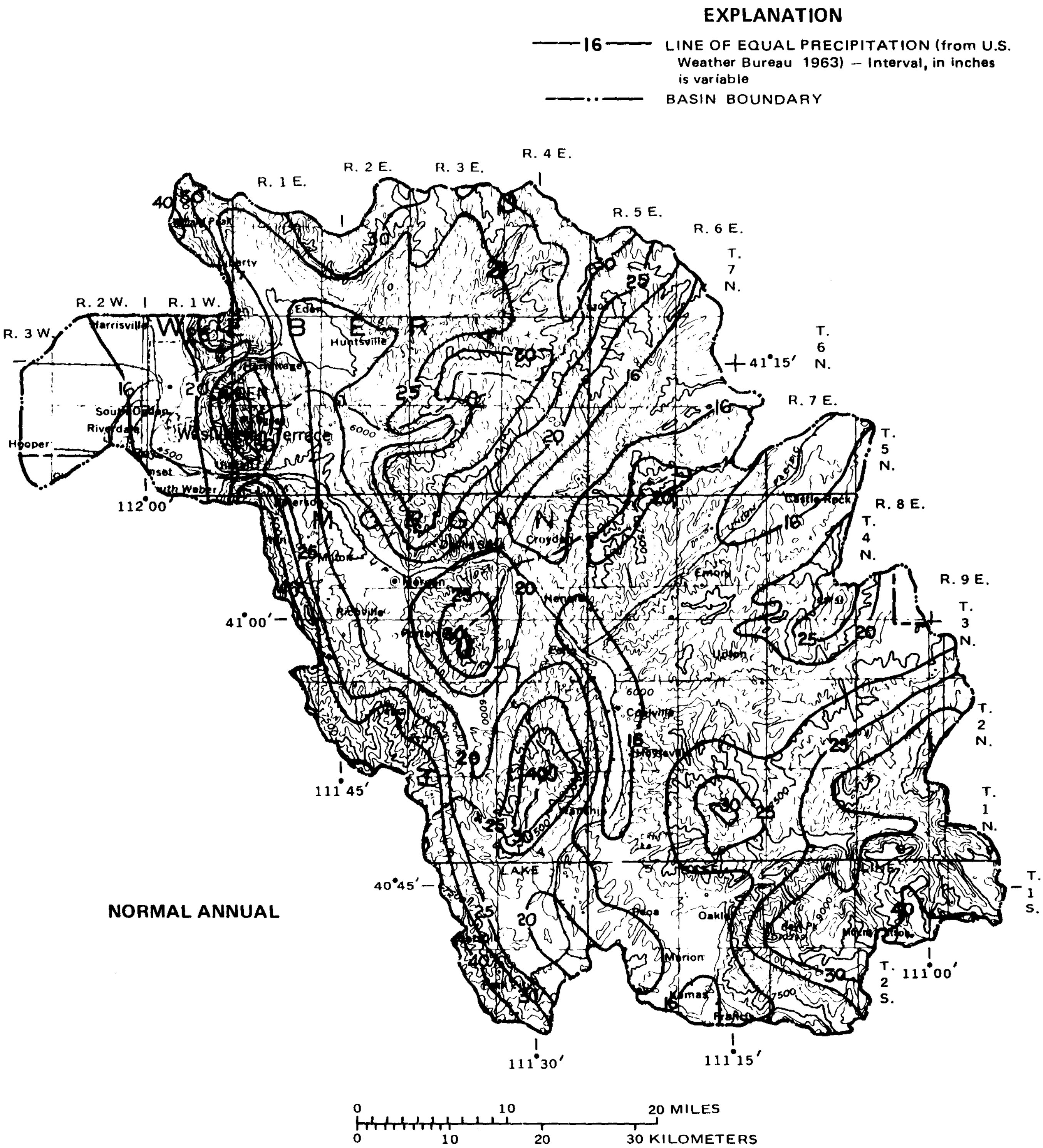
Normal annual precipitation for 1931-60 (fig. 2) ranged from 16 inches (406 mm) near the mouth of the Weber River and in some mountain valleys to 40 inches (1,016 mm) in the higher elevations of the Wasatch Range (U.S. Weather Bureau, 1963). In the higher elevations most of the October-April precipitation (fig. 2) falls as snow. Total annual precipitation during the study was less than normal during 1979 and greater than normal during 1980. During 1979, precipitation ranged from 5 percent less than normal at Riverdale near Ogden to 35 percent less than normal at Heber, about 12 miles (19 km) south of Kamas. During 1980, precipitation ranged from 49 percent greater than normal at Heber to 65 percent greater than normal at Riverdale.

During the 1979 water year, mean discharges at two long-term streamflow gaging stations in the basin ranged from -25 to -41 percent of the long-term average. The mean discharges at these stations during the 1980 water year ranged from -3 to +152 percent of the long-term average.

Water Development and Irrigation

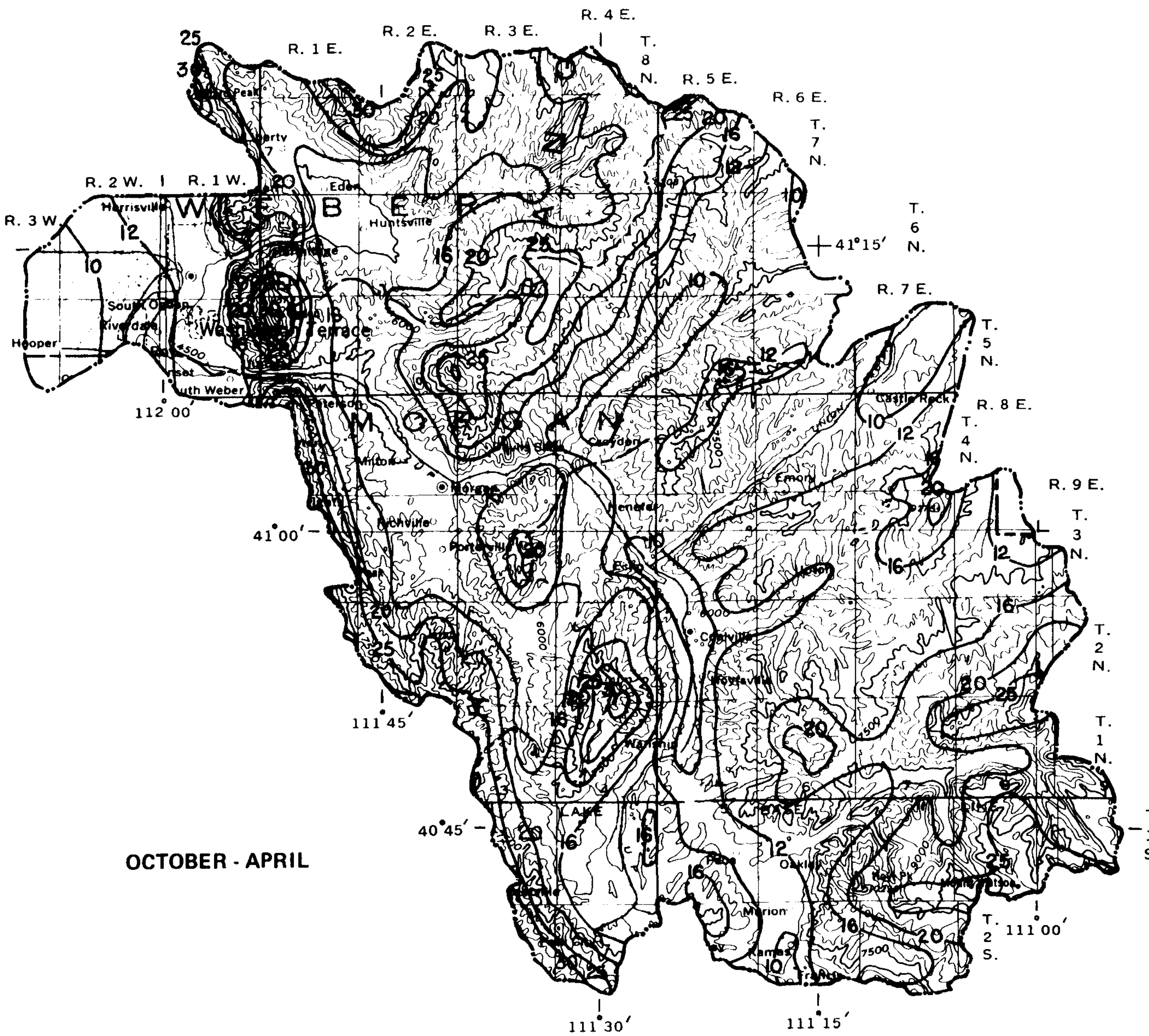
The water distribution system on the Weber River is well developed. During the irrigation season, flow in the river is greatly reduced at several locations due to irrigation diversions. The principal diversions are:

Canal or diversion	Capacity: Cubic feet per second	Capacity: Cubic meter per second	Remarks
Weber-Provo Canal	950	27	Diverts water from the Weber River near Oakley to the Provo River. (See site 85.)
Stoddard Diversion into Gateway Canal	700	20	Diverts water from the Weber River downstream from Morgan for irrigation and municipal use, and for one small electrical powerplant; some of the water reaches the Wasatch Front near Ogden through the Gateway tunnel where it is eventually used for pressure irrigation and municipal use. (See sites 54, 53, and 38.)
Weber-Davis Canal	300	8.5	Diverts water from the Weber River downstream from Utah Power & Light Co.'s Gateway powerplant for irrigation in Weber and Davis Counties. (See site 35.)
South Weber Canal	30-50	0.8-1.4	Diverts water from the Weber River at the mouth of Weber Canyon for irrigation in Davis County. (See site 34.)
Wilson Canal	80	2.3	Diverts water from the Weber River near the Union Stockyards for irrigation in Weber County. (See site 26.)
Slaterville Diversion			Diverts water from the Weber River near Slaterville into Willard and Layton Intake Canals (described below).
Willard Canal	900	25	Diverts water into Willard Bay (located 6 miles north of Plain City), an off-stream reservoir. During droughts, water can be pumped 300 cubic feet per second (9.9 cubic meters per second) back up Willard Canal for redistribution at the Slaterville Diversion. (See sites 17 and 20.)
Layton Intake Canal	350	9.9	Water can be pumped 200 cubic feet per second (5.7 cubic meters per second) from the Layton Intake Canal to the Wasatch Front area of Davis County for irrigation. Water also can be diverted from the Layton Intake Canal into Hooper Canal, capacity 175 cubic feet per second (5 cubic meters per second), for irrigation in Weber County. (See site 19.)
Warren Canal	90	2.5	Diverts water from the Weber River near Highway 84 for irrigation in Weber County. (See site 15.)



Base from U.S. Geological Survey 1:250,000 quadrangles:
Salt Lake City, Utah, Wyoming, 1954 (revised 1970);
Ogden, Utah, Wyoming, 1954 (limited revision 1966);
Brigham City, Utah, Idaho, 1954 (revised 1970)

Figure 2.—Normal annual precipitation and normal October-April precipitation (1931-60).



Isohyetal analysis prepared by the Water Supply Forecast Unit and Office of State Climatologist, U.S. Weather Bureau, Salt Lake City, Utah, using adjusted climatological data and values derived by correlation with physiographic factors

Figure 2.—Continued

Seven major reservoirs in the study were built primarily for storage of water for irrigation and some recreational use. These reservoirs are listed below:

Reservoir	Drainage basin	Usable capacity, in acre-feet
Causey	South Fork Ogden River	6,870
East Canyon	East Canyon Creek	48,110
Echo	Weber River	73,940
Lost Creek	Lost Creek	20,040
Pineview	Ogden River	110,000
Rockport	Weber River	60,860
Willard Bay[1]	Weber River	198,200
Total		518,020

[1]Off-stream reservoir, located 6 miles north of Plain City.

General Geology

Rocks exposed in the Weber River basin range in age from Precambrian to Quaternary. They consist largely of conglomerates, but also include various other sedimentary rocks as well as some igneous and metamorphic rocks (pl. 2). In most parts of the basin the rocks have been complexly folded and faulted, and in some areas they contain economic ore deposits.

The Precambrian rocks in the headwater areas of the Weber River basin consist chiefly of quartzite, which contributes relatively little to the dissolved-solids concentration of the streamflow. The Tertiary and Cretaceous rocks are widely exposed in the central part of the basin. They include shale and siltstone strata, which contain large amounts of readily soluble minerals and, therefore, probably comprise the most important geologic source of dissolved solids in the streamflow. The dissolved solids are carried to the streams by influent ground water. The Tertiary and Cretaceous rocks also include considerable amounts of easily eroded tuffaceous material. Consequently, they probably are the most important natural source of fluvial sediment in the basin.

Several fault-related saline springs occur in the Morgan and Ogden areas. Some of the discharge from those springs directly or indirectly reach the Weber River; however, this discharge has very little effect on the chemical quality of the streamflow.

Population and Land Use

Most people in the Weber River basin reside in the Ogden area near the mouth of the Weber River. Ogden, which is a major railroad terminal, is the fourth largest city in Utah with a population of 64,444, according to the 1980 census.

The largest uses of land in the basin are for agriculture, forestry, and recreation; the largest consumptive use of water is for agriculture. Population, according to the 1980 census, and principal land use (Haws, 1970; Lee, 1979, p. 14) are shown below:

		Land use, in acres				
County	Population	Cropland	Pasture	Range	Forest	Industry
Weber	143,170	48,353	1,770	117,803	86,346	1,910
Morgan	4,914	18,736	5,212	192,045	148,087	154
Summit	10,227	43,857	1,718	284,292	292,359	267

GENERAL CHEMICAL QUALITY OF THE SURFACE WATER

The principal factors that affect the water quality in the Weber River are tributary inflow from both surface- and ground-water sources, irrigation-return flow, and reservoir storage. The effect of any of these factors varies with differing locations and times in the basin. If water quality in the main stem Weber River is analyzed during three periods--winter base flow, spring runoff, and summer irrigation--certain trends become evident.

During the winter base-flow period, reservoir releases are decreased and the river is maintained principally by ground-water inflow and some overland runoff. Dissolved-solids concentrations in the Weber River generally are slightly increased and fluctuate little except near the mouth of the river as shown on plate 3B and 3C.

The transition between winter base-flow and spring runoff is shown on plate 3(D). Snowmelt begins earlier in the downstream part of the basin, decreasing dissolved-solids concentrations in this area.

During the spring-runoff period, streamflow is derived principally from snowmelt and has relatively small dissolved-solids concentrations. The largest concentrations of dissolved solids in the Weber River during this period are caused by releases of water stored in Rockport and Echo Reservoirs during the winter base-flow period. Downstream from Echo Reservoir, dissolved-solids concentrations in the river gradually decrease, as shown on plate 3E, due to tributary inflow of fresher water. Near the mouth of the river, irrigation-return flows such as Hooper Slough (site 5) increase the dissolved-solids concentration of the remaining waters in the river. Sites 1-4 are located at diversion structures for the Ogden Bay Waterfowl Management Area and represent the mouth of the Weber River.

During the summer-irrigation period, discharge of the Weber River is affected largely by irrigation diversions. These numerous diversions dramatically decrease the flow in the river at several locations. Dissolved-solids concentrations tend to increase in a downstream direction primarily due to both surface and subsurface irrigation-return flows. These return flows are the major sources of dissolved solids during the summer. Inflow from the Ogden River interrupts this trend and decreases the dissolved-solids concentration in the Weber River by dilution. The available data indicate that transpiration and evaporation along water courses cause minor increases in the dissolved-solids concentration of the river. It is beyond the scope of this project to quantify this relationship. To better discuss the quality of surface water in the Weber River basin, the basin has been divided into four areas and each area is discussed separately.

Headwaters of the Weber River to Echo Reservoir

Elevations in this area range from 5,560 feet (1,695 m) at Echo Reservoir to 11,708 feet (3,568 m) at Reids Peak near the headwaters of the Weber River (pl. 1). Water at the headwaters of the Weber River (site 95) is derived principally from snowmelt. Streamflow was principally a calcium magnesium bicarbonate type, having small concentrations of dissolved solids. A water sample collected on August 3, 1979, at site 95 had a dissolved-solids concentration of 14 milligrams per liter.

Two of the larger tributaries between the headwaters of the Weber River and the Weber River near Oakley (site 92) also were sampled. Smith and Morehouse Creek (site 94), sampled once during high-flow and once during low-flow conditions, had a dissolved-solids range of 52 to 97 milligrams per liter. This was slightly less than the dissolved-solids concentration of the Weber River upstream from Smith and Morehouse Creek (site 93), which ranged from 100 to 114 milligrams per liter during the same period. The South Fork of the Weber River at its mouth (site 92.5) also was sampled once during high-flow and once during low-flow periods. Dissolved-solids concentrations determined from these two samples were 146 milligrams per liter during high flow and 168 milligrams per liter during low flow, which is significantly larger than for the Weber River at site 93.

Dissolved-solids concentrations of the Weber River near Oakley (site 92) were determined six times and ranged from 108 to 175 milligrams per liter. The water was a calcium bicarbonate type. (See table 1 and pls. 4 and 5.)

Water that is diverted from the Weber River basin to the Provo River basin by the Weber-Provo Diversion Canal (site 89) is characteristically a calcium bicarbonate type having small concentrations of dissolved solids. Small amounts of good quality water are diverted from the Provo River into the Weber River basin through an unnamed canal (table 7, site 90). Some of this water may reach the Weber River as irrigation-return flow.

At times, during the irrigation season, streamflow is almost entirely diverted from the Weber River in the vicinity of Oakley. During these times, tributary inflow, ground-water inflow, and irrigation-return flow re-establish the flow in the river downstream from Oakley. Beaver Creek is the largest tributary in this reach and enters the Weber River downstream from Oakley. Water is diverted at many locations along Beaver Creek, including one that can divert Beaver Creek water into the Weber-Provo Diversion Canal at Kamas. Dissolved-solids concentrations of six samples from Beaver Creek near its mouth (site 87) ranged from 81 to 280 milligrams per liter. The water was a calcium bicarbonate type. The salinity hazard ranged from low to medium and the sodium hazard was low. Dissolved-solids concentrations in the Weber River at site 83 upstream from Beaver Creek typically were smaller than they were in Beaver Creek at site 87. (See table 1.) The only exception was during spring runoff when samples collected on May 13, 1980 had a dissolved-solids concentration of 81 milligrams per liter at site 87 and 112 milligrams per liter at site 83.

Rockport Reservoir, formed by Wanship Dam, near Wanship, is the first of the two principal impoundments of the Weber River in the upstream basin (pl. 1). Water is stored in this reservoir principally for irrigation. Wanship Dam [elevation 6,037 ft (1,840 m)] also includes a small hydroelectric plant. At times, releases from this reservoir have a larger dissolved-solids concentration than inflows to the reservoir. For example, during spring runoff on May 12, 1980, the Weber River upstream from Rockport Reservoir (site 81) had a dissolved-solids concentration of 136 milligrams per liter. The Weber River downstream from Rockport Reservoir (site 80) had a dissolved-solids concentration of 181 milligrams per liter or an increase of 33 percent. This increase in dissolved-solids concentration results primarily from storage of water of greater dissolved-solids concentration during summer and winter rather than from reservoir evaporation. Water samples collected at site 81 had dissolved-solids concentrations of 218 milligrams per liter on August 2, 1979, 247 milligrams per liter on February 27, 1980, and 239 milligrams per liter on April 3, 1980. Although the water derived from spring runoff eventually dilutes the water stored in Rockport Reservoir, water discharged from earlier storage has a significantly larger dissolved-solids concentration.

During some periods, inflows to the reservoir have larger dissolved-solids concentrations than the releases from the reservoir. For example, during the irrigation season on August 12, 1980, water entering the reservoir at site 81 had a dissolved-solids concentration of 241 milligrams per liter. Water discharged from the reservoir at site 80 had a dissolved-solids concentration of 133 milligrams per liter, 45 percent less than the inflow. This decrease is due principally to dilution in the reservoir by fresher spring runoff, as mentioned earlier. Because of the small size and the constant exchange of water in the reservoir, changes in water quality due to evaporation probably are minor.

Chalk Creek is a major tributary that enters the Weber River at Echo Reservoir (pl. 1). Dissolved-solids concentrations in Chalk Creek are significantly larger than in the Weber River. Concentrations ranged from 163 to 256 milligrams per liter in the Weber River at site 79; during the same period they varied from 237 to 446 milligrams per liter in Chalk Creek at site 78 (table 1). Water sampled from Chalk Creek varied from a calcium bicarbonate to a calcium magnesium bicarbonate type (pls. 4 and 5). The salinity hazard was medium to high and the sodium hazard was low (table 1).

Echo Reservoir, having an elevation of 5,560 feet (1,695 m), is about 9 miles (14.5 km) downstream from Rockport Reservoir and is the second principal impoundment of the Weber River in the upstream basin. Water is stored in this reservoir principally for irrigation. At times this reservoir, like Rockport Reservoir, causes changes in the water quality of the Weber River. Inflow to this reservoir is principally releases from Rockport Reservoir, discharge from Chalk Creek and other smaller tributaries, and some irrigation-return flow. Differences in water quality between the inflow and outflow of this reservoir principally are due to the variations of quality of the outflow from Rockport Reservoir and the discharge of Chalk Creek. Comparison of inflow at site 79 and outflow at site 76 indicates that the difference in dissolved-solids concentrations ranged from a 2-percent decrease to a 27-percent increase during the study.

Changes in water quality by evaporation from this reservoir probably are small due to the small size of the reservoir and constant exchange of water in it. During the summer of 1979, the usable reservoir contents were almost entirely depleted due to large irrigation demands resulting from less than normal rainfall in the basin.

Park City Area

Elevations in the Park City area range from about 5,700 feet (1,737 m) at East Canyon Dam to 9,998 feet (3,047 m) at Jupiter Hill near Park City. Two major drainages originate in the Park City area--Silver Creek and McLeod-Kimball-East Canyon Creek.

Silver Creek

Silver Creek originates in the upstream Park City area and empties into the Weber River near the town of Wanship. The principal tributary to Silver Creek originates in the Dority Spring area (site 73) near Park City and hereafter will be referred to as Dority Spring Creek.

The principal water type of both Silver Creek (site 72) and Dority Spring Creek (site 73) is mixed, either calcium sulfate bicarbonate or calcium bicarbonate sulfate. Dissolved-solids concentrations ranged from 331 to 519 milligrams per liter at these two sites. Concentrations ranged from 273 to 568 milligrams per liter in Silver Creek near its mouth at Wanship (site 75), where the principal water type was calcium bicarbonate sulfate.

Little change in water quality occurs between Silver Creek at Keetley Junction (site 74) and Silver Creek at Wanship (site 75). Exceptions are during periods of runoff when fresher tributary inflow dilutes the water in Silver Creek. For example, during May 12-14, 1980, Silver Creek at Keetley Junction had a dissolved-solids concentration of 513 milligrams per liter and a discharge of 10 cubic feet per second (0.3 m^3/s) whereas Silver Creek at Wanship had a dissolved-solids concentration of 273 milligrams per liter and a discharge of 67 cubic feet per second (1.9 m^3/s). The decrease in dissolved-solids concentration was 53 percent. At the same time the water type changed from calcium sulfate bicarbonate at the upstream site to calcium bicarbonate sulfate at the downstream site. The sulfate may be related to the sulfide ore-bearing rocks of the Park City mining district.

McLeod-Kimball-East Canyon Creek Drainage

The McLeod-Kimball-East Canyon Creek drainage originates as the Spiro Tunnel outflow (site 71) in Park City. Water from this system is stored in East Canyon Reservoir. East Canyon Creek empties into the Weber River downstream from the town of Morgan.

Water at site 71 was a calcium sulfate type. Dissolved-solids concentrations at this site ranged from 607 to 691 milligrams per liter. Downstream from site 71, tributary inflows of better quality water dilute the mainstem flow and change it from a calcium sulfate type to calcium bicarbonate type or a mixed calcium bicarbonate sulfate type. (See fig. 3.) The large concentrations of sulfate at site 71 may be derived from sulfide ores and from shale in the Woodside Formation of Triassic age; the Woodside reportedly yields water to the mine tunnels in the Park City area (Baker, 1970, p. 19). Dissolved-solids concentrations at site 57, which is near the mouth of East Canyon Creek, ranged from 206 to 334 milligrams per liter, 34 to 48 percent less than at site 71.

One small tributary to East Canyon Creek originates in the Parleys Park area. This tributary had an unusual water type of calcium sodium magnesium chloride bicarbonate (table 1, site 68). Cause for the unusually large concentrations of sodium and chloride could not be determined. Water from two wells in the Parleys Park area were of calcium bicarbonate or calcium sulfate bicarbonate type (Baker, 1970, p. 45) which implies that ground water is not the source of the larger concentrations of sodium and chloride. A more intensive investigation would be necessary to determine the cause of the large sodium and chloride concentrations in this tributary.

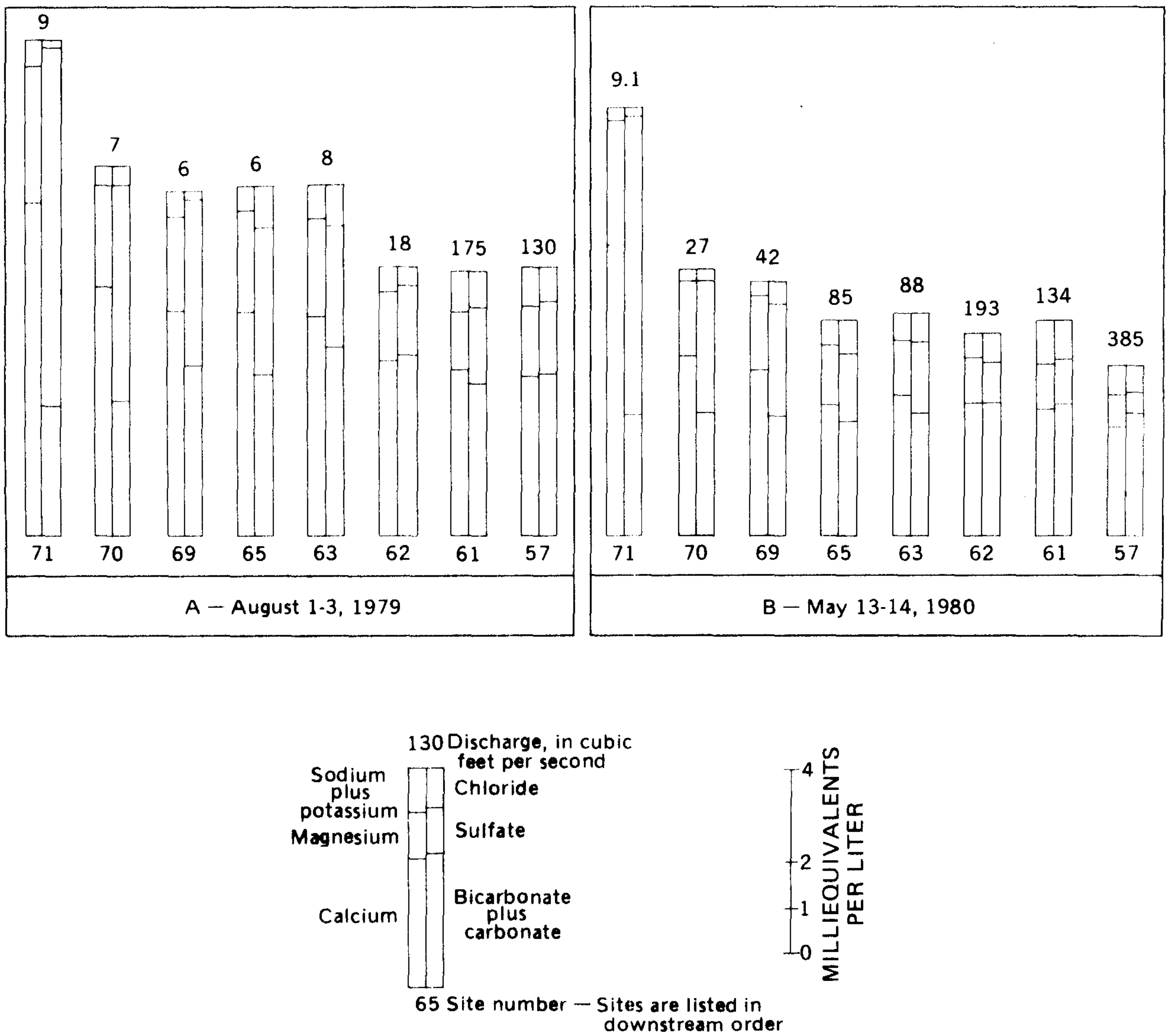


Figure 3.—Changes in the chemical characteristics of water in the McLeod-Kimball-East Canyon Creek drainage.

Echo Reservoir to Gateway

Elevations in this area range from 4,800 feet (1,460 m) at Gateway to 5,560 feet (1,695 m) at Echo Reservoir. Echo Creek enters the Weber River downstream from Echo Reservoir. Dissolved-solids concentrations in Echo Creek (site 77) are significantly larger than in the Weber River upstream from Echo Creek (site 76). In Echo Creek, the dissolved-solids concentrations ranged from 273 to 509 milligrams per liter, whereas in the Weber River at site 76 they ranged from 192 to 296 milligrams per liter. Water in Echo Creek was of a calcium magnesium bicarbonate type and had a medium salinity hazard and a low sodium hazard. (See pl. 3 and table 1.)

Lost Creek is a major tributary that enters the Weber River in the vicinity of the small town of Croydon. Lost Creek Reservoir [elevation 6,005 feet (1,830 m)] impounds the waters of Lost Creek primarily for irrigation purposes. Dissolved-solids concentrations in Lost Creek (site 60) ranged from 169 to 315 milligrams per liter and were, in general, slightly less than in the Weber River upstream from Lost Creek where they ranged from 203 to 396 milligrams per liter. An exception was noted during the irrigation season on August 1, 1979, and August 12, 1980, when dissolved-solids concentrations in Lost Creek (site 60) exceeded those in the Weber River upstream from Lost Creek (site 59) by 21 to 24 percent. This increase apparently is the result of irrigation-return flow. Water in Lost Creek was a calcium bicarbonate type and had a medium salinity hazard and a low sodium hazard.

Irrigation-return flow from the Henefer area (site 59.5) was sampled because water use there is typical of the agricultural water use in this part of the Weber River basin. The source of the water diverted for irrigation in the Henefer area is best represented by site 76, Weber River downstream from Echo Reservoir. Water samples were collected at site 76 and site 59.5 on May 13, 1980; a 31-percent increase in dissolved-solids concentration was determined in the irrigation-return flow from the Henefer area.

East Canyon Creek, also discussed in the section about the Park City area, originates near Park City and is impounded in East Canyon Reservoir primarily for irrigation. During August 1, 1979, to August 12, 1980, dissolved-solids concentrations in six samples collected from East Canyon Creek near its mouth ranged from 300 to 334 milligrams per liter, except during spring runoff, when dissolved-solids concentrations were decreased to 206 milligrams per liter. Water at this site was a calcium bicarbonate type. East Canyon Creek enters the Weber River downstream from Morgan and upstream from the Stoddard Diversion.

At times during the irrigation season, flow in the Weber River is greatly decreased downstream from the Stoddard Diversion, which diverts water from the river into Gateway Canal. On October 26, 1979, for example, the Weber River upstream from Stoddard Diversion (site 53) had a flow of 116 cubic feet per second (3.3 m^3/s) of which 82 percent was diverted into the Gateway Canal, leaving about 21 cubic feet per second (0.6 m^3/s) in the Weber River downstream from the diversion.

Seepage measurements were made during the October 1979 sampling period as part of another hydrologic study by the U.S. Geological Survey (J. S. Gates and J. I. Steiger, U.S. Geological Survey, written commun., 1981). The measurements indicated that the Weber River is a gaining stream from downstream of the Stoddard Diversion to Gateway. Between the Stoddard Diversion and Peterson, the river increased in flow by 90 percent from 21.4 to 40.6 cubic feet per second (0.6 to 1.1 m^3/s). Between Peterson and Gateway, the flow increased 50 percent from 40.6 to 61.1 cubic feet per second (1.1 to 1.7 m^3/s). The total increase in flow from the Stoddard Diversion to Gateway was 186 percent. These increases are due principally to ground-water inflow (J. S. Gates, U.S. Geological Survey, oral commun., Sept. 1980). Water samples were collected during the seepage measurements to determine if any changes were occurring in the quality of streamflow as a result of the ground-water inflow in this stream reach. Dissolved-solids concentrations in the Weber River upstream from Stoddard Diversion (site 53) were 353 milligrams per liter. In the Weber River at Gateway upstream from the powerplant (site 37.5), dissolved-solids concentrations were 347 milligrams per liter, or 1.4 percent less. This small decrease indicates that no significant change in water quality occurred in the river as a result of the ground-water inflow.

At Gateway (downstream from site 37.5) water from the Gateway Canal can re-enter the Weber River after passing through a small hydroelectric generating plant or as overflow from the canal. Water quality in the concrete-lined Gateway Canal changes very little. During August 1-2, 1979, the dissolved-solids concentration in a sample from the canal at the Stoddard Diversion (site 54) was 284 milligrams per liter. The dissolved-solids concentration in a sample collected at the downstream end of the canal at Gateway (site 38) was 297 milligrams per liter. Although the flow of the Weber River between the Stoddard Diversion and Gateway increased substantially during the irrigation season, the change in water quality was insignificant.

Gateway to the Mouth of the Weber River

(Wasatch Front Area)

This is the most populated and intensely irrigated part of the basin. Elevations in the area range from about 4,210 feet (1,280 m) at the mouth of the Weber River to 4,800 feet (1,460 m) at Gateway. The Weber River flows through Ogden, which is the fourth largest city in Utah. The confluence of the Weber River and the Ogden River, the largest tributary of the Weber River, occurs downstream from Ogden. The Ogden River is impounded at Pineview Reservoir, which is the second largest reservoir in the Weber River basin.

The Wasatch Front area, because of its dense population, industrial growth, and diversified agriculture, is where the greatest change in surface-water quality was expected to occur. Therefore, it was the focus of more detailed study.

Several large irrigation diversions are located in the Wasatch Front area. Many times, during the irrigation season, the flow of the Weber River is decreased greatly in the vicinity of Plain City (site 8) principally because of the irrigation diversions. During August 11-12, 1980, for example, only 12 percent of the total flow of the river at site 37 (including the inflow of the Ogden River) reached site 8.

Changes in the dissolved-solids concentration of the Weber River between the mouth of Weber Canyon (site 33) and the Ogden River (site 23) were small. This stream reach had a medium salinity hazard and a low sodium hazard. Water type changed from calcium bicarbonate to calcium magnesium bicarbonate between these two sites.

The greatest change in dissolved-solids concentrations in the Weber River occurred during the irrigation season between site 23, upstream from the confluence of the Weber and Ogden Rivers, and the mouth of the river. In this reach, the Ogden River decreases the dissolved-solids concentrations in the Weber River by dilution. Data collected during the irrigation seasons of 1979 and 1980 at site 20 downstream from the confluence of the two rivers indicated about a 30-percent decrease in dissolved-solids concentration (pls. 3A and 3F). It is in the area downstream from site 20 that dissolved-solids concentrations begin to rapidly increase, principally because of irrigation-return flow. Without the inflow of the Ogden River, the increase of dissolved solids in the Weber River would undoubtedly be much greater.

Irrigation-return flow was sampled at two sites--Hooper Slough (site 5) and Howard Slough (site 6). Dissolved-solids concentrations in Hooper Slough, which enters the Weber River upstream from site 4 (pl. 1), ranged from 444 to 937 milligrams per liter; the range is much greater than that upstream in the Weber River. Dissolved-solids concentrations in the Weber River near Plain City (site 8) ranged from 181 to 470 milligrams per liter. The effect of irrigation-return flow from Hooper Slough on the dissolved-solids concentrations in the Weber River at site 4 is shown on plates 3A and 3F. Howard Slough is representative of numerous sources of return water from irrigation systems that empty directly into Great Salt Lake and, therefore, have no return effect on the Weber River. Howard Slough probably also receives water other than just return water from irrigation systems. The slough was the only water source sampled during this reconnaissance that contained boron in concentrations that might be toxic to at least some of the most boron-sensitive plants (table 1).

Downstream from the confluence of the Weber and Ogden Rivers, water types during low-flow periods changed from calcium magnesium bicarbonate at site 20 to calcium sodium magnesium bicarbonate at site 8. Usually mixed water types varying from a calcium sodium magnesium bicarbonate type to a sodium calcium magnesium bicarbonate chloride type occurred at sites 1-4 (pl. 4). Sodium hazard was low and salinity hazard ranged from medium to high.

The major cause for the poorer quality water downstream from site 20 is the numerous irrigation-return flows to the Weber River, which itself has been greatly decreased in flow because of irrigation diversions. Soils in this area become more saline and poorly drained westward toward Great Salt Lake. The U.S. Soil Conservation Service (1968) has compiled a detailed soil map of this area.

As noted earlier, Willard Bay, the largest reservoir in the Weber River basin, is used for redistribution of water for irrigation in the most downstream part of the basin. There was no such redistribution, and therefore, no sampling of outflow from the reservoir during this reconnaissance.

OTHER CHARACTERISTICS OF THE WATER

Fluvial Sediment

The accurate determination of the sediment characteristics of a river basin requires numerous measurements during a wide range of streamflow conditions. It was not within the scope of this reconnaissance to determine the sediment characteristics of the Weber River basin. The few measurements made were intended to provide only very general information at selected sites. Suspended sediment was sampled during spring runoff, summer low flow, and storm-runoff conditions. These three conditions are intended to represent the extremes that might occur in the Weber River basin.

Suspended-sediment concentrations in general increase with increasing discharge of a stream. Dissolved solids, however, generally decrease with increasing stream discharge. Thus, the quality of water due to sediment loads usually is best when discharge is small and the quality of water due to dissolved-chemical consituents usually is best when discharge is large.

Suspended-sediment concentrations during low-flow conditions were typically very small, ranging from 4 to 43 milligrams per liter at the sampled sites (table 2). Most of the suspended-sediment transport in the basin occurs during spring-runoff and storm-runoff conditions when discharges are large. Samples taken during spring runoff had sediment concentrations ranging from 6 to 174 milligrams per liter. The largest suspended-sediment load of 1,130 tons per day (1,025 Mg/d) was measured at the Weber River near Plain City (site 8). At site 8, suspended-sediment loads calculated from 51 samples that generally were collected on a monthly basis from October 1976 to August 1980 ranged from a minimum of 0.84 ton per day (0.76 Mg/d) to a maximum of 2,900 tons per day (2,630 Mg/d) with a mean value of 167 tons per day (152 Mg/d) (table 3).

Because rainstorms are of limited extent, they generally affect only parts of the Weber River basin. One storm having intense rainfall occurred on June 2, 1980, in that part of the basin between Morgan and the mouth of the river. Runoff from that storm was sampled at selected sites and analyzed for suspended sediment. The largest suspended-sediment concentration occurred in samples from the Weber River at Gateway (site 37). The concentration was 998 milligrams per liter, which equates to 6,470 tons per day (5,870 Mg/d).

The complexities of this largely regulated river become apparent when suspended sediment sampled at site 37 during this storm are compared to suspended sediment at site 8, which is located downstream. Although discharges differed by only 9 percent, suspended sediment expressed in tons per day was 350 percent greater at site 37 than at site 8. This apparent anomaly is largely the result of the numerous diversions between the two sites, the inflow of the Ogden River, and a collapsible dam located upstream from site 8.

Echo Creek, a small tributary that enters the Weber River downstream from Echo Reservoir, may be a large contributor of suspended sediment to the Weber River during storms. Echo Creek drains an area that is underlain by the Echo Canyon Conglomerate of Cretaceous age, which is red in color (pl. 2). Local residents have observed Echo Creek during storms and noted its distinct red color as it enters the Weber River. The Weber River itself is then observed to have a red color from the confluence to Plain City. One sample was obtained from Echo Creek during a storm on July 1, 1980. A suspended-sediment concentration of 1,080 milligrams per liter was determined from this sample and was the largest concentration measured during the reconnaissance.

Most of the suspended sediment transported by the river apparently occurs primarily during storm-runoff periods and secondarily during spring runoff. Reservoirs located on three of the five major tributaries, and on the Weber River itself, undoubtedly are a major control of sediment transport in the Weber River. For example, during spring runoff on May 13, 1980, suspended-sediment concentrations upstream from East Canyon Reservoir were 29 times greater than the concentrations downstream from the reservoir.

Sanitary Quality of the Water

The sanitary quality of the water in the Weber River basin was considered using three indicator bacteria: total coliform, fecal coliform, and fecal streptococcus. Total bacteria have been used as indicators of sanitary quality of water since 1880. Fecal coliform and fecal streptococcus bacteria are more specific indicators of warmblooded animal contamination.

Bacteria were sampled at nine sites in the basin during July 31 through August 2, 1979. Data obtained during this period are not adequate to assess, accurately, the sanitary quality of the water in the basin, but can be used as an indicator of sanitary quality. Site 8 is part of the National Stream Quality Accounting Network. Fecal coliform and fecal streptococci bacteria are sampled on a monthly basis at this site (table 3). Results of the bacteriological analyses are reported in number of colonies per 100 milliliters of water sampled (table 4).

A useful ratio has been developed to help clarify results of this type of bacteriologic analysis (American Public Health Association, 1981, p. 819). The ratio is derived by dividing the fecal coliform count (expressed as colonies per 100 milliliters of sample) by the fecal streptococcus count (expressed as colonies per 100 milliliters of sample).

$$\frac{\text{Fecal coliform count (colonies per 100 milliliters)}}{\text{Fecal streptococcus count (colonies per 100 milliliters)}} = \text{Ratio}$$

The ratio can be interpreted as follows:

If the ratio is greater than 4.1, it indicates that pollution derives from human waste.
If the ratio is less than 0.7, it indicates that pollution derives from livestock or poultry.
If the ratio is between 0.7 and 4.1, it indicates mixed pollution sources.

Total coliform densities should not exceed 20,000 colonies per 100 milliliters, and fecal coliform densities should not exceed 2,000 colonies per 100 milliliters in raw surface water intended for public-water supplies (National Academy of Sciences and National Academy of Engineering, 1973, p. 58). The results of bacteriological analyses for this reconnaissance indicate an absence of serious sanitary problems in the Weber River.

Dissolved Oxygen

Dissolved oxygen was measured seasonally at selected sites in the Weber River basin. The dissolved-oxygen concentrations ranged from a minimum of 5.5 milligrams per liter (80 percent saturation) at site 1 to a maximum of 14.7 milligrams per liter (138 percent saturation) at site 59. The maximum value occurred during low-flow conditions with a large amount of bright green algae in the streambed. All these measurements were made during daylight hours.

To obtain an indication of the diel fluctuation of dissolved oxygen, a recorder was installed at site 8, Weber River near Plain City. Dissolved oxygen was monitored during low-flow conditions, August 5-6, 1980. During this period, discharge ranged from 57 to 58 cubic feet per second (1.61 to 1.64 m^3/s), and specific conductance ranged from 580 to 650 micromhos per centimeter at 25°C. A minimum concentration of 4.1 milligrams per liter was recorded during the early morning hours and the maximum concentration of 6.4 milligrams per liter occurred during the afternoon. A rapid increase in dissolved-oxygen concentrations occurred immediately after sunrise, showing the effect of photosynthesis on the dissolved-oxygen concentration of the river. The minimal concentrations that occurred during the early morning hours probably were due to respiration. The U.S. Environmental Protection Agency (1977, p. 123) recommends a minimum concentration of 5.0 milligrams per liter of dissolved oxygen to maintain good fish populations.

Trace Elements and Pesticides

Substances that typically occur in concentrations of less than 1.0 milligram per liter commonly are referred to as "minor" or "trace" elements or constituents (Hem, 1970, p. 188). Samples collected July 31-August 2, 1979 at 17 sites were analyzed semiquantitatively for 23 trace elements (table 5). In reporting semiquantitative analysis, results for each element are repeated in steps. The steps are incremented as follows: 1, 3, 5, 7, 10, 30, 50, 70 and so forth. During the calculation of reported results, the intermediate values are rounded to the nearest step. At the 68-percent confidence level (one standard deviation) the true value will occur within plus or minus one reporting level (step) of that which is stated. Similarly, at the 95-percent confidence level (two standard deviations), the true value will occur within plus or minus two reporting levels (steps) of that which is stated. Based on the results of the semiquantitative analysis, 14 sites were sampled for analysis of 10 trace elements using quantitative methods (table 5).

As indicated in table 1, the limits recommended by the U.S. Environmental Protection Agency (1977) for manganese and cadmium were exceeded at some sites. Some of the values, however, were analyzed using semiquantitative methods, and therefore may not accurately represent exceedance of recommended limits.

Pesticides in bottom materials were sampled at three sites downstream from the major irrigated areas. The results of these analyses are presented in table 6. Concentrations of pesticides in water, collected as part of the National Stream Accounting Network program at site 8 are summarized in table 3.

SUMMARY

Surface water in most of the Weber River basin is suitable for most common uses. The principal water type generally is either calcium bicarbonate or calcium magnesium bicarbonate. In the Park City area, principal water types are variable, varying from calcium sulfate to calcium bicarbonate sulfate.

In the area between the headwaters of the Weber River and the vicinity of Slaterville (which includes all the major irrigation diversions), water diverted for irrigation had no detectable sodium hazard and a low to medium salinity hazard with regard to solubility from irrigation.

Releases from both Rockport and Echo Reservoirs may increase or decrease the dissolved solids in the Weber River, depending on the time of the year. The greatest increase in dissolved solids occurs downstream from Slaterville. This increase is chiefly due to irrigation-return flows. Water types downstream from Slaterville are mixed, ranging from calcium magnesium bicarbonate to sodium calcium magnesium bicarbonate chloride. The following two factors decrease the potential impact of irrigation-return flow downstream from Slaterville:

1. Inflow of the good quality water from the Ogden River.
2. Only minor amounts of irrigation-return water flows to the river because most return water from irrigation systems flows directly into Great Salt Lake.

Most sediment in the basin is transported primarily during storm runoff and secondarily during spring runoff. Echo Creek may be a significant contributor of suspended sediment to the Weber River during storm runoff. No serious sanitary problems were found in the basin. Dissolved oxygen may periodically be a problem in the downstream reaches of the river. Pesticide and trace-metal concentrations were characteristically small. Manganese and cadmium concentrations did exceed limits recommended by the U.S. Environmental Protection Agency at some sites.

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[Abbreviations: ft^3/s, cubic feet per second; mg/L, milligrams

Boron hazard: If the concentration of boron is less than 750 mg/L, the hazard is listed as none. This applies to average conditions only.
Dissolved-solids hazard: If the concentration of dissolved solids is less than 500 mg/L, the hazard is listed as none. This applies to average conditions only.

Site No.	Site name	Number of chemical analyses	Discharge range (ft^3/s)	Dissolved-solids range (mg/L)	Specific-conductance range (μmhos)	Hardness range
1	Weber River North Fork at Ogden Bay dike at (B-6-3)35bcb	6	5-1,250	180-483	320-820	Hard-very hard
2	Weber River Middle Fork at Ogden Bay dike at (B-6-3)35cbb	6	85-200	179-456	330-785	Hard-very hard
3	Weber River South Fork at Ogden Bay dike at (B-5-3)11bcb	3	245-1,480	207-450	385-730	Hard-very hard
4	South Run Canal at Ogden Bay dike at (B-5-3)11bcb	6	24-98	318-674	520-1,155	Hard-very hard
5	Hooper Slough at U.S.G.S. gage at (B-5-3)11baa	7	7.2-29.7	444-937	740-1,470	Very hard
6	Howard Slough at U.S.G.S. gage at (B-5-3)25add	11	8.6-27	446-907	795-1,360	Very hard
7	Weber River at bridge at 1150 South Street at (B-6-2)19bac	2	85-2,960	182-401	320-670	Hard-very hard
8	Weber River near Plain City at U.S.G.S. gage at (B-6-2)5dcc	18	54-2,960	181-470	320-770	Hard-very hard
9	Warren Canal above Fourmile Creek at (B-6-2)4bdc	2	43-65	226-433	400-740	Hard-very hard
10	Fourmile Creek at mouth at (B-6-2)4bdc	2	10-15	358-425	620-750	Very hard
11	Warren Canal above Mill Creek at (B-6-2)10dab	2	25-40	190-285	350-500	Hard-very hard
12	Slaterville sewer plant effluent at (B-6-2)10dab	2	84-93	467-523	790-915	Very hard
13	Mill Creek near mouth at (B-6-2)10daa	2	.5-.7	175-226	315-415	Hard
14	Weber River near Slaterville at (B-6-2)15daa	2	35-2,870	177-247	305-410	Hard-very hard
15	Warren Canal at diversion at (B-6-2)23add	1	25	236	400	Hard
16	Weber River above Warren Canal diversion at (B-6-2)24bcc	2	60-2,910	174-229	300-405	Hard
17	Willard Canal at Slaterville diversion at (B-6-2)24dac	1	63	221	380	Hard
18	Weber River below Slaterville diversion at (B-6-2)24dca	1	55	214	380	Hard
19	Layton Intake canal above Hooper Canal diversion at (B-6-2)24ddb	1	150	220	380	Hard
20	Weber River above Slaterville diversion at (B-6-2)24dda	6	170-3,800	178-360	320-630	Hard-very hard
21	Neilson drain near Hooper Canal diversion at (B-6-2)25bac	2	2-4	562-711	870-1,170	Very hard
22	Hooper Canal at diversion with Layton Intake Canal at (B-6-2)25bda	1	150	224	385	Hard
23	Weber River below Union Stockyards at (B-6-1)30bdd	6	78-2,600	194-361	335-620	Hard-very hard
25	Ogden River near mouth at (B-6-1)29hbb	6	29-1,200	116-376	210-680	Moderately hard-hard
26	Wilson Canal at diversion at (B-6-1)30dad	1	70	308	490	Very hard
27	Weber River above Wilson Canal and Union Stockyards at (B-6-1)30dda	6	148-2,600	198-352	340-575	Hard-very hard
28	Weber River near I-15, 31st Street interchange at (B-5-1)6adb	6	140-2,600	195-346	310-595	Hard-very hard

data collected in the Weber River basin

per liter; μmhos, micromhos per centimeter at 25° Celsius.]

Dominant cation(s)		Dominant anion(s)		Water-use problems					Significant upstream diversions	Significant upstream irrigation
					Irrigation supply					
High flow	Low flow	High flow	Low flow	Public supply	Salinity hazard	Sodium hazard	Boron hazard	Dissolved-solids hazard		
Ca,Mg	Ca,Na,Mg	HCO_3	HCO_3	-	Medium-high	Low	None	None	Yes	Yes
Ca,Mg	Ca,Na,Mg Na,Ca,Mg	HCO_3	HCO_3,Cl HCO_3,Cl	-	Medium-high	Low	None	None	Yes	Yes
Ca,Mg,Na	-	HCO_3	-	-	Medium-high	Low	None	None	Yes	Yes
Na,Ca,Mg	Ca,Na,Mg	HCO_3,Cl	HCO_3	-	Medium-high	Low	None	Sensitive crops	Yes	Yes
Na,Mg	Ca,Mg,Na Ca,Na,Mg	HCO_3,Cl	HCO_3	-	Medium-high	Low	None	Sensitive crops	No	Yes
Na,Mg	Ca,Na,Mg Na,Mg,Ca	HCO_3	HCO_3	-	Medium	Low	Sensitive crops	Sensitive crops	No	Yes
Ca,Mg	Ca,Na,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Mg	Ca,Na,Mg	HCO_3	HCO_3	Manganese [1]	Medium-high	Low	None	None	Yes	Yes
Ca,Mg,Na	Ca,Na,Mg	HCO_3	HCO_3,Cl	-	Medium	Low	None	None	-	-
Na,Ca,Mg	Ca,Mg,Na	HCO_3	HCO_3	-	Medium	Low	None	None	No	Yes
Ca,Mg	Ca,Mg,Na	HCO_3	HCO_3	-	Medium	Low	None	None	-	-
Ca,Na,Mg	Ca,Na,Mg	HCO_3,Cl	HCO_3	-	High	Low	None	None	No	No
Ca,Na,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
-	Ca,Mg	-	HCO_3	-	Medium	Low	None	None	-	-
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
-	Ca,Mg	-	HCO_3	-	Medium	Low	None	None	-	-
-	Ca,Mg	-	HCO_3	-	Medium	Low	None	None	Yes	Yes
-	Ca,Mg	-	HCO_3	-	Medium	Low	None	None	-	-
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Mg,Ca,Na	Ca,Na,Mg	HCO_3,Cl	HCO_3,Cl	-	Medium	Low	None	Sensitive crops	No	Yes
-	Ca,Mg	-	HCO_3	-	Medium	Low	None	None	-	-
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca	Ca,Mg	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
-	Ca,Mg	-	HCO_3	-	Medium	Low	None	None	-	-
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes

Site No.	Site name	Number of chemical analyses	Discharge range (ft^3/s)	Dissolved-solids range (mg/L)	Specific-conductance range (μmhos)	Hardness range
29	Weber River at Riverdale Road at (B-5-1)7dbd	6	135-2,550	205-337	345-580	Hard-very hard
30	Mill Creek near Pioneer Power Plant at (B-6-1)22bbc	2	16-21	108-138	185-245	Moderately hard
31	Pioneer Power Plant tailrace at (B-6-1)22bcb	2	96-241	106-129	185-235	Moderately hard
32	Ogden River at Rainbow Gardens at canyon mouth at (B-6-1)23ccb	2	190-1,000	116-158	205-305	Moderately hard
32.5	Burch Creek near Harrison Blvd. at (B-5-1)15dbb	1	12	54	97	Soft
33	Weber River at canyon mouth below Weber-Davis Canal diversion at (B-5-1)25dad	6	127-2,500	196-349	315-570	Hard-very hard
34	South Weber Canal below diversion at (B-5-1)25dcb	1	45	288	510	Very hard
35	Weber-Davis Canal at Job Corps Center at (B-5-1)36baa	1	284	305	505	Very hard
37	Weber River at Gateway at U.S.G.S. gage at (A-5-1)27cbd	16	80-2,570	173-367	320-650	Hard-very hard
37.5	Weber River at Gateway above power plant at bridge at (A-5-1)27cda	5	61-2,000	196-347	335-580	Hard-very hard
38	Gateway Canal at diversion to Gateway tunnel at (A-5-1)27cdc	1	560	297	500	Very hard
38.5	Unnamed creek at Gateway bridge at (A-5-1)27cda-2	1	6	54	86	Soft
39	Strawberry Creek at mouth at (A-5-1)27caa	2	0.1-15	39-74	63-125	Soft
40	Jacob's Creek at mouth at (A-5-1)27ddd	1	2	62	105	Soft
41	Gordon Creek near mouth at (A-5-1)26bdc	2	2-26	48-55	87-90	Soft
42	Dry Creek near mouth at (A-5-1)26acb	1	23	150	235	Moderately hard
43	Cottonwood Creek near mouth at (A-5-1)25dbb	1	152	65	115	Soft
44	Peterson Creek at mouth at (A-4-2)6bdd	2	0.1-23	84-276	150-460	Moderately hard-very hard
45	Ogden River below Pineview Reservoir at (A-6-1)16cad	3	7-900	107-173	185-325	Moderately hard-hard
46	Wheeler Creek at mouth at U.S.G.S. gage at (A-6-1)16dbc	2	3.6-82	144-196	245-375	Hard-very hard
47	South Fork of South Fork Ogden River near mouth at (A-6-2)19aab	2	3-350	119-226	205-430	Moderately hard-very hard
48	South Fork Ogden River near mouth at (A-6-2)19aab	2	5-275	116-223	200-405	Moderately hard-very hard
49	Spring Creek at mouth at (A-6-2)7dcc	2	5-13	235-271	405-455	Very hard
50	Middle Fork Ogden River near mouth at (A-6-2)6bcc	2	0.3-90	61-114	105-225	Soft-moderately hard
51	North Fork Ogden River near mouth at (A-7-1)34cdb	2	1-388	78-159	140-320	Soft-moderately hard
52	South Fork Ogden River at U.S.G.S. gage at (A-6-2)12cad	2	86-620	109-172	190-325	Moderately hard-hard
52.3	Beaver Creek (Trib. to South Fork Ogden River) at mouth at (A-7-3)33cbd	2	3-110	101-179	170-350	Moderately hard-hard
52.6	South Fork Ogden River below Causey Reservoir at (A-7-3)34dcb	2	89-390	116-182	200-340	Moderately hard-hard

data collected in the Weber River basin--Continued

Dominant cation(s)		Dominant anion(s)		Water-use problems					Significant upstream diversions	Significant upstream irrigation
					Irrigation supply					
High flow	Low flow	High flow	Low flow	Public supply	Salinity hazard	Sodium hazard	Boron hazard	Dissolved-solids hazard		
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low	Low	None	None	No	No
Ca	Ca,Mg	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca,Mg	-	HCO_3	--	-	Low	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	Cadmium [2,3]	Medium	Low	None	None	Yes	Yes
-	Ca	-	HCO_3	-	Medium	Low	None	None	-	-
-	Ca	-	HCO_3	-	Medium	Low	None	None	-	-
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
-	Ca	-	HCO_3	-	Medium	Low	None	None	-	-
Ca,Mg,Na	-	HCO_3	-	-	Low	Low	None	None	No	No
Ca,Mg,Na	Ca,Mg,Na	HCO_3	HCO_3	-	Low	Low	None	None	No	No
Ca,Mg	-	HCO_3	-	-	Low	Low	None	None	No	No
Ca	Ca,Mg	HCO_3	HCO_3	-	Low	Low	None	None	Yes	No
Ca	-	HCO_3	-	-	Low	Low	None	None	No	No
Ca	-	HCO_3	-	-	Low	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	No	Yes
Ca	Ca	HCO_3	HCO_3	-	Low	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	No	No

Site No.	Site name	Number of chemical analyses	Discharge range (ft^3/s)	Dissolved-solids range (mg/L)	Specific-conductance range (μmhos)	Hardness range
53	Weber River above Stoddard diversion at (A-4-2)21acb	6	116-1,755	116-352	200-610	Moderately hard-very hard
54	Gateway Canal at Stoddard diversion at (A-4-2)21bda	1	610	284	495	Very hard
55	Line Creek at mouth at (A-4-2)21cdd	2	0.25-38	73-217	130-390	Soft-hard
56	Deep Creek at mouth at (A-4-2)34bcc	2	0.75-68	94-225	160-370	Moderately hard-hard
57	East Canyon Creek near mouth at Morgan at (A-4-2)35dcc	6	17-385	206-334	360-540	Hard-very hard
58	Weber River at Morgan at (A-4-2)36bbc	3	99-1,370	222-367	385-640	Hard-very hard
58.2	Como Springs at (A-4-3)31cab	1	-	553	880	Very hard
58.5	Hardscrabble Creek at mouth at (A-3-2)24cdb	2	2-225	146-222	260-400	Hard-very hard
59	Weber River above Lost Creek at (A-4-4)19cdd	6	74-800	203-396	370-720	Hard-very hard
59.5	Irrigation return flow from Henefer Valley at (A-4-4)32bad	1	5	318	560	Very hard
60	Lost Creek at mouth at (A-4-4)19dcc	6	25-400	169-315	280-545	Hard-very hard
60.5	Lost Creek below Lost Creek Reservoir at (A-5-5)8dba	2	55-190	224-239	355-380	Hard-very hard
61	East Canyon Creek below East Canyon Reservoir at U.S.G.S. Gage at (A-2-3)10bbc	3	16-175	279-352	470-585	Very hard
62	East Canyon Creek above East Canyon Reservoir at (A-2-3)26bda	2	18-193	258-342	430-540	Very hard
63	East Canyon Creek above Toll Creek near Gorgoza at (D-1-3)12bab	6	8-88	285-513	475-750	Very hard
64	Toll Creek near mouth at (D-1-3)11aad	2	1-14	328-475	575-850	Very hard
65	East Canyon Creek at Kimball Junction at (A-1-4)18cbc	2	6-85	282-457	470-680	Very hard
66	Unnamed creek at Kimball Junction at mouth at (D-1-4)19aba	2	2-26	197-395	350-590	Hard-very hard
67	Willow Draw Creek at mouth at (D-1-4)20bca	2	1-1.5	419-465	660-680	Very hard
68	Unnamed creek from Parley's Park at mouth at (D-1-4)20abd	3	0.1-9.8	207-674	360-1,130	Hard-very hard
69	Kimball Creek above unnamed creek from Parley's Park at (D-1-4)20acb	5	6-42	338-531	530-750	Very hard
70	McLeod Creek below Park City at (D-2-4)6aab	5	7-25	363-604	560-815	Very hard
71	Spiro Tunnel outflow at Park City at (D-2-4)8dba	2	9-9.1	607-691	830-870	Very hard
72	Silver Creek below Park City at (D-2-4)10bbd	1	3	331	495	Very hard
73	Dority Spring Creek above Silver Creek at (D-2-4)3cdc	2	3-5.5	446-519	720-740	Very hard
74	Silver Creek at Keetley Junction at (D-2-4)2aab	5	0.5-10	513-575	805-875	Very hard
75	Silver Creek at Wanship at (A-1-5)20bad	5	1-67	273-568	425-875	Very hard
76	Weber River below Echo Reservoir at (A-3-4)25add	6	6-700	192-296	380-520	Very hard

Dominant cation(s)		Dominant anion(s)		Water-use problems					Significant upstream diversions	Significant upstream irrigation
					Irrigation supply					
High flow	Low flow	High flow	Low flow	Public supply	Salinity hazard	Sodium hazard	Boron hazard	Dissolved-solids hazard		
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
-	Ca	-	HCO_3	-	Medium	Low	None	None	-	-
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	No
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Mg	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Mg	-	SO_4, HCO_3	-	-	High	Low	None	Sensitive crops	No	No
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca,Na,Mg	-	HCO_3	-	-	Medium	Low	None	None	No	Yes
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	No	No
Ca,Mg	Ca	HCO_3, SO_4	HCO_3, SO_4	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3, SO_4	HCO_3, SO_4	-	Medium	Low	None	Sensitive crops	Yes	Yes
Ca	Ca	HCO_3,Cl	HCO_3,Cl	-	Medium-high	Low	None	None	No	No
Ca	Ca	HCO_3, SO_4	HCO_3, SO_4	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3, SO_4	-	Medium	Low	None	None	No	No
Ca	Ca	SO_4, HCO_3	SO_4, HCO_3	-	Medium	Low	None	None	No	No
Ca,Na,Mg	Ca,Na,Mg Ca,Mg,Na	HCO_3	Cl,HCO_3	Manganese [1]	Medium-high	Low	None	Sensitive crops	No	No
Ca	Ca	HCO_3, SO_4	HCO_3,SO_4 SO_4,HCO_3	-	Medium	Low	None	Sensitive crops	Yes	Yes
Ca	Ca	SO_4, HCO_3	SO_4,HCO_3 SO_4	Sulfate [4]	Medium-high	Low	None	Sensitive crops	Yes	Yes
Ca	Ca	SO_4	SO_4	Sulfate [4]	High	Low	None	Sensitive crops	No	No
Ca,Na	-	SO_4,Cl, HCO_3	-	-	Medium	Low	None	None	No	No
Ca	Ca	SO_4, HCO_3	HCO_3, SO_4	-	Medium	Low	None	Sensitive crops	No	No
Ca	Ca	SO_4, HCO_3	HCO_3, SO_4	-	Medium	Low	None	Sensitive crops	Yes	No
Ca	Ca	HCO_3, SO_4	HCO_3,SO_4 HCO_3,Cl	Manganese [1]	Medium-high	Low	None	Sensitive crops	Yes	Yes
Ca	Ca	HCO_3	HCO_3	Manganese [1,3]	Medium	Low	None	None	Yes	Yes

Site No.	Site name	Number of chemical analyses	Discharge range (ft^3/s)	Dissolved-solids range (mg/L)	Specific-conductance range (μmhos)	Hardness range
77	Echo Creek at mouth at (A-3-5)19ccc	5	3-109	273-509	480-960	Very hard
78	Chalk Creek at mouth at U.S.G.S. gage at (A-2-5)8dab	6	14.5-319	237-446	390-775	Very hard
78.5	Chalk Creek above Upton at (A-2-5)4adb	2	12-230	202-234	375-380	Very hard
79	Weber River near Coalville above Echo Reservoir at U.S.G.S. Gage at (A-2-5)20aca	5	134-790	163-256	290-435	Hard-very hard
80	Weber River below Rockport Reservoir at (A-1-5)29acb	6	20-800	133-234	225-395	Moderately hard-very hard
80.5	Crandall Creek at mouth at (D-1-5)4aac	2	0.3-21	197-541	320-850	Hard-very hard
81	Weber River above Rockport Reservoir at (D-1-5)10bdb	5	55-750	136-247	230-405	Hard-very hard
82	Fort Creek near mouth at (D-1-5)23aac	2	9	251-316	385-550	Very hard
83	Weber River above Weber-Provo diversion at (D-1-6)21cca	5	4-500	112-177	220-295	Moderately hard-hard
85	Whites Creek at mouth at (D-1-6)15cbc	1	13	227	355	Very hard
86	Crooked Creek at mouth at (D-1-6)31cab	2	10-13	187-194	330-340	Hard
87	Beaver Creek near mouth at (D-2-5)1aad	6	26.4-133	81-280	155-430	Moderately hard-very hard
88	Beaver Creek above Weber-Provo canal at Kanas at (D-2-6)17dac	2	4-51	111-145	225-275	Moderately hard-hard
89	Weber-Provo Canal above Beaver Creek at (D-2-6)17dac	1	5	181	350	Hard
90	Unnamed canal from Provo River at Francis at (D-2-6)28ccb	2	10-12	66-81	110-160	Soft-moderately hard
90.5	Beaver Creek below Fish Hatchery at (D-2-6)26baa	2	9-91	57-133	90-250	Soft-hard
91	Beaver Creek above diversions near Samak at (D-2-6)25dbb	2	7-88	33-48	70-77	Soft
92	Weber River near Oakley at U.S.G.S. gage at (D-1-6)15aca	6	38.5-500	108-175	180-305	Moderately hard-hard
92.5	South Fork Weber River at mouth at (D-1-6)12dbb	2	10-44	146-168	250-310	Hard
93	Weber River above Smith and Morehouse Creek at (A-1-7)26daa	2	60-280	100-114	175-210	Moderately hard
94	Smith and Morehouse Creek at U.S.G.S. gage at (A-1-7)36bbb	2	20-153	52-97	90-190	Soft-moderately hard
95	Headwaters of Weber River below Reid's Meadow near Mirror Lake at (D-1-9)22dbc	1	0.15	14	24	Soft

[1] The U.S. Environmental Protection Agency (1977, p. 95) recommended limit for manganese in public-water supplies is 50 μg/L.
[2] The U.S. Environmental Protection Agency (1976, p. 5) maximum contaminant level for cadmium in public-water supplies is 10 μg/L.
[3] Semiquantitative methods were used in the analysis.
[4] The U.S. Environmental Protection Agency (1977, p. 205) recommended limit for sulfate in domestic water supplies is 250 mg/L.

Dominant cation(s)		Dominant anion(s)		Water-use problems					Significant upstream diversions	Significant upstream irrigation
					Irrigation supply					
High flow	Low flow	High flow	Low flow	Public supply	Salinity hazard	Sodium hazard	Boron hazard	Dissolved solids hazard		
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	Sensitive crops	Yes	Yes
Ca	Ca,Mg	HCO_3	HCO_3	-	Medium-high	Low	None	None	Yes	Yes
Ca	Ca,Mg	HCO_3	HCO_3	-	Medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca,Mg,Na	HCO_3	HCO_3,SO_4	-	Medium-high	Low	None	Sensitive crops	No	No
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	No	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	No
Ca	-	HCO_3	-	-	Medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	No	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	Yes	Yes
Ca	-	HCO_3	-	-	Medium	Low	None	None	-	-
Ca	Ca	HCO_3	HCO_3	-	Low	Low	None	None	-	-
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Low	Low	None	None	No	No
Ca,Mg	Ca,Mg	HCO_3	HCO_3	-	Low	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low-medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Medium	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low	Low	None	None	No	No
Ca	Ca	HCO_3	HCO_3	-	Low	Low	None	None	No	No
-	Ca,Mg	-	HCO_3	-	Low	Low	None	None	No	No

Table 2.--Suspended sediment at selected sites

Site No.	Site name (abbreviated)	Water discharge (cubic feet per second)	Suspended-sediment concentration (milligrams per liter)	Suspended-sediment discharge (tons per day)
	Low flow: August 11-13, 1980			
8	Weber River near Plain City	54	10	1.4
37	Weber River at Gateway	456	43	53
37.5	Weber River at Gateway above powerplant at bridge	115	13	4
61	East Canyon Creek below East Canyon Reservoir	175	4	1.9
62	East Canyon Creek above East Canyon Reservoir	236	3	.2
75	Silver Creek at Wanship	1	26	.07
76	Weber River below Echo Reservoir	470	25	32
77	Echo Creek at mouth	5.2	20	.3
79	Weber River near Coalville	134	9	3.2
81	Weber River above Rockport Reservoir	80	22	4.8
	Spring runoff: May 12-13, 1980			
8	Weber River near Plain City	2,960	141	1,130
37	Weber River at Gateway	2,450	119	790
61	East Canyon Creek below East Canyon Reservoir	134	6	2.2
62	East Canyon Creek above East Canyon Reservoir	193	174	91
75	Silver Creek at Wanship	67	51	9.2
76	Weber River below Echo Reservoir	700	14	26
79	Weber River near Coalville	790	77	160
81	Weber River above Rockport Reservoir	750	24	49

Table 2.--Suspended sediment at selected sites--Continued

Site No.	Site name (abbreviated)	Water discharge (cubic feet per second)	Suspended-sediment concentration (milligrams per liter)	Suspended-sediment discharge (tons per day)
		Storm runoff: June 2, 1980		
8	Weber River near Plain City	2,180	244	1,440
32.5	Birch Creek near Harrison Boulevard	24	382	25
37	Weber River at Gateway	2,400	998	6,470
57	East Canyon Creek near mouth	308	188	160
61	East Canyon Creek below East Canyon Reservoir	112	5	1.5
62	East Canyon Creek above East Canyon Reservoir	170	50	23
75	Silver Creek at Wanship	10	7	.2
76	Weber River below Echo Reservoir	500	12	16
77	Echo Creek at mouth	33	397	35
79	Weber River near Coalville	425	16	18
81	Weber River above Rockport Reservoir	675	9	16
		Storm runoff: July 1, 1980		
77	Echo Creek at mouth	30	1,080	87

Table 3.--Descriptive statistics of water-quality data collected at selected U.S. Geological Survey stream-gaging stations

[Constituent concentrations listed as .0 are concentrations below the analytical detection limit for that constituent.]

Parameter	Number of analyses	Mean	Standard deviation	Minimum value	Maximum value	Standard error of mean	Range
			Weber River at Gateway (site 37)				
Temperature, water (°C)	140	8.6	5.3	0.0	20.0	0.4	20.0
Temperature, air (°C)	73	12.7	10.1	-9.5	34.0	1.2	43.5
Streamflow, instantaneous (ft^3/s)	99	549	636	67	2,700	64	2,633
Specific conductance (umhos/cm at 25°C)	275	466	83	259	650	5.0	391
Oxygen, dissolved (mg/L)	72	10.5	1.6	6.2	14.9	.18	8.7
pH (units)	264	7.9	.3	7.0	8.9	.02	1.9
Carbon dioxide, dissolved (mg/L as CO_2)	84	5.0	4.2	1.0	18.0	.46	17.0
Alkalinity (mg/L as $CaCO_3$)	138	193	32	110	271	2.7	161
Bicarbonate (mg/L as HCO_3)	254	233	43	114	330	2.7	216
Carbonate (mg/L as CO_3)	233	.96	3.29	.00	20.0	.22	20.0
Nitrogen, nitrate, dissolved (mg/L as N)	3	.32	.10	.2	.4	.061	.2
Nitrogen, NO_2 + NO_3, dissolved (mg/L as N)	103	.42	.37	.0	3.3	.037	3.3
Phosphorus, orthophosphate, total (mg/L)	4	.01	.01	.0	.03	.006	.03
Phosphorus, orthophosphate, dissolved (mg/L)	118	.06	.07	.0	.49	.007	.49
Hardness (mg/L as $CaCO_3$)	268	217	38	110	285	2.3	175
Hardness, noncarbonate (mg/L as $CaCO_3$)	267	25	11	.0	78	.66	78.0
Calcium, dissolved (mg/L as Ca)	188	59.9	10.6	26	80	.77	54
Magnesium, dissolved (mg/L as Mg)	188	15.9	3.3	7.1	22.0	.24	14.9
Sodium, dissolved (mg/L as Na)	255	17.7	5.2	7.6	51.0	.33	43.4
Sodium-adsorption ratio	268	.52	.13	.2	1.5	.008	1.3
Sodium, percent	138	14.6	4.8	7	64	.40	57
Sodium + potassium, dissolved (mg/L as Na)	25	19.9	6.5	7.2	31.0	1.30	23.8
Potassium, dissolved (mg/L as K)	183	2.4	.6	1.2	7.7	.05	6.5
Chloride, dissolved (mg/L as Cl)	269	22.6	6.6	9.5	49.0	.40	39.5
Sulfate, dissolved (mg/L as SO_4)	269	32.7	7.6	15	49	.46	34
Fluoride, dissolved (mg/L as F)	132	.2	.1	.0	1.3	.01	1.3
Silica, dissolved (mg/L as SiO_2)	184	10.0	2.7	.3	31.0	.20	30.7
Boron, dissolved (ug/L as B)	175	52.0	28.8	.03	200.0	2.18	200.97
Copper, dissolved (ug/L as Cu)	2	.5	.7	.0	1.0	.50	1.0
Iron, total recoverable (ug/L as Fe)	11	17.3	26.1	.0	90.0	7.87	90.0
Iron, dissolved (ug/L as Fe)	53	37.4	71.4	.0	430	9.8	430
Manganese, dissolved (ug/L as Mn)	53	16.1	10.3	.0	50	1.4	50
Zinc, dissolved (ug/L as Zn)	3	6.0	1.7	4.0	7.0	1.0	3.0
Solids, dissolved, residue at 180°C	165	280.3	49.7	154	376	3.87	222
Solids, dissolved, sum of constituents (mg/L)	123	276	47	165	367	4.2	202
Solids, dissolved (tons per day)	268	334	281	46.2	1,484	17.1	1,438
Solids, dissolved (tons per acre-feet)	267	.38	.07	.21	.51	.004	.30
Nitrogen, nitrate total (mg/L as NO_3)	44	1.92	.64	1.00	3.40	.097	2.40
Nitrogen, nitrate dissolved (mg/L as NO_3)	61	1.66	.75	.10	3.80	.096	3.70

Table 3.--Descriptive statistics of water-quality data collected at selected U.S. Geological Survey stream-gaging stations--Continued

Parameter	Number of analyses	Mean	Standard deviation	Minimum value	Maximum value	Standard error of mean	Range
		Howard Slough (site 6)					
Temperature, water (°C)	77	11.2	8.2	0.0	29.0	0 94	29.0
Temperature, air (°C)	35	13.1	9.0	-.5	32.0	1.5	32.5
Streamflow, instantaneous (ft^3/s)	56	29.3	18.9	3.6	87.0	2.52	83.4
Specific conductance (umhos/cm at 25°C)	77	897	244	590	1,780	27.9	1,190
Oxygen, dissolved (mg/L)	17	9.4	1.9	6.0	12.1	.46	6.1
pH (units)	71	8.2	.3	7.5	9.0	.04	1.5
Carbon dioxide, dissolved (mg/L as CO_2)	54	4.6	3.4	.5	16.0	.47	15.5
Alkalinity (mg/L as $CaCO_3$)	78	328	76	156	532	8.6	376
Bicarbonate (mg/L as HCO_3)	69	389	88	190	649	10.5	459
Carbonate (mg/L as CO_3)	61	4.5	9.2	.0	43	1.18	43.0
Nitrogen, NO_2 + NO_3, dissolved (mg/L as N)	72	2.88	4.30	.0	29.0	.51	29.0
Phosphorus, orthophosphate, dissolved (mg/L)	74	.69	.75	.03	4.3	.087	4.27
Cyanide, total (mg/L as Cn)	7	.001	.004	.00	.01	.001	.01
Hardness (mg/L as $CaCO_3$)	75	301	55	200	460	6.4	260
Hardness, noncarbonate (mg/L as $CaCO_3$)	75	3.1	8.5	.0	54.0	.99	54.0
Calcium, dissolved (mg/L as Ca)	75	57.9	9.2	30	87	1.06	57
Magnesium, dissolved (mg/L as Mg)	75	37.8	11.4	23	71	1.32	48
Sodium, dissolved (mg/L as Na)	77	83.0	36.8	41	190	4.20	149
Sodium-adsorption ratio	75	2.08	.82	1.1	4.4	.094	3.3
Sodium, percent	75	35.2	7.2	24	58	.83	34
Sodium + potassium, dissolved (mg/L as Na)	3	126.7	56.9	80	190	32.8	110
Potassium, dissolved (mg/L as K)	75	15.2	7.3	6.8	49.0	.85	42.2
Chloride, dissolved (mg/L as Cl)	75	69.9	28.5	33	150	3.29	117
Sulfate, dissolved (mg/L as SO_4)	75	59.3	19.1	33	110	2.20	77
Fluoride, dissolved (mg/L as F)	74	.43	.24	.1	2.1	.028	2.0
Silica, dissolved (mg/L as SiO_2)	75	16.4	4.8	.3	26.0	.56	25.7
Arsenic, dissolved (ug/L as As)	9	30.9	17.7	13	65	5.90	52
Barium, dissolved (ug/L as Ba)	7	114	69	.0	200.0	26.1	200.0
Boron, dissolved (ug/L as B)	74	252	119	90	820	13.9	730
Cadmium, dissolved (ug/L as Cd)	8	.5	.5	.0	1.0	.19	1.0
Chromium, dissolved (ug/L as Cr)	8	2.8	4.5	.0	10.0	1.60	10.0
Copper, dissolved (ug/L as Cu)	10	3.2	2.0	1.0	7.0	.65	6.0
Iron, dissolved (ug/L as Fe)	65	77.2	80.5	.0	430.0	9.98	430.0
Lead, dissolved (ug/L as Pb)	9	3.2	2.9	.0	10.0	.98	10.0
Manganese, dissolved (ug/L as Mn)	65	30.8	23.3	.0	120.0	2.88	120.0
Silver, dissolved (ug/L as Ag)	7	.14	.38	.0	1.0	.143	1.0
Zinc, dissolved (ug/L as Zn)	9	15.6	8.5	4.0	30.0	2.82	26.0
Lithium, dissolved (ug/L as Li)	8	78.8	22.9	50.0	110.0	8.12	60.0
Selenium, dissolved (ug/L as Se)	9	.7	1.3	.0	4.0	.44	4.0
Solids, dissolved, sum of constituents (mg/L)	75	551	143	359	972	16.5	613
Solids, dissolved (tons per day)	75	44.8	39.9	7.6	282.0	4.62	274.4
Solids, dissolved (tons per acre-feet)	76	.75	.19	.49	1.32	.022	.83
Mercury, dissolved (ug/L as Hg)	9	.08	.20	.0	.6	.066	.6

Table 3.--Descriptive statistics of water-quality data collected at selected U.S. Geological Survey stream-gaging stations--Continued

Parameter	Number of analyses	Mean	Standard deviation	Minimum value	Maximum value	Standard error of mean	Range
		Weber River at Plain City (site 8)					
Temperature, water (^{o}C)	116	10.6	6.6	0.0	24.0	0.61	24.0
Temperature, air (^{o}C)	83	11.7	9.4	-10.0	34.0	1.04	44.0
Streamflow, instantaneous (ft^3/s)	96	543	740	37	3,060	75.6	3.023
Turbidity (JTU)	43	15.3	16.5	3	92	2.5	89
Turbidity (NTU)	25	13.6	15.4	1	65	3.1	64
Specific conductance (umhos/cm at 25^{o}C)	181	659	209	280	1,390	15.6	1,110
Oxygen, dissolved (mg/L)	66	8.7	2.0	5.4	13.4	.25	8.0
pH (units)	139	7.9	.326	7.300	8.7	.028	1.4
Carbon dioxide, dissolved (mg/L as CO_2)	70	5.2	3.0	.7	16.0	.36	15.3
Alkalinity (mg/L as $CaCO_3$)	82	206.9	42.6	23	300	4.7	277
Bicarbonate (mg/L as HCO_3)	125	262.2	54.7	28.4	360.0	4.89	331.6
Carbonate (mg/L as CO_3)	107	1.1	3.7	.0	21.0	.36	21.0
Periphyton, biomass, ash weight (g/mi^2)	15	27.1	30.3	.4	104.0	7.8	103.6
Periphyton, biomass, total dry weight (g/mi^2)	15	181.8	568.1	.5	2,231	146.7	2,230.5
Nitrogen, total (mg/L as N)	66	2.2	1.2	1.00	7.1	.15	6.1
Nitrogen, dissolved (mg/L as N)	12	1.94	.94	.76	4.1	.27	3.34
Nitrogen, organic, total (mg/L as N)	30	.96	.49	.39	3.0	.090	2.61
Nitrogen, organic, dissolved (mg/L as N)	11	.72	.43	.16	1.80	.129	1.64
Nitrogen, ammonia, dissolved (mg/L as N)	11	.23	.17	.06	.63	.051	.57
Nitrogen, ammonia, total (mg/L as N)	35	.2	.2	.00	1.10	.03	1.1
Nitrogen, ammonia + organic, dissolved (mg/L as N)	34	.89	.46	.29	2.20	.079	1.91
Nitrogen, NH_4 + organic, suspended, total (mg/L as N)	30	.36	.36	.0	1.20	.065	1.2
Nitrogen, ammonia + organic, total (mg/L as N)	66	1.17	.61	.05	3.80	.075	3.75
Nitrogen, NO_2 + NO_3, total (mg/L as N)	71	1.18	1.16	.12	7.00	.137	6.88
Nitrogen, NO_2 + NO_3, dissolved (mg/L as N)	22	1.037	.645	.31	2.70	.138	2.39
Phosphorus, orthophosphate, total (mg/L)	3	1.50	.62	1.00	2.20	.361	1.20
Phosphorus, orthophosphate, dissolved (mg/L)	10	1.69	1.23	.18	3.40	.388	3.22
Phosphorus, total (mg/L as P)	71	1.06	1.02	.18	5.20	.121	5.02
Phosphorus, dissolved (mg/L as P)	35	.82	.67	.06	3.00	.113	2.94
Carbon, organic, total (mg/L as C)	34	11.2	11.7	3	57	2.00	54
Carbon, organic, dissolved (mg/L as C)	13	6.8	2.5	3.3	11.0	.70	7.7
Carbon, organic, suspended (mg/L as C)	11	1.32	.54	.6	2.3	.16	1.7
Hardness (mg/L as $CaCO_3$)	135	237.5	46.1	120	330	3.97	210
Hardness, noncarbonate (mg/L as $CaCO_3$)	134	23.9	21.2	.0	220	1.83	220
Calcium, dissolved (mg/L as Ca)	131	62.9	11.3	35	81	.99	46
Magnesium, dissolved (mg/L as Mg)	131	19.8	5.1	8.7	33.0	.45	24.3
Sodium, dissolved (mg/L as Na)	138	50.3	28.9	12	190	2.46	178
Sodium-adsorption ratio	134	1.4	.8	.4	5.1	.067	4.7
Sodium, percent	81	28.1	9.8	15	60	1.09	45
Sodium + potassium, dissolved (mg/L as Na)	14	47.8	11.5	28	69	3.07	41
Potassium, dissolved (mg/L as K)	119	6.4	2.9	1.3	17.0	.27	15.7
Chloride, dissolved (mg/L as Cl)	137	70.2	45.5	11	290	3.8	279
Sulfate, dissolved (mg/L as SO_4)	137	34.7	10.1	15	86	.86	71
Fluoride, dissolved (mg/L as F)	85	.21	.08	.1	.7	.009	.6
Silica, dissolved (mg/L as SiO_2)	132	10.1	2.0	4.9	15.0	.18	10.1
Arsenic, dissolved (ug/L as As)	25	2.2	1.2	.0	5.0	.25	5.0
Arsenic, suspended, total (ug/L as As)	19	.8	1.0	.0	3.0	.24	3.0
Arsenic, total (ug/L as As)	25	2.9	1.3	1.0	5.0	.26	4.0
Barium, dissolved (ug/L as Ba)	13	105.3	29.0	80	200	8.06	120
Barium, suspended recoverable (ug/L as Ba)	13	110	228	.0	800	63.2	800
Barium, total recoverable (ug/L as Ba)	13	185	247	.0	900	68.7	900
Boron, dissolved (ug/L as B)	58	108	46	30	210	6.0	180
Cadmium, dissolved (ug/L as Cd)	25	1.2	1.4	.0	5.0	.28	5.0
Cadmium, suspended recoverable (ug/L as Cd)	22	4.9	4.6	.0	10.0	.98	10.0
Cadmium, total recoverable (ug/L as Cd)	25	5.5	4.5	.0	10.0	.91	10.0
Chromium, dissolved (ug/L as Cr)	25	2.0	5.0	.0	20.0	1.00	20.0
Chromium, suspended recoverable (ug/L as Cr)	24	5.0	10.2	.0	40.0	2.08	40.0
Chromium, total recoverable (ug/L as Cr)	25	6.0	10.4	.0	40.0	2.08	40.0
Cobalt, dissolved (ug/L as Co)	25	1.3	1.4	.0	3.0	.29	3.0
Cobalt, suspended recoverable (ug/L as Co)	22	23.6	24.7	.0	50.0	5.26	50.0

Parameter	Number of analyses	Mean	Standard deviation	Minimum value	Maximum value	Standard error of mean	Range
Weber River at Plain City (site 8)--Continued							
Cobalt, total recoverable (ug/L as Co)	25	23.2	24.6	.0	50.0	4.92	50.0
Copper, dissolved (ug/L as Cu)	25	3.4	1.9	.0	8.0	.38	8.0
Copper, suspended recoverable (ug/L as Cu)	24	25	59	.0	270	12.0	270
Copper, total recoverable (ug/L as Cu)	25	28	57	2	270	11.4	268
Iron, suspended recoverable (ug/L as Fe)	10	812	1,245	240	4,300	393	4,060
Iron, total recoverable (ug/L as Fe)	33	2,902	12,641	.0	73,000	2,200	73,000
Iron, dissolved (ug/L as Fe)	29	50	105	10	590	19.6	580
Lead, dissolved (ug/L as Pb)	25	5.9	10.4	.0	48.0	2.09	48.0
Lead, suspended recoverable (ug/L as Pb)	24	61.2	39.6	4	100	8.09	96
Lead, total recoverable (ug/L as Pb)	25	68.8	40.5	4	100	8.1	96
Manganese, suspended recoverable (ug/L as Mn)	25	86.4	216.6	.0	1,100	43.3	1,100
Manganese, total recoverable (ug/L as Mn)	25	129	206	40	1,100	41.2	1,060
Manganese, dissolved (ug/L as Mn)	30	43	23	.0	100	4.3	100
Nickel, dissolved (ug/L as Ni)	5	2.2	1.1	1.0	3.0	0.49	2.0
Nickel, suspended recoverable (ug/L as Ni)	5	3.4	2.5	.0	7.0	1.12	7.0
Nickel, total recoverable (ug/L as Ni)	5	5.0	3.7	.0	10.0	1.67	10.0
Silver, dissolved (ug/L as Ag)	13	.0	0.0	.0	.0	.0	0
Silver, suspended recoverable (ug/L as Ag)	13	.9	2.8	.0	10.0	.76	10
Silver, total recoverable (ug/L as Ag)	17	.9	2.4	.0	10.0	59	10
Zinc, dissolved (ug/L as Zn)	25	16.9	21.4	.0	110	4.28	110
Zinc, suspended recoverable (ug/L as Zn)	25	42.4	79.8	.0	350	15.97	350
Zinc, total recoverable (ug/L as Zn)	25	55	79	10.0	350	15.9	340
Selenium, dissolved (ug/L as Se)	25	.04	.20	.0	1.0	.040	1.0
Selenium, suspended total (ug/L as Se)	24	.17	.38	.0	1.0	.078	1.0
Selenium, total (ug/L as Se)	25	.16	.37	.0	1.0	.075	1.0
Coliform, fecal, 0.45 UM-MF (cols/100 mL)	21	65	61	.0	220	13.4	220
Coliform, fecal. 0.7 UM-MF (cols/100 mL)	50	368	1,450	1	10.000	205	9,999
Streptococci, fecal, KF agar (cols/100 mL)	49	252	455	1	2,500	65	2,499
Streptococci, fecal (cols/100 mL)	26	77	158	2.0	980	30.9	978
Chlorophyll, B periphyton, uncorrected (mg/m^2)	6	6.8	11.3	.0	28	4.63	26
Chlorophyll, A periphyton, uncorrected (mg/m^2)	6	60	90	.2	193	36.9	192.8
Simazine, total, Coulson condition (ug/L)	9	.0	.0	.0	.0	.0	.0
Simazine, in bottom material (ug/kg, dry)	4	.0	.0	.0	.0	.0	.0
Aldrin, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Aldrin, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Lindane, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Lindane, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Chlordane, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Chlordane, total in bottom material (ug/kg)	10	.9	1.8	.0	5.0	.55	5.0
DDD, total (ug/L)	21	.0	.0	.0	.0	.0	.0
DDD, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
DDE, total (ug/L)	20	.0	.0	.0	.0	.0	.0
DDE, total in bottom material (ug/kg)	9	.0	.0	.0	.0	.0	.0
DDT, total (ug/L)	21	.0	.0	.0	.0	.0	.0
DDT, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Dieldrin, total (ug/L)	21	.0	.002	.000	.010	.0	.010
Dieldrin, total in bottom material (ug/kg)	10	.08	.18	.00	.43	.057	.43
Endrin, total (ug/L)	21	.000	.0	.0	.0	.0	.0
Endrin, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Ethion, total (ug/L)	20	.0	.0	.0	.0	.0	.0
Ethion, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Toxaphene, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Toxaphene, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Heptachlor, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Heptachlor, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Heptachlor, epoxide, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Heptachlor, epoxide, total in bottom material	10	.0	.0	.0	.0	.0	.0
Methoxychlor, total (ug/L)	21	.0	.0	.0	.0	.0	.0
Methoxychlor, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Aroclor, total in bottom material, 1242 PCB series	2	.68	.96	.00	1.36	.68	1.36

Table 3.--Descriptive statistics of water-quality data collected at selected U.S. Geological Survey stream-gaging stations--Continued

Parameter	Number of analyses	Mean	Standard deviation	Minimum value	Maximum value	Standard error of mean	Range
			Weber River at Plain City (site 8)--Continued				
Aroclor, total in bottom material, 1254 PCB series	6	5.8	6.1	2.3	18.1	2.49	15.8
PCB, total (ug/L)	10	.0	.0	.0	.0	.0	.0
Malathion, total (ug/L)	20	.0	.0	.0	.0	.0	.0
Malathion, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Parathion, total (ug/L)	20	.0	.0	.0	.0	.0	.0
Parathion, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Diazinon, total (ug/L)	20	.01	.04	.0	.2	.01	.2
Diazinon, total in bottom material (ug/kg)	10	.03	.09	.0	.3	.03	.3
Methyl parathion, total (ug/L)	20	.0	.0	.0	.0	.0	.0
Methyl parathion, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Atrazine, total (ug/L)	12	.0	.0	.0	.0	.0	.0
Atrazine, total in bottom material (ug/kg)	4	.0	.0	.0	.0	.0	.0
2,4-D, total (ug/L)	13	.0	.0	.0	.0	.0	.0
2.4-D, total in bottom material (ug/kg)	5	.0	.0	.0	.0	.0	.0
2,4,5-T, total (ug/L)	13	.0	.0	.0	.0	.0	.0
2.4,5-T, total in bottom material (ug/kg)	5	.0	.0	.0	.0	.0	.0
Silvex, total (ug/L)	13	.0	.0	.0	.0	.0	.0
Silvex, total in bottom material (ug/kg)	5	.0	.0	.0	.0	.0	.0
Trithion, total (ug/L)	20	.0	.0	.0	.0	.0	.0
Trithion, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Methyl trithion, total (ug/L)	20	.0	.0	.0	.0	.0	.0
Methyl trithion, total in bottom material (ug/kg)	10	.0	.0	.0	.0	.0	.0
Phytoplanktkon, total (cells/mL)	51	5,944	8,111	100	35,000	1,136	34,900
Solids, dissolved residue at 180°C (mg/L)	136	406	121	165	772	10.4	607
Solids, dissolved, sum of constituents (mg/L)	81	372	124	163	788	13.8	625
Solids, dissolved (tons per day)	135	276	303	5	1,520	26	1.515
Solids, dissolved (tons per acre-feet)	147	.54	.16	.22	1.05	.014	.83
Sediment, suspended, sieve diameter (% finer than .062 mm)	67	82.9	27.5	7	247	3.4	240
Biomass, chlorophyll ratio periphyton	7	2,225	3,754	24.7	9,201	1,419.1	9,176.3
Chlor-A periphyton, chromospectmetric (mg/m^2)	4	2.081	2.795	.413	6.230	1.398	5.817
Chlor-B periphyton, chromospectmetric (mg/m^2)	4	.201	.150	.019	.387	.075	.368
Chlor-A periphyton, chromographic fluorometric (mg/m^2)	9	23.47	33.99	.06	105	11.33	104.94
Chlor-B periphyton, chromographic fluorometric (mg/m^2)	9	3.23	4.67	.0	13.4	1.56	13.4
Nitrogen, ammonia, total (mg/L as NH_4)	17	.26	.18	.05	.74	.044	.69
Nitrogen, ammonia, dissolved (mg/L as NH_4)	11	.29	.22	.08	.81	.066	.73
Nitrogen, nitrate, total (mg/L as NO_3)	23	8.0	5.6	1.0	18	1.17	17.0
Nitrogen, nitrate, dissolved (mg/L as NO_3)	46	6.8	5.2	1.0	18	.77	17
Iron (ug/L as Fe)	13	9.2	9.5	.0	20	2.65	20
Phosphorus, total (mg/L as PO_4)	17	3.1	2.7	.86	12.0	.66	11.14
Nitrogen, total (mg/L as NO_3)	66	9.9	5.3	4.4	31	.65	26.6
Mercury, dissolved (ug/L as Hg)	25	.05	.13	.0	.6	.026	.6
Mercury, suspended recoverable (ug/L as Hg)	24	.02	.06	.0	.2	.012	.2
Mercury, total recoverable (ug/L as Hg)	25	.06	.13	.0	.6	.027	.6
Sediment, suspended (mg/L)	70	82	235	4	1,790	28.0	1,785
Sediment, suspended discharge (t/day)	61	240	845	.84	5,780	108.3	5,779

Table 4.--Bacteriological data from selected sites

[NI, nonideal colony count.]

Site No.	Site name (abbreviated)	Colonies per 100 milliliter sample: Total coliform	Fecal coliform (F.C.)	Fecal streptococci (F.S.)	F.C./F.S. ratio
5	Hooper Slough	26,000	1,000	1,200	0.83
6	Howard Slough	29,000	510	3,000	.17
8	Weber River near Plain City	900	96	120	.80
20	Weber River near Slaterville	2,100NI	700	82	8.54
23	Weber River below Union Stockyards	--	1,500NI	340NI	4.41
29	Weber River at Riverdale Road	--	270	84	3.21
37	Weber River at Gateway	--	180NI	340NI	.53
45	Ogden River below Pineview Reservoir	990NI	5NI	21	.24
92	Weber River near Oakley	720	5NI	100	.05

Table 5.--Trace-element concentrations

[Constituents are dissolved and constituent values are reported in

Site No.	Site name (abbreviated)	Semi-Quantitative (S) Quantitative (Q)	Date of collection	Discharge (ft^3/s)	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)
5	Hooper Slough near Hooper	S	7-31-79	16	300	<30	-	100	<1	<1,000	5	<50	<5
		Q	8-11-80	29.7	-	-	19	-	-	-	<1	10	-
6	Howard Slough at U.S.G.S. gage	S	7-31-79	23	300	<30	-	100	<1	<1,000	1	<50	<5
		Q	8-11-80	20.7	-	-	19	-	-	-	<1	10	-
8	Weber River near Plain City	S	7-31-79	75	300	<30	-	100	<1	<1,000	5	<50	<5
		Q	7-18-79	-	-	-	2	100	-	-	4	0	<3
		Q	10-31-79	163	-	-	1	100	-	-	<1	0	<3
		Q	12-4-79	136	-	-	2	100	-	-	<1	0	<3
		Q	2-12-80	293	-	-	2	100	-	-	<1	0	<3
		Q	5-21-80	2,640	-	-	1	80	-	-	<1	0	<3
		Q	8-11-80	54	-	-	4	-	-	-	<1	20	-
20	Weber River above Slaterville diversion	S	7-31-79	270	300	<30	-	70	<1	<1,000	3	<50	<5
23	Weber River below Union Stockyards	S	7-31-79	90	300	<30	-	100	<1	<1,000	10	<50	<5
25	Ogden River near mouth	S	7-31-79	187	300	<30	-	50	<1	<1,000	10	<50	<5
		Q	8-11-80	220	-	-	2	-	-	-	<1	10	-
27	Weber River above Union Stockyards	S	7-31-79	160	100	<30	-	100	<1	<1,000	3	<50	<5
28	Weber River near I-15 31st Street	S	7-31-79	160	100	<30	-	100	<1	<1,000	10	<50	<5
29	Weber River at Riverdale Road	S	7-31-79	160	100	<30	-	100	<1	<1,000	10	<50	<5
33	Weber River at canyon mouth	S	8-1-79	160	100	<30	-	100	1	<1,000	19	<50	<5
37	Weber River at Gateway	S	8-1-79	432	100	<30	-	100	<1	<1,000	10	<50	<5
		Q	8-12-80	456	-	-	2	-	-	-	<1	10	-
57	East Canyon Creek near mouth	S	8-1-79	130	100	<30	-	100	<1	<1,000	5	<50	<5
		Q	8-12-80	135	-	-	4	-	-	-	<1	0	-
58	Weber River at Morgan	S	8-1-79	560	10	<30	-	100	<1	<1,000	3	<50	<5
60	Lost Creek at mouth	Q	8-12-80	49	-	-	1	-	-	-	<1	0	-
68	Unnamed creek from Parleys Park	Q	8-13-80	.1	-	-	3	-	-	-	3	10	-
70	McLeod Creek below Park City	Q	8-13-80	12	-	-	12	-	-	-	<1	0	-
75	Silver Creek at Wanship	Q	8-12-80	1	-	-	11	-	-	-	3	10	-
76	Weber River below Echo Reservoir	S	8-2-79	510	100	<30	-	100	<1	<1,000	5	<50	<5
77	Echo Creek at mouth	Q	8-12-80	5.2	-	-	2	-	-	-	<1	0	-
78	Chalk Creek at mouth at U.S.G.S. gage	Q	8-12-80	23	-	-	1	-	-	-	<1	10	-
80	Weber River below Rockport Reservoir	S	8-2-79	165	100	<30	-	100	<1	<1,000	3	<50	<5
87	Beaver Creek near mouth	S	8-2-79	27	100	<30	-	70	<1	<1,000	3	<50	<5
92	Weber River near Oakley	S	8-2-79	85	100	<30	-	100	<1	<1,000	3	<50	<5
		Q	8-13-79	124	-	-	1	-	-	-	<1	10	-

in water samples from selected sites

micrograms per liter. Abbreviations: ft^3/s, cubic feet per second.]

Copper (Cu)	Gallium (Ga)	Germanium (Ge)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Strontium (Sr)	Tin (Sn)	Titanium (Ti)	Vanadium (V)	Zircon (Zr)	Zinc (Zn)
<10	<30	300	10	-	70	10	-	<10	<50	-	<10	500	100	<5	<10	<5	<5
1	-	-	20	0	-	10	0.0	-	-	0	-	-	-	-	-	-	<3
<10	<30	300	30	-	70	30	-	<10	<50	-	<10	500	100	<5	<10	<5	<5
2	-	-	40	2	-	20	.1	-	-	0	-	-	-	-	-	-	4
<10	<30	100	10	-	50	30	-	<10	<50	-	<10	300	<50	<5	<10	<5	<5
2	-	-	20	21	-	60	.1	-	-	0	0	-	-	-	-	-	5
0	-	-	20	0	-	30	.0	-	1	0	0	-	-	-	-	-	10
3	-	-	20	6	-	40	.0	-	1	0	0	-	-	-	-	-	20
1	-	-	<10	0	-	40	.0	-	3	0	0	-	-	-	-	-	10
5	-	-	40	0	-	20	.1	-	3	0	0	-	-	-	-	-	5
2	-	-	20	2	-	40	.0	-	-	0	-	-	-	-	-	-	3
<10	<30	70	5	-	10	30	-	<10	<50	-	<10	100	<50	<5	<10	<5	5
<10	<30	100	7	-	10	30	-	<10	<50	-	<10	300	<50	<5	<10	<5	<5
<10	<30	30	7	-	30	30	-	<10	<50	-	<10	100	<50	<5	<10	<5	30
1	-	-	20	0	-	20	.0	-	-	0	-	-	-	-	-	-	<3
<10	<30	100	10	-	10	30	-	<10	<50	-	<10	300	100	<5	<10	<5	<5
<10	<30	100	10	-	10	10	-	<10	<50	-	<10	300	100	<5	<10	<5	<5
<10	<30	100	7	-	10	10	-	<10	<50	-	<10	300	100	<5	<10	<5	10
<10	<30	100	7	-	10	10	-	<10	<50	-	<10	300	100	<5	<10	<5	<5
<10	<30	100	<5	-	10	10	-	<10	<50	-	<10	300	100	<5	<10	<5	<5
1	-	-	10	0	-	8	.0	-	-	0	-	-	-	-	-	-	4
<10	<30	100	5	-	10	7	-	<10	<50	-	<10	300	100	<5	<10	<5	<5
0	-	-	<10	0	-	6	.0	-	-	0	-	-	-	-	-	-	<3
<10	<30	100	7	-	10	30	-	<10	<50	-	<10	300	100	<5	<10	<5	<5
0	-	-	10	0	-	6	.0	-	-	0	-	-	-	-	-	-	4
1	-	-	20	3	-	140	.0	-	-	0	-	-	-	-	-	-	5
0	-	-	10	0	-	30	.0	-	-	2	-	-	-	-	-	-	20
4	-	-	<10	3	-	60	.0	-	-	0	-	-	-	-	-	-	150
<10	<30	100	5	-	10	70	-	<10	<50	-	<10	300	70	<5	<10	<5	<5
1	-	-	20	0	-	9	.0	-	-	1	-	-	-	-	-	-	<3
2	-	-	20	1	-	10	.0	-	-	0	-	-	-	-	-	-	<3
<10	<30	100	<5	-	10	7	-	<10	<50	-	<10	100	70	<5	<10	<5	<5
<10	<30	100	10	-	10	10	-	<10	<50	-	<10	300	70	<5	<10	<5	<5
<10	<30	70	10	-	<10	5	-	<10	<50	-	<10	70	70	<5	<10	<5	<5
0	-	-	10	1	-	4	.0	-	-	0	-	-	-	-	-	-	<3

Table 6.--Pesticide concentrations in stream-bottom materials at selected sites, July 31, 1979

[Concentrations are reported in micrograms per kilogram. The analytical detection limit for all pesticides listed is 0.1 microgram per kilogram except for Chlordane and PCB which is 1 microgram per kilogram and Toxaphene which is 10 micrograms per kilogram. The symbol "--" represents levels below the limit of detection.]

Pesticide	Site name (abbreviated)		
	Hooper Slough near Hooper (site 5)	Howard Slough at Hooper (site 6)	Weber River at 1150 South Street (site 7)
Aldrin	--	--	--
Chlordane	1	--	6
DDD	.6	--	.5
DDE	.4	0.1	.1
DDT	.4	--	.2
Diazinon	--	--	--
Dieldrin	--	--	.2
Endosulfan	--	--	--
Endrin	--	--	--
Ethylparathion	--	--	--
Ethyltrithion	--	--	--
Ethion	--	--	--
Heptachlor epoxide	--	--	--
Heptachlor	--	--	--
Lindane	--	--	--
Malathion	--	--	--
Methylparathion	--	--	--
Methyltrithion	--	--	--
Methoxychlor	--	--	--
Mirex	--	--	--
PCB	1	--	5
Perthane	--	--	--
Toxaphene	--	--	--

Table 7.--Chemical analyses of water samples collected

[Abbreviations: ft^3/s, cubic feet per second; °C, degrees Celsius; µmhos, micromhos

Discharge: E, estimated.

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (µmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved potassium (K)
1	Weber River North	7-31-79	8.0	23.0	820	8.4	483	14	69	23	75	11
	Fork at Ogden	10-24-79	23	10.0	800	7.9	460	13	68	23	64	8.9
	Bay dike at	2-25-80	455	7.0	610	8.3	367	10	62	20	44	6.1
	(B-6-3)35bcb	4-1-80	325	5.0	540	8.3	302	7.2	57	16	30	3.9
		5-12-80	1,250	8.0	320	8.0	180	8.6	38	10	13	2.6
		8-11-80	5	22.0	720	8.5	418	4.8	59	23	63	8.2
2	Weber River Middle	7-31-79	104	24.5	675	8.8	400	11	60	20	56	9.7
	Fork at Ogden	10-24-79	85	11.0	770	7.9	447	13	69	23	58	8.9
	Bay dike at	2-25-80	160	5.0	590	8.3	355	9.7	65	20	37	5.1
	(B-6-3)35cbb	4-1-80	136	5.0	515	8.3	301	7.7	59	17	28	3.8
		5-12-80	200	8.0	330	8.1	179	8.7	38	10	12	2.5
		8-11-80	88	23.0	785	8.7	456	6.0	60	22	78	8.9
3	Weber River South	7-31-79	Dry	-	-	-	-	-	-	-	-	-
	Fork at Ogden	10-24-79	Dry	-	-	-	-	-	-	-	-	-
	Bay dike at	2-25-80	300 E	6.0	730	8.2	450	12	61	25	68	11
	(B-5-3)11bcb	4-1-80	245	5.0	540	8.4	318	7.4	58	18	32	4.6
		5-12-80	1,480	9.0	385	8.1	207	8.7	38	11	20	4.0
		8-11-80	Dry	-	-	-	-	-	-	-	-	-
4	South Run Canal	7-31-79	34	23.0	770	8.3	455	16	56	28	62	17
	at Ogden Bay	10-24-79	37	10.0	1,155	8.1	663	15	65	34	120	21
	dike at	2-25-80	98	6.0	1,060	8.7	674	17	61	38	130	22
	(B-5-3)11bcc	4-1-80	48	5.0	585	8.4	334	7.6	59	19	39	5.5
		5-12-80	56	9.0	520	7.9	318	10	38	17	49	9.9
		8-11-80	24	21.5	720	8.6	423	12	52	26	59	15
5	Hooper Slough at	7-31-79	16	21.5	820	8.2	494	21	63	36	60	2.0
	U.S.G.S. gage at	10-24-79	7.2	10.0	1,130	8.1	695	24	69	49	93	32
	(B-5-3)11baa	2-25-80	21.8	7.0	1,470	8.3	937	25	73	66	160	33
		3-17-80	8.3	5.0	1,390	8.2	883	23	76	64	150	31
		4-1-80	9.0	4.0	1,290	8.4	804	18	65	59	130	30
		5-12-80	20	9.0	1,450	8.2	898	24	57	60	170	47
		8-11-80	29.7	27.0	740	8.0	444	20	57	30	50	17
6	Howard Slough at	7-31-79	23	18.0	795	7.8	497	21	65	35	68	12
	U.S.G.S. gage at	10-24-79	10.3	8.0	1,040	8.2	651	25	60	47	95	19
	(B-5-3)25add	2-25-80	27	4.5	1,360	8.4	907	26	66	71	160	25
		3-17-80	15	11.5	1,130	8.3	737	23	62	61	130	18
		4-1-80	13.7	1.0	1,230	8.4	756	20	56	59	130	22
		4-16-80	8.6	8.0	1,220	8.3	793	21	54	64	140	21
		5-7-80	16	16.5	1,010	8.4	612	19	45	43	110	21
		5-12-80	73	8.0	1,220	8.4	749	20	30	43	160	49
		6-10-80	24	20.5	700	7.5	446	13	47	33	65	11
		7-21-80	22	18.5	710	7.6	419	17	54	29	57	10
		7-31-80	20	20.0	870	7.7	526	25	57	34	75	17
		8-11-80	20.7	16.0	820	7.8	494	22	56	34	69	15
7	Weber River at	7-31-79	85	23.0	670	7.9	401	12	64	22	53	7.4
	bridge at 1150	5-12-80	2,960	8.0	320	8.1	182	8.7	38	10	13	2.9
	So. Street at											
	(B-6-2)19bac											
8	Weber River near	7-31-79	75	21.5	665	7.8	372	12	63	20	45	6.4
	Plain City at	8-22-79	82	20.5	675	7.8	384	13	60	20	49	7.3
	U.S.G.S. gage	9-11-79	129	19.5	580	7.9	343	11	61	20	36	5.3
	at (B-6-2)5dcc	10-24-79	145	11.0	770	7.8	432	12	68	22	50	8.3
		10-31-79	163	8.0	710	8.1	397	9.9	65	21	43	7.4
		12-4-79	136	3.0	665	8.1	470	11	72	23	55	7.7
		1-4-80	65	6.0	755	7.9	460	12	70	23	61	8.1
		1-30-80	189	2.0	635	7.7	374	10	63	20	43	5.6
		2-12-80	293	3.0	600	8.4	359	8.9	65	19	35	4.4
		2-25-80	744	5.0	580	8.2	347	9.5	66	20	34	4.8
		3-12-80	910	5.5	480	7.8	298	8.2	63	18	24	4.0
		4-1-80	735	5.5	495	8.2	288	7.1	59	16	24	3.5
		4-9-80	1,720	6.0	355	8.3	236	6.9	52	13	15	2.8
		5-12-80	2,960	7.5	320	8.1	181	8.8	39	10	12	2.6
		5-21-80	2,645	12.0	320	8.2	197	8.7	40	10	12	2.0
		6-24-80	426	15.0	450	7.6	261	7.9	53	15	22	3.4
		7-10-80	69	20.0	710	7.7	404	12	66	21	46	7.3
		8-11-80	54	20.0	665	8.2	371	11	58	19	47	6.1
9	Warren Canal above	7-31-79	65	20.0	740	7.7	433	14	72	23	55	7.7
	Fourmile Creek at	5-12-80	43	9.5	400	8.0	226	9.2	42	13	21	4.5
	(B-6-2)4bdc											

in the Weber River basin, July 1979 through August 1980

per centimeter at 25°C, mg/L, milligrams per liter; pCi/L, picocuries per liter.]

Milligrams per liter												
Alkalinity (total as $CaCO_3$)	Dissolved sulfate (SO_4)	Dissolved chloride (Cl)	Dissolved fluoride (F)	Dissolved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phosphorus, orthophosphate (as P)	Dissolved phosphate, ortho (as PO_4)	Total hardness (as $CaCO_3$)	Noncarbonate hardness (as $CaCO_3$)	Sodium adsorption ratio	Dissolved boron (B) (mg/L)	Potassium-40 (pCi/L)	Dissolved oxygen (mg/L)
260	39	95	0.2	0.00	0.64	2.0	270	7	1.9	100	8.2	5.5
250	44	81	.2	1.6	.89	2.7	260	15	1.7	160	6.6	7.2
210	36	58	.2	1.0	.32	.98	240	27	1.2	100	4.6	9.8
190	32	39	.2	.64	.25	.77	210	18	.9	80	2.9	10.4
120	18	17	.1	.19	.01	.03	140	16	.5	60	1.9	9.2
250	31	78	.4	.00	.72	2.2	240	0	1.8	170	6.1	14.1
230	35	69	.2	.08	.49	1.5	230	2	1.6	200	7.2	13.2
250	42	75	.2	1.7	.95	2.9	270	17	1.5	140	6.6	7.0
210	34	53	.2	1.0	.27	.83	240	35	1.0	90	3.8	9.7
190	32	36	.2	.63	.23	.71	220	77	.8	80	2.8	10.0
120	18	16	.1	.34	.01	.03	140	16	.4	50	1.9	9.1
240	37	99	.3	.003	.48	1.5	240	0	2.2	180	6.6	15.8
-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-
240	46	78	.2	1.0	.26	.80	260	15	1.9	150	8.2	7.8
200	33	41	.1	.70	.25	.77	220	19	.9	70	3.4	11.0
130	20	26	.1	.30	.07	.21	140	10	.7	70	3.0	6.1
-	-	-	-	-	-	-	-	-	-	-	-	-
270	46	64	.3	.66	.21	.64	260	0	1.7	250	13	6.7
280	65	170	.3	.83	.38	1.2	300	22	3.0	240	16	8.3
320	76	130	.3	1.5	.37	1.1	310	0	3.2	290	16	6.0
200	35	45	.1	.79	.25	.77	230	26	1.1	80	4.1	9.9
170	29	61	.2	.38	.18	.55	160	0	1.7	160	7.4	6.2
240	40	71	.3	.62	.21	.64	240	0	1.7	210	11	11.1
310	56	61	.3	1.8	.22	.67	310	0	1.5	280	1.5	6.0
400	81	91	.4	3.3	.35	1.1	370	0	2.1	290	24	8.0
490	110	160	.5	3.3	.51	1.6	450	0	3.3	400	25	-
450	110	140	.5	3.9	.80	2.5	450	3	3.1	350	23	9.5
430	100	130	.4	2.8	.30	.92	410	0	2.8	290	22	-
440	94	170	.4	2.4	.75	2.3	390	0	3.8	550	35	-
270	43	56	.4	1.8	.17	.52	270	0	1.3	200	13	6.4
310	56	51	.3	.44	.21	.64	310	0	1.7	140	9.0	6.9
400	73	78	.4	3.0	.18	.55	340	0	2.2	290	14	10.1
500	100	130	.6	6.1	.51	1.6	460	0	3.3	420	19	11.8
400	83	95	.6	5.3	.24	.74	410	6	2.8	310	13	10.0
440	84	100	.5	4.4	.18	.55	380	0	2.9	330	16	11.0
450	89	110	.6	5.1	.31	.95	400	0	3.1	360	16	12.1
350	61	95	.4	1.5	.35	1.1	290	0	2.8	420	16	12.1
410	74	120	.3	1.3	1.1	3.4	250	0	4.4	820	37	7.8
280	48	55	.3	1.1	.13	.40	250	0	1.8	270	8.2	7.6
240	47	55	2.1	.77	.16	.49	250	14	1.6	190	7.5	6.0
340	48	63	.5	.47	.34	1.0	280	0	1.9	220	13	5.6
320	48	54	.4	.63	.20	.61	280	0	1.8	240	11	7.7
220	38	67	.2	1.2	.73	2.2	250	30	1.5	160	5.5	-
100	19	16	.1	.40	.09	.28	140	16	.5	60	2.2	9.0
210	31	61	.2	1.5	.78	2.4	240	30	1.3	140	4.8	6.9
220	33	69	.2	-	-	-	230	12	1.4	140	5.4	-
210	34	47	.2	.43	-	-	230	25	1.0	100	4.0	-
250	42	72	.2	1.6	1.0	3.0	260	10	1.3	140	6.2	8.0
230	39	68	.2	1.2	-	-	250	19	1.2	-	5.5	8.7
240	83	67	.2	1.6	-	-	270	35	1.4	-	5.7	10.4
260	37	84	.2	1.9	-	-	270	10	1.6	-	6.0	8.8
220	32	64	.2	.95	-	-	240	20	1.2	-	4.2	12.8
210	36	60	.1	.85	-	-	240	31	1.0	-	3.3	13.4
210	32	50	.2	.93	.29	.89	250	37	.9	70	3.6	11.2
190	28	36	.2	.63	-	-	230	41	.7	-	3.0	9.9
190	30	32	.1	.55	.22	.67	210	23	.7	60	2.6	11.2
160	28	20	.1	.36	-	-	180	23	.5	-	2.1	10.5
120	19	16	.1	.33	.23	.71	140	19	.4	60	1.9	9.7
110	45	11	.2	.31	-	-	140	31	.4	-	1.5	8.4
170	26	30	.2	.40	-	-	190	24	.7	-	2.5	7.6
240	33	67	.4	1.5	-	-	250	11	1.3	-	5.4	5.6
210	28	69	.3	.093	.75	2.3	220	13	1.4	150	4.6	7.0
230	31	86	.1	1.3	1.6	4.9	270	45	1.4	140	5.7	-
140	20	30	.1	.42	.22	.67	160	18	.7	70	3.4	-

Table 7.--Chemical analyses of water samples collected

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (μmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved potassium (K)
10	Fourmile Creek at mouth at (B-6-2)4bdc	7-31-79	10	27.0	620	8.1	358	14	60	25	36	8.5
		5-12-80	15	8.5	750	8.0	425	13	47	28	66	14
11	Warren Canal above Mill Creek at (B-6-2)10dab	7-31-79	25	20.5	500	8.1	285	9.3	53	15	26	9.5
		5-12-80	40	9.0	350	8.0	190	8.7	39	11	15	3.5
12	Slaterville Sewer Plant effluent at (B-6-2)10dab	7-31-79	84	19.0	790	7.5	467	16	75	25	60	9.2
		5-12-80	93	12.5	915	7.7	523	15	72	29	75	10
13	Mill Creek near mouth at (B-6-2)10daa	7-31-79	.5	26.0	315	8.8	175	7.2	39	8.5	15	2.7
		5-12-80	.7	11.0	415	8.3	226	7.6	39	12	29	4.5
14	Weber River near Slaterville at (B-6-2)15daa	7-31-79	35	22.0	410	8.1	247	8.7	50	14	21	3.6
		5-12-80	2,870	8.0	305	8.1	177	8.9	39	9.9	11	2.3
15	Warren Canal at diversion at (B-6-2)23add	7-31-79	25	20.0	400	8.1	236	9.0	49	13	17	3.4
16	Weber River above Warren Canal diversion at (B-6-2)24bcc	7-31-79	60	21.5	405	7.9	229	8.2	47	13	17	3.4
		5-12-80	2,910	8.5	300	8.1	174	8.7	38	9.7	9.7	2.1
17	Willard Canal at Slaterville diversion at (B-6-2)24dac	7-31-79	63	19.0	380	8.4	221	8.7	46	12	14	3.0
18	Weber River below Slaterville diversion at (B-6-2)24dca	7-31-79	55	19.0	380	8.3	214	8.7	46	12	14	2.8
19	Layton Intake Canal above Hooper Canal diversion at (B-6-2)24ddb	7-31-79	150	19.0	380	8.3	220	8.7	46	12	14	2.9
20	Weber River above Slaterville diversion at (B-6-2)24dda	7-31-79	270	18.5	380	8.3	214	9.0	47	12	15	2.9
		10-24-79	170	10.0	630	7.8	360	11	71	20	29	4.8
		2-25-80	700	5.0	495	8.2	300	8.6	64	17	22	3.3
		4-1-80	1,200	5.0	425	8.3	261	6.5	59	15	17	2.8
		5-12-80	3,800	8.5	320	8.2	178	9.3	38	11	11	3.5
		8-11-80	288	15.0	360	8.2	197	8.7	42	10	15	2.5
21	Neilson Drain near Hooper Canal diversion at (B-6-2)25bac	7-31-79	2.0	24.5	870	8.4	562	21	77	35	70	21
		5-12-80	4.0	11.0	1,170	7.9	711	26	63	68	71	47
22	Hooper Canal at diversion with Layton Intake Canal at (B-6-2)25bda	7-31-79	150	17.5	385	8.2	224	9.0	48	12	15	2.9
23	Weber River below Union Stockyards at (B-6-1)30bdd	7-31-79	90	22.0	505	8.4	304	11	63	19	21	3.5
		10-24-79	140	9.5	620	7.9	361	11	72	20	27	4.2
		2-25-80	400	5.0	520	8.2	336	10	71	20	25	3.3
		4-1-80	975	5.0	500	8.4	293	7.2	64	17	20	2.8
		5-12-80	2,600	7.5	335	8.1	194	9.3	42	11	11	2.2
		8-11-80	78	19.0	490	8.2	285	9.5	60	16	19	3.2
25	Odgen River near mouth at (B-6-1)29bbb	7-31-79	187	18.0	305	8.4	181	8.8	41	9.5	13	2.4
		10-24-79	29	10.0	680	7.9	376	8.1	58	18	49	7.9
		2-25-80	300	4.5	370	8.2	214	5.0	49	12	15	2.5
		4-1-80	224	5.5	360	8.6	210 E	-	-	-	-	2.6
		5-12-80	1,200	10.0	210	8.2	116	7.5	28	6.7	6.1	1.3
		8-11-80	220	15.0	295	8.3	166	8.8	36	8.2	13	2.4
26	Wilson Canal at diversion at (B-6-1)30dad	7-31-79	70	24.5	490	8.4	308	11	69	19	22	3.5

in the Weber River basin, July 1979 through August 1980--Continued

Alkalinity (total as $CaCO_3$)	Dissolved sulfate (SO_4)	Dissolved chloride (Cl)	Dissolved fluoride (F)	Dissolved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phosphorus, orthophosphate (as P)	Dissolved phosphate, ortho (as PO_4)	Total hardness (as $CaCO_3$)	Noncarbonate hardness (as $CaCO_3$)	Sodium adsorption ratio	Dissolved boron (B) (mg/L)	Potassium-40 (pCi/L)	Dissolved oxygen (mg/L)
Milligrams per liter												
240	27	43	0.2	0.02	0.16	0.49	250	13	1.0	130	6.3	-
240	28	83	.2	.19	.18	.55	230	0	1.9	190	10	-
170	24	44	.2	.27	.08	.25	190	24	.8	100	7.1	-
120	18	21	.1	.32	.15	.46	140	23	.5	70	2.6	-
250	35	79	.3	3.8	2.2	6.7	290	40	1.5	180	6.9	-
270	41	110	.3	1.9	2.5	7.7	300	29	1.9	220	7.5	-
110	11	24	.1	.23	.17	.52	130	22	.6	50	2.0	-
130	13	41	.1	.37	.07	.21	150	17	1.0	110	3.4	-
160	24	29	.1	.17	.08	.25	180	23	.7	70	2.7	-
120	18	14	.1	.31	.13	.40	140	18	.4	40	1.7	-
150	27	26	.1	.28	.05	.15	180	26	.6	80	2.5	-
150	24	25	.1	.21	.04	.12	170	21	.6	60	2.5	-
120	18	14	.1	.30	.08	.25	130	15	.4	40	1.6	-
150	22	24	.1	.30	.03	.09	160	14	.5	70	2.2	-
140	22	23	.1	.26	.05	.15	160	24	.5	80	2.1	-
150	22	23	.1	.28	.03	.09	160	14	.5	80	2.2	-
140	21	22	.1	.20	.01	.03	170	27	.5	60	2.2	10.2
230	42	41	.2	.63	.02	.06	260	30	.8	70	3.6	10.5
200	30	32	.2	.59	.07	.21	230	30	.6	50	2.5	11.2
180	29	22	.1	.31	.03	.09	210	29	.5	50	2.1	11.2
120	17	14	.1	.32	.08	.24	140	20	.4	30	2.6	9.8
130	16	23	.2	.33	.03	.09	150	16	.5	110	1.9	9.7
310	50	89	.3	2.7	.32	.98	340	26	1.7	230	16	-
440	63	99	.3	1.9	1.5	4.6	440	0	1.5	410	35	9.8
150	24	21	.1	.33	.05	.15	170	19	.5	60	2.2	-
200	40	25	.2	.15	.03	.09	240	36	.6	40	2.6	10.2
240	43	37	.2	.51	.02	.06	260	22	.7	70	3.1	11.0
220	36	35	.2	.67	.07	.21	260	40	.7	70	2.5	10.8
200	35	25	.1	.33	.02	.06	230	30	.6	60	2.1	11.3
130	23	16	.2	.31	.01	.03	150	20	.4	50	1.6	10.1
200	28	27	.2	.30	.02	.06	220	16	.6	130	2.4	9.8
120	15	17	.2	.35	.01	.03	140	22	.5	40	1.8	8.2
190	34	84	.2	.46	.06	.18	220	29	1.4	90	5.9	9.1
150	15	24	.1	.31	.03	.09	170	22	.5	40	1.9	11.2
150	14	19	.1	.16	.01	.03	-	-	-	30	2.6	12.2
84	7.0	8.1	.1	.25	.00	.00	98	14	.3	20	1.0	9.5
110	11	19	.1	.32	.01	.03	120	14	.5	90	1.8	8.6
200	41	25	.2	.15	.01	.03	240	41	.6	60	2.6	-

Table 7.--Chemical analyses of water samples collected

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (μmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved potassium (K)
27	Weber River above Wilson Canal and Union Stockyards at (B-6-1)30dda	7-31-79	160	24.5	490	8.3	327	11	65	20	24	3.5
		10-24-79	150	10.5	575	7.9	352	11	71	20	27	4.0
		2-25-80	400	5.0	545	8.2	336	10	71	20	25	3.2
		4-1-80	950	5.0	460	8.3	290	7.2	64	17	19	2.8
		5-12-80	2,600	8.0	340	8.2	198	11	44	11	12	2.3
		8-11-80	148	21.0	480	8.3	276	9.9	58	16	19	3.2
28	Weber River near I-15, 31st Street interchange at (B-5-1)6adb	7-31-79	160	24.0	475	8.3	288	11	59	19	21	3.2
		10-24-79	140	11.0	595	8.0	346	11	71	20	27	3.8
		2-25-80	395	5.0	545	8.2	334	10	71	20	25	3.0
		4-1-80	925	5.0	490	8.3	293	7.4	66	17	19	2.7
		5-12-80	2,600	8.0	310	8.2	195	9.6	44	11	12	2.1
		8-11-80	148	21.5	460	8.5	265	9.8	56	16	18	3.0
29	Weber River at Riverdale Road at (B-5-1)7dbd	7-31-79	160	23.5	460	8.3	274	10	57	18	19	2.9
		10-24-79	135	11.0	580	8.0	337	10	67	19	25	3.7
		2-25-80	385	4.5	520	8.2	323	9.9	70	19	24	2.9
		4-1-80	900	5.0	485	8.4	292	7.2	65	17	19	2.6
		5-12-80	2,550	8.0	345	8.2	205	9.5	46	12	12	2.1
		8-11-80	148	21.5	435	8.5	248	9.2	52	15	17	2.9
30	Mill Creek near Pioneer Power Plant at (B-6-1)22bbc	8-1-79	21	14.0	245	7.3	138	8.8	36	7.3	5.0	1.0
		5-14-80	16	9.4	185	8.0	108	7.4	27	6.0	4.3	1.0
31	Pioneer Power Plant tailrace at (B-6-1)22bcb	8-1-79	96	14.5	235	7.1	129	7.5	30	6.5	4.7	1.2
		5-14-80	241	9.0	185	7.9	106	7.4	27	6.0	4.3	1.0
32	Ogden River at Rainbow Gardens at canyon mouth at (B-6-1)23ccb	8-1-79	190	14.0	305	8.2	158	7.3	32	7.7	11	2.1
		5-14-80	1,000	10.0	205	8.1	116	7.4	28	6.6	5.9	1.3
32.5	Burch Creek near Harrison Blvd. at (B-5-1)15dbb	5-13-80	12	6.5	97	8.4	54	9.0	9.5	3.2	4.4	.7
33	Weber River at canyon mouth below Weber-Davis Canal diversion at (B-5-1)25dcd	8-1-79	160	15.0	505	8.3	306	8.7	72	18	15	2.6
		10-25-79	127	8.0	570	8.1	349	10	73	19	23	3.3
		2-26-80	380	2.0	500	8.3	310	9.3	68	18	21	2.8
		4-2-80	865	3.0	490	8.3	279	7.2	63	16	17	2.5
		5-13-80	2,500	7.0	315	8.4	196	9.0	45	11	11	2.0
		8-11-80	166	18.0	430	8.5	254	9.1	58	14	14	2.3
34	South Weber Canal below diversion at (B-5-1)25dcb	8-1-79	45	15.0	510	8.3	288	8.7	67	15	15	2.6
		5-13-80	Dry	-	-	-	-	-	-	-	-	-
35	Weber-Davis Canal at Job Corps Center at (B-5-1)36baa	8-1-79	284	15.0	505	8.3	305	8.5	69	18	15	2.6
		5-13-80	Dry	-	-	-	-	-	-	-	-	-
37	Weber River at Gateway at U.S.G.S. gage at (A-5-1)27cbd	8-2-79	432	15.0	505	8.0	299	8.0	70	18	15	2.6
		8-23-79	360	15.0	530	8.1	306	10	65	16	17	2.8
		9-18-79	333	13.0	490	7.8	302	10	67	18	17	2.4
		10-25-79	127	8.0	610	7.9	357	9.0	73	19	26	3.4
		12-13-79	80	1.0	580	8.4	304	11	76	19	22	2.2
		1-23-80	133	2.0	650	7.9	367	13	76	20	27	3.0
		2-21-80	493	2.5	465	8.3	276	11	51	16	27	3.9
		2-26-80	373	2.5	520	8.3	314	8.2	68	19	22	2.6
		3-18-80	441	3.0	505	8.0	300	11	68	17	22	2.5
		4-2-80	858	3.0	450	8.2	287	7.2	64	16	18	2.5
		4-23-80	2,570	7.0	320	7.7	173	8.6	39	9.8	11	1.9
		5-13-80	2,450	7.0	360	8.1	207	9.4	47	12	11	2.1
		5-22-80	2,180	11.0	340	7.9	181	8.6	43	10	11	1.8
		6-18-80	846	11.5	360	7.9	212	12	49	12	12	2.0
		7-21-80	551	13.5	440	8.0	270	9.2	60	14	14	2.5
		8-12-80	456	14.5	420	8.1	245	8.7	58	13	13	2.3
37.5	Weber River at Gateway above power plant at bridge at (A-5-1)27cda	8-2-79	125	15.0	520	8.1	323	10	76	19	16	2.7
		10-25-79	61	8.0	580	7.9	347	12	75	19	20	3.1
		2-25-80	175	3.0	490	8.2	309	10	68	17	21	2.8
		5-13-80	2,000	6.5	335	8.1	196	9.4	45	11	11	2.0
		8-12-80	115	14.5	510	8.1	304	12	71	16	16	2.8
38	Gateway Canal at diversion to Gateway tunnel at (A-5-1)27cdc	8-2-79	560	15.0	500	8.1	297	7.9	71	15	15	2.5

in the Weber River basin, July 1979 through August 1980--Continued

Milligrams per liter												
Alka-linity (total as $CaCO_3$)	Dis-solved sul-fate (SO_4)	Dis-solved chlor-ide (Cl)	Dis-solved fluor-ide (F)	Dis-solved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phos-phorus, ortho-phos-phate (as P)	Dis-solved phos-phate, ortho (as PO_4)	Total hard-ness (as $CaCO_3$)	Non-car-bonate hard-ness (as $CaCO_3$)	Sodium adsorp-tion ratio	Dis-solved boron (B) (mg/L)	Potas-sium-40 (pCi/L)	Dis-solved oxygen (mg/L)
190	42	46	0.2	0.15	0.01	0.03	240	55	0.7	80	2.6	-
230	43	35	.2	.51	.01	.03	260	30	.7	60	3.0	11.6
210	43	34	.2	.63	.07	.21	260	50	.7	60	2.4	10.7
200	34	24	.1	.32	.01	.03	230	30	.5	40	2.1	11.4
130	22	16	.1	.31	.01	.03	160	25	.4	40	1.7	10.4
190	28	26	.2	.25	.01	.03	210	21	.6	120	2.4	11.0
180	42	24	.2	.10	.01	.03	230	46	.6	70	2.4	-
220	44	35	.2	.47	.02	.06	260	40	.7	60	2.8	11.7
220	36	34	.2	.61	.05	.15	260	40	.7	50	2.2	10.8
200	35	24	.1	.32	.01	.05	230	35	.5	40	2.0	11.4
130	22	15	.1	.30	.01	.03	160	25	.4	40	1.6	10.1
180	28	25	.2	.15	.01	.03	210	26	.5	120	2.2	11.3
170	41	23	.2	.04	.00	.00	220	46	.6	70	2.2	9.6
220	44	34	.2	.35	.01	.03	250	26	.7	60	2.8	11.6
210	35	33	.2	.61	.08	.25	250	43	.7	50	2.2	10.7
200	35	24	.1	.31	.01	.03	230	32	.5	50	1.9	11.4
130	27	16	.1	.36	.01	.03	160	34	.4	40	1.6	9.9
170	28	21	.2	.07	.01	.03	190	22	.5	100	2.2	11.0
100	12	6.5	.1	.35	.00	.00	120	20	.2	0	.8	-
81	6.3	5.7	.1	.29	.01	.03	92	11	.2	10	.7	-
100	11	6.6	.1	.35	.00	.00	100	2	.2	10	.9	-
81	5.2	5.4	.1	.28	.03	.09	92	11	.2	10	.7	-
110	15	15	.1	.33	.00	.00	110	2	.5	40	1.6	-
84	6.7	8.7	.1	.25	.04	.12	97	13	.3	20	1.0	-
25	5.9	4.4	.1	.33	.01	.03	37	12	.3	10	.5	-
210	41	21	.2	.28	.01	.03	250	44	.4	80	1.9	8.5
230	44	35	.2	.61	.03	.09	260	31	.6	50	2.5	9.9
210	33	29	.2	.53	.05	.15	240	34	.6	50	2.1	10.3
190	35	23	.1	.28	.01	.03	220	33	.5	40	1.9	10.2
130	23	15	.2	.30	.01	.03	160	28	.4	30	1.5	10.1
180	27	20	.2	.29	.01	.03	200	23	.4	80	1.7	10.5
190	42	22	.2	.29	.00	.00	230	39	.4	20	1.9	8.5
-	-	-	-	-	-	-	-	-	-	-	-	-
210	42	22	.2	.29	.00	.00	250	36	.5	60	1.9	-
-	-	-	-	-	-	-	-	-	-	-	-	-
200	42	22	.2	.23	.00	.00	250	49	.4	50	1.9	8.0
210	39	28	.1	.31	.04	.12	230	18	.5	40	2.1	-
200	37	29	.2	.21	.04	.12	240	41	.5	40	1.8	-
230	47	39	.2	.48	.01	.03	260	31	.7	50	2.5	10.2
190	31	24	.2	.78	.01	.03	270	78	.6	40	2.2	11.6
230	48	38	.2	.88	.03	.09	270	42	.7	50	2.2	9.4
160	31	37	.2	.55	.08	.25	190	33	.8	70	2.9	11.7
210	34	32	.2	.45	.04	.12	250	38	.6	50	1.9	10.0
190	35	27	.2	.49	.05	.15	240	50	.6	70	1.9	10.4
200	35	23	.1	.31	.01	.03	270	26	.5	50	1.9	9.9
110	21	14	.1	.39	.02	.06	140	28	.4	40	1.4	10.4
140	24	16	.2	.26	.02	.06	170	27	.4	40	1.6	9.8
120	20	13	.2	.26	.05	.15	150	29	.4	30	1.3	10.2
140	24	18	.1	.40	.00	.00	170	32	.4	40	1.5	10.5
200	28	20	.4	.35	-	-	210	7	.4	40	1.9	8.6
170	27	19	.2	.32	.02	.06	200	28	.4	110	1.7	8.1
220	42	23	.2	.33	.01	.03	270	48	.5	10	2.0	-
240	40	30	.2	.66	.01	.03	270	26	.5	50	2.3	10.7
210	34	27	.2	.68	.05	.15	240	30	.6	50	2.1	10.1
130	22	16	.2	.28	.01	.03	160	28	.4	30	1.5	10.2
220	30	22	.2	.026	.00	.00	240	23	.4	120	2.1	8.1
200	41	23	.2	.21	.00	.00	240	39	.4	80	1.9	-

Table 7.--Chemical analyses of water samples collected

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (μmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved Potassium (K)
38.5	Unnamed creek at Gateway bridge at (A-5-1)27cda-2	5-13-80	6.0	7.5	86	8.2	54	9.3	8.7	2.9	4.3	0.5
39	Strawberry Creek at mouth at (A-5-1)27caa	8-2-79	.10	13.0	125	8.2	74	12	11	3.5	6.2	.8
		5-13-80	15	7.5	63	7.7	39	8.7	6.4	2.2	3.2	.7
40	Jacob's Creek at mouth at (A-5-1)27ddd	8-2-79	Dry	-	-	-	-	-	-	-	-	-
		5-13-80	2.0	8.0	105	7.2	62	9.1	13	3.5	4.6	.5
41	Gordon Creek near mouth at (A-5-1)26bdc	8-2-79	2.0	13.5	87	7.1	48	4.2	10	2.6	3.6	.9
		5-13-80	26	8.0	90	7.6	55	9.6	12	2.2	3.9	1.0
42	Dry Creek near mouth at (A-5-1)26acb	8-2-79	Dry	-	-	-	-	-	-	-	-	-
		5-13-80	23	8.5	235	8.0	150	22	30	4.8	13	3.1
43	Cottonwood Creek near mouth at (A-5-1)25dbb	8-2-79	Dry	-	-	-	-	-	-	-	-	-
		5-13-80	152	9.0	115	8.1	65	9.1	15	3.5	3.5	.9
44	Peterson Creek at mouth at (A-4-2)6bdd	8-2-79	.10	20.0	460	8.7	276	.4	63	16	16	2.7
		5-13-80	23	9.5	150	7.9	84	8.0	21	3.9	4.7	.7
45	Ogden River below Pineview Reservoir at (A-6-1)16cad	8-1-79	210	13.0	325	8.2	167	.4	42	11	4.4	.8
		10-25-79	7	11.0	320	7.9	173	3.3	43	11	6.7	1.5
		5-14-80	900	9.5	185	7.9	107	7.3	27	5.9	4.3	1.6
46	Wheeler Creek at mouth at U.S.G.S. gage at (A-6-1)16dbc	8-1-79	3.6	12.0	375	8.4	196	.7	50	15	4.4	.7
		5-14-80	82	10.0	245	8.2	144	7.7	37	8.9	5.7	1.0
47	South Fork of South Fork Ogden River near mouth at (A-6-2)19aab	8-1-79	3.0	15.0	430	7.9	226	.0	57	14	7.8	1.4
		5-14-80	350	7.5	205	7.9	119	7.7	30	6.8	4.3	.8
48	South Fork Ogden River near mouth at (A-6-2)19aab	8-1-79	5.0	16.5	405	8.0	223	6.5	55	14	5.4	1.9
		5-14-80	275	7.5	200	8.0	116	7.5	30	6.4	3.4	.8
49	Spring Creek at mouth at (A-6-2)7dcc	8-1-79	5.0	20.0	455	8.2	271	10	69	18	7.0	1.9
		5-14-80	13	11.5	405	8.0	235	8.5	59	16	7.7	1.1
50	Middle Fork Ogden River near mouth at (A-6-2)6bcc	8-1-79	.3	21.0	225	7.1	114	.7	28	5.1	7.5	.4
		5-14-80	90	7.5	105	8.0	61	7.6	16	2.2	2.5	.6
51	North Fork Ogden River near mouth at (A-7-1)34cdb	8-1-79	1.0	18.5	320	7.1	159	.7	40	8.2	6.0	.9
		5-14-80	338	10.0	140	8.0	78	5.6	18	3.4	3.9	.6
52	South Fork Ogden River at U.S.G.S. gage at (A-6-2)12cad	8-1-79	86	18.5	325	8.5	172	.9	43	12	3.1	.7
		5-14-80	620	7.0	190	8.1	109	6.6	29	6.0	3.1	.8
52.3	Beaver Creek (Trib. to South Fork Ogden River) at mouth at (A-7-3)33cbd	8-1-79	3.0	19.5	350	8.4	179	.0	44	12	5.7	.8
		5-14-80	110	5.5	170	8.1	101	7.8	28	3.9	3.7	.8
52.6	South Fork Ogden River below Causey Reservoir at (A-7-3)34dcb	8-1-79	89	14.0	340	8.3	182	.7	47	12	2.6	.7
		5-14-80	390	7.0	200	8.2	116	5.9	31	7	2.5	.7
53	Weber River above Stoddard diversion at (A-4-2)21acb	8-1-79	680	15.5	495	8.2	293	.0	70	17	16	2.5
		10-25-79	116	10.0	610	7.8	352	9.3	72	19	27	3.3
		2-26-80	285	4.0	530	8.3	315	8.3	68	20	22	2.6
		4-2-80	650	3.0	480	8.3	282	6.6	64	17	18	2.5
		5-13-80	1,755	8.0	370	8.1	213	8.7	47	12	12	2.1
		8-12-80	625	14.5	430	8.1	247	8.6	57	14	14	2.3

in the Weber River basin, July 1979 through August 1980

Milligrams per liter												
Alkalinity (total as $CaCO_3$)	Dissolved sulfate (SO_4)	Dissolved chloride (Cl)	Dissolved fluoride (F)	Dissolved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phosphorus, orthophosphate (as P)	Dissolved phosphate, ortho (as PO_4)	Total hardness (as $CaCO_3$)	Noncarbonate hardness (as $CaCO_3$)	Sodium adsorption ratio	Dissolved boron (B) (mg/L)	Potassium-40 (pCi/L)	Dissolved oxygen (mg/L)
24	9.7	3.7	0.1	0.10	0.01	0.03	34	10	0.3	20	0.4	-
42	10	4.6	.1	.04	.00	.00	42	0	.4	40	.6	-
18	3.5	2.4	.1	.14	.01	.03	27	7	.3	9	.5	-
-	-	-	-	-	-	-	-	-	-	-	-	-
37	5.2	3.9	.1	.01	.01	.03	47	10	.3	10	.4	-
31	4.5	3.6	.1	.01	.00	.00	36	5	.3	30	.7	-
32	2.9	3.2	.1	.08	.04	.12	39	7	.03	20	.7	-
-	-	-	-	-	-	-	-	-	-	-	-	-
90	11	11	.2	.06	.06	.18	95	5	.6	40	2.3	-
-	-	-	-	-	-	-	-	-	-	-	-	-
38	6.2	3.9	.1	.08	.05	.15	52	14	.2	30	.7	-
190	37	26	.2	.02	.03	.09	220	33	.5	60	2.0	-
61	3.4	4.3	.1	.25	.04	.12	69	8	.2	20	.5	-
150	11	6.2	.1	.17	.01	.03	150	0	.2	40	.6	8.8
140	13	9.3	.1	.15	.01	.03	150	13	.2	30	1.1	9.0
80	5.6	5.9	.1	.26	.03	.09	92	12	.2	20	1.2	-
180	11	6.0	.1	.06	.01	.03	190	7	.1	20	.5	-
120	4.8	6.4	.1	.10	.02	.06	130	9	.2	20	.7	-
200	12	13	.1	.05	.04	.12	200	0	.2	30	1.0	-
96	5.2	5.1	.1	.34	.02	.06	100	7	.2	20	.6	-
200	11	7.6	.1	.26	.00	.00	200	0	.2	0	1.4	-
94	6.4	3.8	.1	.28	.03	.09	100	7	.1	20	.6	-
230	11	14	.1	.35	.01	.03	250	16	.2	39	1.4	-
200	8.3	10	.1	.91	.02	.06	210	13	.2	50	.8	-
93	7.6	8.4	.1	.00	.00	.00	91	0	.3	30	.3	-
43	3.0	2.5	.1	.12	.02	.06	49	6	.2	40	.4	-
130	14	9.1	.1	.46	.00	.00	130	4	.2	20	.7	-
56	6.3	4.6	.1	.33	.02	.06	59	3	.2	9	.4	-
160	11	4.2	.1	.28	.01	.03	160	0	.1	50	.5	-
89	4.8	3.5	.1	.26	.01	.03	97	8	.1	20	.6	-
160	11	8.7	.1	.02	.00	.00	160	0	.2	20	.6	-
82	3.3	3.7	.1	.19	.02	.06	86	4	.2	20	.6	-
170	11	3.6	.1	.38	.00	.00	170	0	.1	20	.5	-
100	4.1	3.4	.1	.29	.02	.06	110	6	.1	20	.5	-
200	38	28	.1	.21	.04	.12	240	45	.4	40	1.9	8.2
220	46	41	.2	.47	.01	.03	260	38	.7	50	2.5	11.0
210	34	32	.2	.46	.05	.15	250	42	.6	60	1.9	10.8
190	35	23	.1	.26	.01	.03	230	40	.5	60	1.9	10.1
150	24	16	.2	.22	.02	.06	170	17	.4	40	1.6	9.9
170	27	20	.2	.37	.02	.06	200	30	.4	110	1.7	-

Table 7.--Chemical analyses of water samples collected

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (μmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved potassium (K)
54	Gateway Canal at Stoddard diversion at (A-4-2)21bda	8-1-79	610	15.5	495	8.2	284	0.7	63	15	15	2.5
55	Line Creek at mouth at (A-4-2)21cdd	8-1-79	.25	16.5	390	8.5	217	.8	51	8.9	15	3.7
		5-13-80	38	9.5	130	8.1	73	9.1	17	3.1	4.4	.8
56	Deep Creek at mouth at (A-4-2)34bcc	8-1-79	.75	17.5	370	8.3	225	9.3	56	8.9	14	2.3
		5-13-80	68	9.0	160	8.0	94	12	20	4.6	5.7	1.0
57	East Canyon Creek near mouth at Morgan at (A-4-2)35dcc	8-1-79	130	15.0	530	8.4	334	7.7	72	18	19	2.3
		10-25-79	17	8.0	540	8.2	315	8.0	71	16	18	2.4
		2-26-80	26	3.5	500	8.4	300	8.7	68	17	20	1.8
		4-2-80	106	3.5	535	8.5	320	4.1	73	17	20	1.9
		5-13-80	385	7.5	360	8.2	206	8.5	50	10	12	1.4
		8-12-80	135	14.0	505	8.1	315	8.9	71	14	19	2.3
58	Weber River at Morgan at (A-4-2)36bbc	8-1-79	560	17.5	460	8.4	279	8.7	61	16	15	2.5
		10-25-79	99	9.0	640	8.0	367	6.8	68	21	36	3.5
		5-13-80	1,370	9.0	385	8.2	222	8.5	49	13	13	2.4
58.2	Como Springs at (A-4-3)31cab	5-13-80	-	27.5	880	7.3	553	19	99	32	33	8.2
58.5	Hardscrabble Creek at mouth at (A-3-2)24cdb	8-1-79	2.0	18.5	400	8.2	222	.7	56	13	8.2	1.3
		5-13-80	225	7.5	260	8.3	146	8.1	39	7.6	5.0	.7
59	Weber River above Lost Creek at (A-4-4)19cdd	8-1-79	525	21.0	445	8.5	239	.4	57	15	13	2.6
		10-25-79	74	11.0	720	8.2	396	6.8	61	25	54	4.0
		2-25-80	190	7.0	535	8.4	311	6.6	67	19	23	2.6
		4-2-80	445	5.0	480	8.4	276	6.8	62	17	16	2.7
		5-12-80	800	7.0	470	7.8	243	8.8	52	15	15	2.8
		8-12-80	460	18.0	370	8.3	203	8.0	48	12	9.9	2.0
59.5	Irrigation return flow from Henefer Valley at (A-4-4)32bad	5-13-80	5.0	13.0	560	8.0	318	11	58	16	35	3.1
60	Lost Creek at mouth at (A-4-4)19dcc	8-1-79	35	17.0	485	7.9	302	7.2	70	16	18	3.0
		10-25-79	25	11.0	545	7.7	315	9.3	70	15	19	3.3
		2-26-80	35	7.5	500	8.0	299	7.3	69	16	19	3.3
		4-2-80	96	6.0	450	8.4	262	5.0	61	14	14	2.0
		5-12-80	400	5.0	280	7.6	169	6.4	39	8.7	9.1	1.5
		8-12-80	49.4	13.5	460	8.0	268	8.8	65	13	15	1.9
60.5	Lost Creek below Lost Creek Reservoir at (A-5-5)8dba	8-1-79	55	8.0	380	8.2	239	6.2	58	12	11	1.3
		5-12-80	190	5.0	355	8.5	224	3.9	52	12	11	1.4
61	East Canyon Creek below East Canyon Reservoir at U.S.G.S. gage at (A-2-3)10bbc	8-1-79	175	13.5	520	8.3	332	7.8	76	16	19	2.2
		10-26-79	16	6.5	585	7.7	352	12	74	16	26	2.3
		5-13-80	134	8.0	470	8.2	279	7.6	58	13	19	2.1
62	East Canyon Creek above East Canyon Reservoir at (A-2-3)26bda	8-1-79	18	23.0	540	8.6	342	12	79	18	15	1.9
		5-13-80	193	9.0	430	8.2	258	12	60	12	14	1.5
63	East Canyon Creek above Toll Creek near Gorgoza at (D-1-3)12bab	8-3-79	8.0	13.0	660	8.2	445	14	98	26	19	1.9
		10-26-79	16	10.0	700	8.5	475	11	100	25	16	2.5
		2-26-80	20	.5	750	8.3	513	13	110	28	28	2.2
		4-3-80	21	.5	750	8.2	480	13	100	25	22	2.0
		5-14-80	88	5.0	475	8.2	285	11	65	16	13	1.4
		8-13-80	13.3	24.0	620	8.7	388	13	84	23	13	1.5
64	Toll Creek near mouth at (D-1-3)11aad	8-3-79	1.0	12.5	850	8.2	475	13	110	22	24	1.7
		5-14-80	14	4.5	575	8.2	328	9.8	76	12	29	1.2
65	East Canyon Creek at Kimball Junction at (A-1-4)18cbc	8-3-79	6.0	16.5	680	8.3	457	16	100	27	16	2.0
		5-14-80	85	6.0	470	8.1	282	12	61	16	13	1.3
66	Unnamed creek Kimball Junction at mouth at (D-1-4)19aba	8-3-79	2.0	11.5	590	8.2	395	15	86	22	14	3.6
		5-14-80	26	8.0	350	8.2	197	9.1	46	7.8	12	1.1

in the Weber River basin, July 1979 through August 1980

Alkalinity (total as $CaCO_3$)	Dissolved sulfate (SO_4)	Dissolved chloride (Cl)	Dissolved fluoride (F)	Dissolved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phosphorus, orthophosphate (as P)	Dissolved phosphate, ortho (as PO_4)	Total hardness (as $CaCO_3$)	Noncarbonate hardness (as $CaCO_3$)	Sodium adsorption ratio	Dissolved boron (B) (mg/L)	Potassium-40 (pCi/L)	Dissolved oxygen (mg/L)
Milligrams per liter												
200	38	28	0.1	0.21	0.01	0.03	220	19	0.4	40	1.9	-
150	15	31	.1	.33	.04	.12	160	14	.5	40	2.8	-
50	4.2	3.9	.1	.13	.04	.12	55	5	.3	20	.6	-
160	14	24	.2	.08	.01	.03	180	17	.5	40	1.7	-
63	6.1	5.7	.1	.09	.03	.09	69	6	.3	20	.7	-
180	70	36	.1	.16	.01	.03	250	74	.5	20	1.7	7.9
200	48	30	.1	.28	.04	.12	240	43	.5	30	1.8	11.2
200	36	27	.2	.34	.05	.15	240	40	.6	30	1.3	11.8
180	64	31	.1	.12	.02	.06	250	72	.5	30	1.4	12.4
140	23	16	.1	.15	.04	.12	170	26	.4	40	1.0	10.1
180	58	32	.2	.31	.06	.18	240	55	.5	100	1.7	8.4
200	29	26	.1	.15	.01	.03	220	18	.4	100	1.9	7.7
210	53	52	.2	.13	.01	.03	260	46	1.0	60	2.6	11.7
150	26	18	.2	.33	.04	.12	180	26	.4	50	1.8	-
200	210	30	1.5	.04	.03	.09	380	180	.7	10	6.1	-
200	12	9.6	.1	.21	.01	.03	190	0	.2	30	1.0	-
120	7.1	5.7	.2	.06	.02	.06	130	9	.2	10	.5	-
170	25	23	.1	.15	.00	.00	200	34	.4	60	1.9	-
210	40	78	.2	.11	.02	.06	260	45	1.5	80	3.0	14.7
220	26	33	.2	.27	.05	.15	250	26	.6	50	1.9	9.6
200	26	24	.1	.21	.01	.03	220	25	.5	40	2.0	10.8
170	25	21	.2	.30	.03	.09	190	22	.5	40	2.1	9.5
150	17	14	.2	.27	.01	.03	170	19	.3	100	1.5	8.0
190	26	52	.2	.48	.04	.12	210	21	1.1	50	2.3	-
200	46	20	.2	.31	.00	.00	240	41	.5	50	2.2	-
210	44	26	.2	.42	.04	.12	240	27	.5	40	2.5	9.6
190	46	22	.2	.36	.03	.09	240	48	.5	40	2.5	9.2
170	47	16	.1	.23	.01	.03	210	40	.4	30	1.5	10.8
110	26	10	.2	.36	.04	.12	130	23	.3	30	1.1	9.3
190	30	18	.2	.38	.00	.00	220	26	.4	110	1.4	8.6
150	48	11	.2	.34	.00	.00	190	44	.3	0	1.0	-
150	40	12	.2	.29	.03	.09	180	29	.4	30	1.0	-
170	79	29	.2	.14	.01	.03	260	86	.5	50	1.6	-
180	74	37	.2	.59	.12	.37	250	71	.7	40	1.7	7.6
150	55	33	.1	.25	.05	.15	200	48	.6	40	1.6	-
200	73	23	.2	.00	.01	.03	270	71	.4	30	1.4	-
150	44	22	.2	.37	.05	.15	200	49	.4	60	1.1	-
210	130	29	.2	.09	.04	.12	350	140	.4	70	1.4	-
170	190	26	.1	.40	.08	.25	350	180	.4	40	1.9	11.8
190	160	55	.2	.53	.07	.21	390	200	.6	30	1.6	-
180	160	47	.1	.50	.04	.12	350	170	.5	20	1.5	-
140	71	21	.1	.60	.03	.09	230	88	.4	20	1.0	9.8
170	130	21	.2	.02	.03	.09	300	130	.3	110	1.1	7.3
210	68	110	.2	.00	.01	.03	370	160	1.0	60	1.3	-
170	23	74	.1	.13	.02	.06	240	69	.8	30	.9	-
180	160	28	.2	.00	.10	.31	360	180	.4	70	1.5	-
130	76	22	.1	.66	.02	.06	220	88	.4	10	1.0	-
200	110	23	.2	.18	.10	.31	310	110	.3	40	2.7	-
120	24	22	.1	.60	.03	.09	150	27	.4	10	.8	-

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (μmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved Potassium (K)
67	Willow Draw Creek at mouth at (D-1-4)20bca	8-3-79	1.5	12.5	680	7.9	465	15	100	27	13	1.0
		5-14-80	1.0	8.0	660	7.9	419	12	87	24	18	1.3
68	Unnamed creek from Parleys Park at mouth at (D-1-4)20abd	8-3-79	.25	16.0	1,130	7.9	674	41	110	37	74	3.6
		5-14-80	9.8	8.0	360	8.0	207	19	37	8.8	22	1.7
		8-13-80	.1	21.0	920	8.3	535	42	98	29	38	3.5
69	Kimball Creek above unnamed creek from Parleys Park at (D-1-4)20acb	8-3-79	6.0	12.5	700	8.2	469	16	100	26	11	1.2
		2-26-80	19	.0	740	8.2	531	13	120	31	15	1.8
		4-3-80	16	.5	750	8.2	523	13	110	29	12	1.7
		5-14-80	42	7.0	530	8.1	338	11	77	20	8.7	1.3
		8-13-80	8.1	23.0	670	8.5	438	15	97	25	10	1.2
70	McLeod Creek below Park City at (D-2-4)6aab	8-3-79	7	13.5	720	7.9	491	4.7	110	27	10	2.5
		2-26-80	9	4.5	800	8.3	604	14	130	35	13	2.2
		4-3-80	7.5	5.0	815	8.4	590	14	120	33	11	2.0
		5-14-80	25	10.0	560	8.1	363	13	82	21	7.5	1.4
		8-13-80	11.9	17.0	750	8.1	523	15	120	28	7.5	1.7
71	Spiro Tunnel outflow at Park City at (D-2-4)8dba	8-3-79	9.0	9.5	870	7.9	691	6.5	150	37	5.9	2.2
		5-14-80	9.1	9.0	830	7.8	607	16	130	34	5.4	1.
72	Silver Creek below Park City at (D-2-4)10bbd	8-3-79	Dry	-	-	-	-	-	-	-	-	-
		5-14-80	3.0	11.5	495	7.9	331	11	59	9.2	36	2.1
73	Dority Spring Creek above Silver Creek at (D-2-4)3cdc	8-3-79	3.0	12.5	720	7.7	446	30	100	26	13	1.7
		5-14-80	5.5	11.0	740	7.8	519	14	110	29	18	1.6
74	Silver Creek at Keetley Junction at (D-2-4)2aab	8-3-79	.5	18.5	840	7.7	557	1.6	130	31	17	.9
		2-27-80	3	3.0	810	8.1	553	13	120	31	22	1.7
		4-3-80	2	3.5	865	8.0	570	13	120	29	23	2.4
		5-14-80	10	11.0	805	7.9	513	13	110	23	23	2.0
		8-13-80	1	20.0	875	7.8	575	20	130	32	17	.4
75	Silver Creek at Wanship at (A-1-5)20bad	8-2-79	2	18.5	665	8.3	381	5.5	86	16	23	3.9
		2-27-80	10	4.5	830	8.3	552	21	120	25	35	4.2
		4-2-80	7.3	3.0	875	8.7	568	23	120	24	34	3.6
		5-12-80	67	6.5	425	8.1	273	18	57	11	15	2.1
		8-12-80	1	21.0	720	8.2	447	30	97	17	29	3.9
76	Weber River below Echo Reservoir at (A-3-4)25add	8-2-79	510	18.5	440	8.2	261	8.6	59	15	11	2.5
		10-26-79	6	9.0	520	7.9	296	6.9	67	18	16	2.8
		2-26-80	146	4.0	440	8.3	269	5.3	65	17	13	2.3
		4-2-80	420	4.0	435	8.3	251	6.4	59	15	12	2.6
		5-12-80	700	9.0	380	8.1	242	18	57	11	15	.3
		8-12-80	470	17.5	340	8.2	192	7.7	46	11	7.6	1.7
77	Echo Creek at mouth at (A-3-5)19ccc	8-2-79	3	18.0	635	8.4	344	.4	57	33	28	3.2
		2-26-80	30	4.0	900	8.4	509	10	77	43	54	4.6
		4-2-80	12	7.0	960	8.5	490	6.1	82	55	51	4.1
		5-12-80	109	6.0	480	8.1	273	11	44	24	21	2.1
		8-12-80	5.2	19.0	650	8.3	371	7.5	62	33	30	3.1
78	Chalk Creek at mouth at U.S.G.S. gage at (A-2-5)8dab	8-2-79	21	15.5	775	7.5	423	2.1	90	28	28	3.4
		10-25-79	14.5	11.0	720	7.6	412	11	84	27	30	3.8
		2-27-80	36	3.0	590	8.2	361	7.5	78	24	27	3.0
		4-2-80	15	6.5	690	8.2	446	11	74	25	30	2.5
		5-12-80	319	5.5	390	8.1	237	7.8	60	15	9.8	1.6
		8-12-80	23.1	16.0	650	7.7	408	12	88	27	25	3.5
78.5	Chalk Creek above Upton at (A-2-5)4adb	8-2-79	12	19.5	375	8.4	202	.8	49	16	7.5	1.0
		5-12-80	230	5.0	380	8.0	234	7.0	57	17	8.9	1.3
79	Weber River near Coalville above Echo Reservoir at U.S.G.S. gage at (A-2-5)20aca	8-2-79	174	14.5	380	8.4	205	.1	52	12	7.8	2.1
		2-27-80	205	5.0	425	8.5	253	8.4	62	15	11	2.6
		4-2-80	187	6.0	435	8.4	256	9.8	62	15	11	2.8
		5-12-80	790	8.0	320	7.9	196	11	48	12	8.1	2.4
		8-12-80	134	16.5	290	8.2	163	8.6	40	8.9	5.8	1.4
80	Weber River below Rockport Reservoir at (A-1-5)29acb	8-2-79	165	13.0	340	8.2	193	.7	50	12	6.4	1.9
		10-26-79	20	12.0	360	7.8	202	4.8	50	12	7.0	2.0
		2-27-80	150	2.0	375	8.3	224	7.2	57	14	9.1	2.5
		4-3-80	160	3.0	395	8.3	234	8.6	56	14	8.7	2.7
		5-12-80	800	7.0	310	8.0	181	9.8	45	12	6.8	2.3
		8-12-80	155	13.0	225	8.1	133	6.8	32	6.6	3.1	1.0

in the Weber River basin, July 1979 through August 1980

Milligrams per liter												
Alkalinity (total as $CaCO_3$)	Dissolved sulfate (SO_4)	Dissolved chloride (Cl)	Dissolved fluoride (F)	Dissolved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phosphorus, orthophosphate (as P)	Dissolved phosphate, ortho (as PO_4)	Total hardness (as $CaCO_3$)	Noncarbonate hardness (as $CaCO_3$)	Sodium adsorption ratio	Dissolved boron (B) (mg/L)	Potassium-40 (pCi/L)	Dissolved oxygen (mg/L)
170	180	22	0.1	1.1	0.04	0.12	360	190	0.3	6	0.7	-
130	160	34	.1	1.0	.03	.09	320	190	.4	20	1.0	-
200	48	240	.2	.02	.01	.03	430	230	1.6	70	2.7	-
110	12	40	.2	.04	.05	.15	130	19	.8	30	1.3	-
150	33	200	.2	.26	.00	.00	360	210	.9	120	2.6	-
190	180	18	.1	.57	.08	.25	360	170	.3	70	.9	-
170	220	25	.2	.56	.08	.25	430	260	.3	30	1.3	14.6
160	240	19	.1	.47	.03	.09	390	230	.3	20	1.3	11.4
140	120	13	.1	.68	.02	.06	270	130	.2	20	1.0	10.1
170	170	15	.2	.55	.01	.03	350	180	.2	100	.9	8.6
150	230	11	.2	1.2	.37	1.1	390	240	.2	0	1.9	-
150	300	18	.2	.41	.09	.28	470	320	.3	30	1.6	10.5
140	310	14	.1	.32	.06	.18	440	300	.2	20	1.5	11.3
140	140	11	.1	.58	.02	.06	290	150	.2	20	1.0	8.5
150	250	8.5	.2	.41	.02	.06	420	270	.2	100	1.3	7.5
140	400	4.4	.2	.14	.05	.15	530	390	.1	40	1.6	-
140	330	4.3	.2	.19	.01	.03	460	320	.1	9	1.3	-
-	-	-	-	-	-	-	-	-	-	-	-	-
66	120	51	.2	.59	.01	.03	190	120	1.2	1	1.6	-
170	160	33	.1	1.5	.04	.12	360	190	.3	50	1.3	-
170	180	52	.2	2.7	.01	.03	390	220	.4	20	1.2	-
250	190	36	.3	.01	.17	.52	450	200	.3	30	.7	-
180	190	61	.2	1.3	.03	.09	430	250	.5	40	1.3	10.4
170	210	63	.1	1.6	.02	.06	420	250	.5	50	1.8	-
130	200	56	.2	1.7	.01	.03	370	240	.5	30	1.5	-
230	190	47	.3	.00	.13	.40	460	230	.3	100	.3	6.5
210	74	46	.2	.04	.08	.25	280	71	.6	70	2.9	-
180	150	86	.2	.47	.02	.06	400	220	.8	50	3.1	11.2
190	160	87	.2	.35	.01	.03	400	210	.7	40	2.7	10.5
100	78	30	.2	.29	.02	.06	190	88	.5	40	1.6	9.6
210	72	71	.3	.11	.07	.21	310	100	.7	110	2.9	7.0
200	28	16	.2	.20	.04	.12	210	9	.3	60	1.9	-
220	31	21	.1	.15	.02	.06	240	21	.4	50	2.1	7.8
210	23	16	.1	.14	.02	.06	230	22	.4	40	1.7	10.8
190	25	16	.1	.19	.01	.03	210	19	.4	40	1.9	11.2
160	26	17	.2	.23	.03	.09	190	28	.5	40	.2	-
150	15	11	.2	.28	.00	.00	160	10	.3	80	1.3	7.6
220	49	41	.3	.00	.01	.03	280	58	.7	120	2.4	-
290	52	90	.3	.82	.02	.06	370	79	1.2	150	3.4	10.2
320	65	92	.3	.68	.01	.03	290	0	.8	160	1.9	10.3
180	25	34	.3	.67	.04	.12	210	29	.6	80	1.9	9.7
230	45	51	.3	.10	.01	.03	290	61	.8	140	2.3	8.3
320	35	40	.4	.83	.03	.09	340	20	.7	120	2.5	-
290	35	44	.2	.66	.01	.03	320	31	.7	90	2.8	9.3
250	26	44	.2	.31	.00	.00	290	44	.7	50	2.2	10.9
250	33	58	.2	.30	.01	.03	430	180	1.1	60	3.1	11.0
190	14	13	.2	.41	.02	.06	210	22	.3	40	1.2	11.0
300	25	43	.3	.93	.02	.06	330	31	.6	110	2.6	6.6
180	8.1	11	.1	.02	.01	.03	190	8	.2	20	.7	-
190	15	12	.2	.38	.01	.03	210	22	.3	30	1.0	-
170	18	10	.1	.13	.05	.15	180	9	.3	60	1.6	-
190	24	15	.2	.23	.00	.00	220	27	.3	40	1.9	11.0
190	26	14	.1	.23	.00	.00	220	27	.3	30	2.1	11.0
140	19	1.0	.1	.25	.01	.03	170	29	.3	30	1.8	9.2
130	11	8.2	.2	.24	.01	.03	140	7	.2	70	1.0	8.1
160	17	7.4	.1	.21	.05	.15	170	14	.2	30	1.4	-
170	16	7.3	.1	.08	.02	.06	170	4	.2	30	1.5	7.3
180	15	9.4	.2	.19	.01	.03	200	20	.3	30	1.9	10.2
190	17	12	.1	.22	.01	.03	200	8	.3	30	2.0	11.1
140	12	8	.1	.23	.03	.09	160	22	.2	20	1.7	7.9
99	7.2	3.6	.1	3.0	.04	.12	110	8	.1	70	.7	7.8

Site No.	Site name	Date of collection	Discharge (ft^3/s)	Temperature (°C)	Specific conductance (μmhos)	pH	Dissolved solids (sum of constituents)	Dissolved silica (SiO_2)	Dissolved calcium (Ca)	Dissolved magnesium (Mg)	Dissolved sodium (Na)	Dissolved potassium (K)
80.5	Crandall Creek	8-2-79	0.3	20.0	850	8.3	541	14	100	29	47	3.9
	at mouth at	5-12-80	21	6.5	320	8.2	197	7.8	56	8.3	6.6	1.5
	(D-1-5)4aac											
81	Weber River above	8-2-79	55	20.5	400	8.8	218	3.3	58	14	7.9	1.9
	Rockport Reservoir	2-27-80	80	6.0	395	8.5	247	11	64	15	8.2	3.1
	at (D-1-5)10bdb	4-3-80	73	6.0	405	8.6	239	10	60	15	6.8	2.0
		5-12-80	750	7.0	230	8.2	136	7.7	36	8.5	3.5	.9
		8-12-80	80	19.0	400	8.3	241	13	59	14	7.3	1.7
82	Fort Creek near	8-2-79	9.0	23.0	550	8.2	316	6.3	77	17	16	2.0
	mouth at	5-12-80	9.0	10.0	385	8.1	251	18	61	14	12	2.3
	(D-1-5)23aac											
83	Weber River above	8-2-79	4.0	19.5	280	8.0	149	.7	41	9.9	2.3	.6
	Weber-Provo	2-27-80	42	2.0	285	8.6	177	5.1	46	13	2.6	.5
	diversion at	4-3-80	38.5	4.5	295	8.6	169	5.2	43	12	2.4	.5
	(D-1-6)21cca	5-13-80	500	4.0	220	8.3	112	5.1	31	6.9	2.2	.6
		8-13-80	7	22.0	275	8.5	149	4.8	40	9.7	2.3	.6
85	Whites Creek at	8-2-79	Dry	-	-	-	-	-	-	-	-	-
	mouth at	5-13-80	13	4.0	355	8.2	227	9.2	61	13	7.3	1.4
	(D-1-6)15cbc											
86	Crooked Creek at	8-2-79	10	23.5	340	8.5	187	.9	52	12	3.3	.8
	mouth at	5-13-80	13	5.0	330	8.1	194	6.9	54	11	2.8	1.1
	(D-1-6)31cab											
87	Beaver Creek near	8-2-79	27	21.5	375	8.7	227	13	59	13	5.8	1.6
	mouth at	10-26-79	30	8.0	405	8.0	245	12	62	13	6.8	2.3
	(D-2-5)1aad	2-27-80	50	3.0	430	8.2	253	11	64	16	9.2	4.0
		4-3-80	37	3.5	470	8.3	280	13	67	17	7.6	3.0
		5-13-80	133	4.5	155	8.0	81	6.6	17	5.1	2.6	.7
		8-13-80	26.4	18.5	345	8.6	217	11	61	2	4.8	1.2
88	Beaver Creek above	8-2-79	4.0	19.0	275	8.4	145	.1	37	12	3.2	.8
	Weber-Provo Canal	5-13-80	51	7.5	225	8.0	111	4.4	29	6.3	2.5	.8
	at Kamas at											
	(D-2-6)17dac											
89	Weber-Provo Canal	8-2-79	Dry	-	-	-	-	-	-	-	-	-
	above Beaver Creek	5-13-80	5.0	9.0	350	8.1	181	12	42	11	6.0	1.7
	at (D-2-6)17dac											
90	Unnamed canal from	8-2-79	12	21.0	160	8.5	81	.3	21	4.7	1.9	1.6
	Provo River at	5-13-80	10	7.0	110	8.1	66	7.8	16	3.3	1.7	.9
	Francis at											
	(D-2-6)28ccb											
90.5	Beaver Creek below	8-2-79	9.0	20.0	250	8.2	133	.8	32	11	2.8	.8
	fish hatchery at	5-13-80	91	7.0	90	8.0	57	6.9	12	3.8	2.3	.6
	(D-2-6)26baa											
91	Beaver Creek above	8-2-79	7.0	21.5	70	8.4	33	.1	7.2	2.0	1.5	.6
	above diversions	5-13-80	88	6.0	77	8.2	48	7.2	9.2	3.0	2.3	.6
	near Sanak at											
	(D-2-6)25dbb											
92	Weber River near	8-2-79	85	20.5	250	8.7	137	4.3	35	8.7	1.9	.6
	Oakley at	10-26-79	61	7.0	305	8.0	167	5.3	43	11	2.6	.6
	U.S.G.S. gage	2-27-80	41	1.5	280	8.6	175	5.2	46	12	2.8	.5
	at (D-1-6)15aca	4-3-80	38.5	2.0	290	8.6	171	5.4	43	12	2.4	.5
		5-13-80	500	4.0	180	8.3	108	5.1	30	6.5	2.0	.5
		8-12-80	124	18.0	240	8.5	135	4.8	36	8.6	2.0	.5
92.5	South Fork Weber	8-2-79	10	17.5	310	8.7	168	.3	42	12	2.1	.5
	River at mouth at	5-13-80	44	4.5	250	8.2	146	5.6	39	10	2.0	.5
	(D-1-6)12dbb											
93	Weber River	8-2-79	60	20.0	210	8.6	114	.9	31	7.4	1.6	.5
	above Smith and	5-13-80	280	4.5	175	8.3	100	4.7	28	6.3	1.7	
	Morehouse Creek											
	at (A-1-7)26daa											
94	Smith and Morehouse	8-2-79	20	19.0	190	8.4	97	.2	24	6.9	1.5	.6
	Creek at	5-13-80	153	4.0	90	8.3	52	5.0	12	3.6	1.3	.4
	U.S.G.S. gage											
	at (A-1-7)36bbb											
95	Headwaters of	8-3-79	.15	13.5	24	7.3	14	.1	2	.5	.9	.3
	Weber River below											
	Reid's Meadow											
	near Mirror Lake											
	at (D-1-9)22dbc											

in the Weber River basin, July 1979 through August 1980

Milligrams per liter													
Alkalinity (total as $CaCO_3$)	Dissolved sulfate (SO_4)	Dissolved chloride (Cl)	Dissolved fluoride (F)	Dissolved nitrate (NO_3) + nitrite (NO_2) (as N)	Dissolved phosphorus, orthophosphate (as P)	Dissolved phosphate, ortho (as PO_4)	Total hardness (as $CaCO_3$)	Noncarbonate hardness (as $CaCO_3$)	Sodium adsorption ratio	Dissolved boron (B) (mg/L)	Potassium-40 (pCi/L)	Dissolved oxygen (mg/L)
270	140	4.2	.2	0.61	0.01	0.03	370	99	1.1	130	2.9	-
140	25	5.4	.2	.49	.04	.12	170	34	.2	20	1.1	-
180	17	6.9	.2	.06	.01	.03	200	23	.2	30	1.4	-
200	14	9.7	.2	.39	.01	.03	220	22	.2	30	2.3	11.3
200	15	9.1	.1	.19	.01	.03	210	12	.2	40	1.5	10.7
110	8.7	3.7	.1	.17	.02	.06	130	15	.1	20	.7	9.7
200	12	6.6	.2	1.6	.03	.09	210	5	.2	70	1.3	7.9
270	23	9.1	.2	.73	.07	.21	260	0	.4	70	1.5	-
190	18	9.1	.2	.39	.04	.12	210	20	.4	30	1.7	-
130	14	2.2	.1	.01	.01	.03	140	13	.1	30	.4	-
150	17	2.3	.1	.10	.00	.00	170	18	.1	10	.4	12.2
140	19	2.4	.1	.06	.00	.00	160	17	.1	8	.4	11.1
92	7.7	2.1	.1	.19	.02	.06	110	14	.1	20	.4	10.2
130	11	1.9	.1	.08	.00	.00	140	10	.1	50	.4	8.0
-	-	-	-	-	-	-	-	-	-	-	-	-
180	22	4.1	.1	.19	.01	.03	210	26	.2	30	1.0	-
170	12	3.7	.1	.01	.00	.00	180	9	.1	70	.6	-
170	12	3.4	.1	.20	.02	.06	180	10	.1	9	.8	-
190	12	6.8	.2	.24	.01	.03	200	11	.2	30	1.2	-
200	18	8.6	.1	.51	.02	.06	210	8	.2	30	1.7	10.8
210	10	11	.2	.36	.04	.12	230	16	.3	30	3.0	11.4
240	14	13	.1	.32	.01	.03	240	0	.2	30	2.2	10.4
55	7.7	7.2	.1	.17	.02	.06	63	8	.1	10	.5	9.1
180	11	5.6	.1	.35	.02	.06	200	22	.1	60	.9	11.0
130	8.9	3.8	.2	.17	.01	.03	140	12	.1	10	.6	-
91	8.1	4.6	.1	.18	.01	.03	98	7	.1	20	.6	-
-	-	-	-	-	-	-	-	-	-	-	-	-
150	8.2	9.1	.1	.23	.03	.09	150	0	.2	60	1.3	-
62	12	2.2	.1	.05	.03	.09	72	10	.1	20	1.2	-
46	5.2	2.3	.1	.21	.01	.03	54	8	.1	20	.7	-
120	8.7	3.2	.2	.21	.01	.03	130	5	.1	20	.6	-
33	7.7	2.7	.1	.13	.01	.03	46	13	.1	40	.4	-
23	5.7	1.8	.1	.00	.00	.00	26	3	.1	30	.4	-
24	8.3	2.6	.1	.08	.01	.03	35	11	.2	40	.4	-
120	12	1.9	.1	.00	.00	.00	120	3	.1	30	.4	6.8
140	18	2.2	.1	.11	.00	.00	150	13	.1	10	.4	9.4
150	16	2.2	.1	.10	.00	.00	160	14	.1	10	.4	11.6
140	20	2.7	.1	.09	.00	.00	160	17	.1	8	.4	10.7
88	7.7	2.0	.1	.17	.01	.03	100	14	.1	20	.4	12.0
120	9.2	1.5	.1	.07	.00	.00	130	5	.1	50	.4	6.8
150	18	2.3	.1	.05	.00	.00	150	4	.1	40	.4	-
120	14	2.1	.1	.15	.01	.03	140	19	.1	9	.4	-
100	11	1.6	.1	.02	.04	.12	110	8	.1	10	.4	-
82	6.9	1.7	.1	.17	.03	.09	96	14	.1	20	.4	-
84	12	1.5	.1	.03	.01	.03	88	4	.1	20	.4	-
30	7.9	3.1	.1	.08	.02	.06	45	15	.1	10	.3	-
7	4.3	1.2	.0	.00	.01	.03	7	0	.1	10	.2	-

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*No. 2. Water production from oil wells in Utah, by Jerry Tuttle, Utah State Engineer's Office, 1960.

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*No. 4. Ground-water investigations in Utah in 1960 and reports published by the U.S. Geological Survey or the Utah State Engineer prior to 1960, by H. D. Goode, U.S. Geological Survey, 1960.

*No. 5. Developing ground water in the central Sevier Valley, Utah, by R. A. Young and C. H. Carpenter, U.S. Geological Survey, 1961.

*No. 6. Work outline and report outline for Sevier River basin survey, (Sec. 6, P. L. 566), U.S. Department of Agriculture, 1961.

*No. 7. Relation of the deep and shallow artesian aquifers near Lynndyl, Utah, by R. W. Mower, U.S. Geological Survey, 1961.

*No. 8. Projected 1975 municipal water-use requirements, Davis County, Utah, by Utah State Engineer's Office, 1962.

No. 9. Projected 1975 municipal water-use requirements, Weber County, Utah, by Utah State Engineer's Office, 1962.

*No. 10. Effects on the shallow artesian aquifer of withdrawing water from the deep artesian aquifer near Sugarville, Millard County, Utah, by R. W. Mower, U.S. Geological Survey, 1963.

*No. 11. Amendments to plan of work and work outline for the Sevier River basin (Sec. 6, P. L. 566), U.S. Department of Agriculture, 1964.

*No. 12. Test drilling in the upper Sevier River drainage basin, Garfield and Piute Counties, Utah, by R. D. Feltis and G. B. Robinson, Jr., U.S. Geological Survey, 1963.

*No. 13. Water requirements of lower Jordan River, Utah, by Karl Harris, Irrigation Engineer, Agricultural Research Service, Phoenix, Arizona, prepared under informal cooperation approved by Mr. W. W. Donnan, Chief, Southwest Branch (Riverside, California) Soil and Water Conservation Research Division, Agricultural Research Service, U.S.D.A., and by W. D. Criddle, State Engineer, State of Utah, Salt Lake City, Utah, 1964.

*No. 14. Consumptive use of water by native vegetation and irrigated crops in the Virgin River area of Utah, by W. D. Criddle, J. M. Bagley, R. K. Higginson, and D. W. Hendricks, through cooperation of Utah Agricultural Experiment Station, Agricultural Research Service, Soil and Water Conservation Branch, Western Soil and Water Management Section, Utah Water and Power Board, and Utah State Engineer, Salt Lake City, Utah, 1964.

*No. 15. Ground-water conditions and related water-administration problems in Cedar City Valley, Iron County, Utah, February, 1966, by J. A. Barnett and F. T. Mayo, Utah State Engineer's Office.

*No. 16. Summary of water well drilling activities in Utah, 1960 through 1965, compiled by Utah State Engineer's Office, 1966.

*No. 17. Bibliography of U.S. Geological Survey water-resources reports for Utah, compiled by O. A. Keller, U.S. Geological Survey, 1966.

*No. 18. The effect of pumping large-discharge wells on the ground-water reservoir in southern Utah Valley, Utah County, Utah, by R. M. Cordova and R. W. Mower, U.S. Geological Survey, 1967.

No. 19. Ground-water hydrology of southern Cache Valley, Utah, by L. P. Beer, Utah State Engineer's Office, 1967.

*No. 20. Fluvial sediment in Utah, 1905-65, A data compilation by J. C. Mundorff, U.S. Geological Survey, 1968.

*No. 21. Hydrogeology of the eastern portion of the south slopes of the Uinta Mountains, Utah, by L. G. Moore and D. A. Barker, U.S. Bureau of Reclamation, and J. D. Maxwell and B. L. Bridges, Soil Conservation Service, 1971.

*No. 22. Bibliography of U.S. Geological Survey water-resources reports for Utah, compiled by B. A. LaPray, U.S. Geological Survey, 1972.

*No. 23. Bibliography of U.S. Geological Survey water-resources reports for Utah, compiled by B. A. LaPray, U.S. Geological Survey, 1975.

No. 24. A water-land use management model for the Sevier River Basin, Phase I and II, by V. A. Narasimham and Eugene K. Israelsen, Utah Water Research Laboratory, College of Engineering, Utah State University, 1975.

No. 25. A water-land use management model for the Sevier River Basin, Phase III, by Eugene K. Israelsen, Utah Water Research Laboratory, College of Engineering, Utah State University, 1976.

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No. 27. Bibliography of U.S. Geological Survey Water-Resources Reports for Utah, compiled by Barbara A. LaPray and Linda S. Hamblin, U.S. Geological Survey, 1980.

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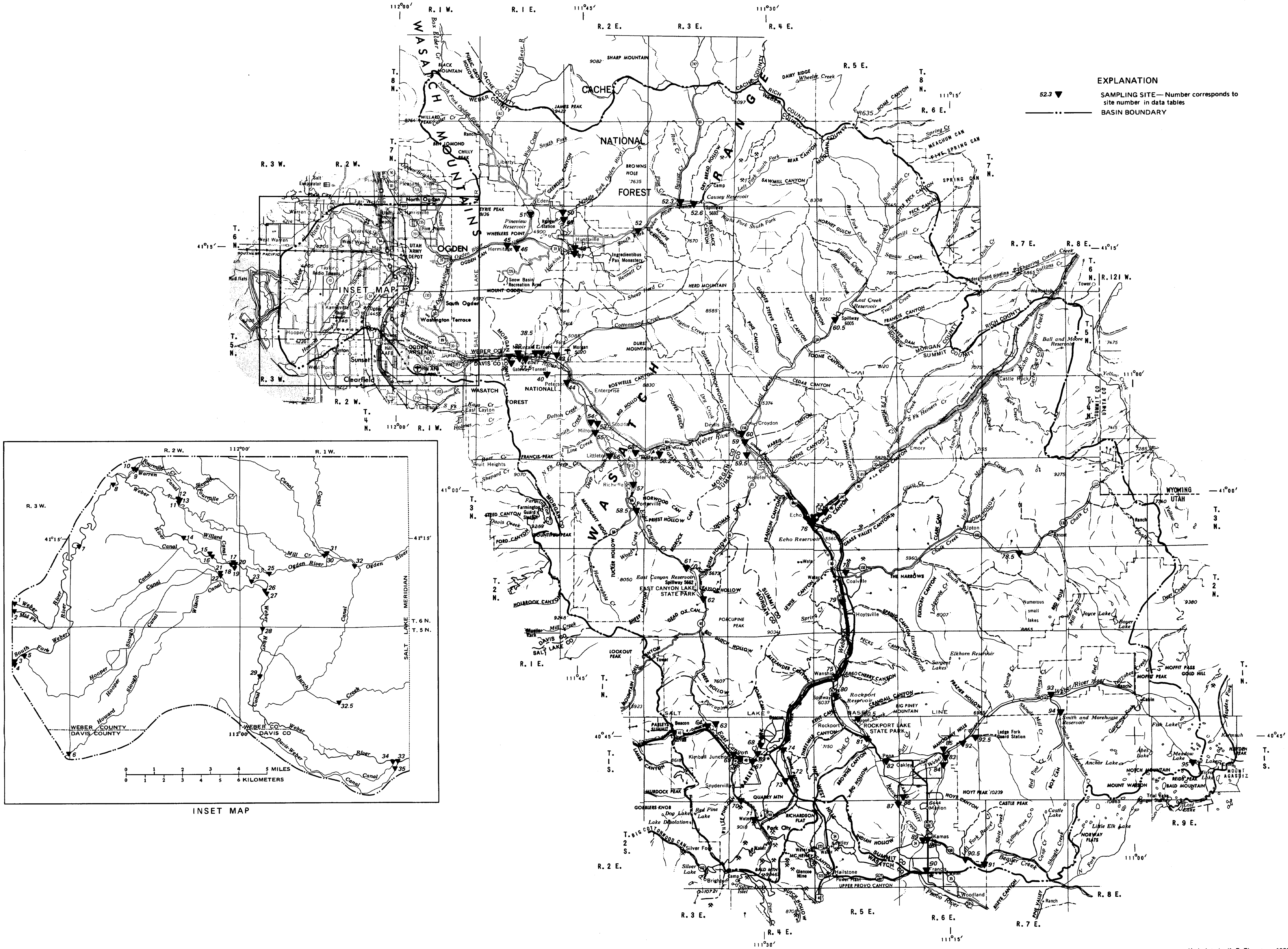

EXPLANATION

52.3 ▼ SAMPLING SITE—Number corresponds to site number in data tables

BASIN BOUNDARY

Base from U.S. Geological Survey 1:250,000 quadrangles:
Salt Lake City, Utah, Wyoming, 1954 (revised 1970);
Ogden, Utah, Wyoming, 1954 (limited revision 1966);
Brigham City, Utah, Idaho, 1954, (revised 1970)

Hydrology by K. R. Thompson, 1980

MAP SHOWING LOCATION OF WATER-QUALITY SAMPLING SITES, WEBER RIVER BASIN, UTAH

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DEPARTMENT OF NATURAL RESOURCES

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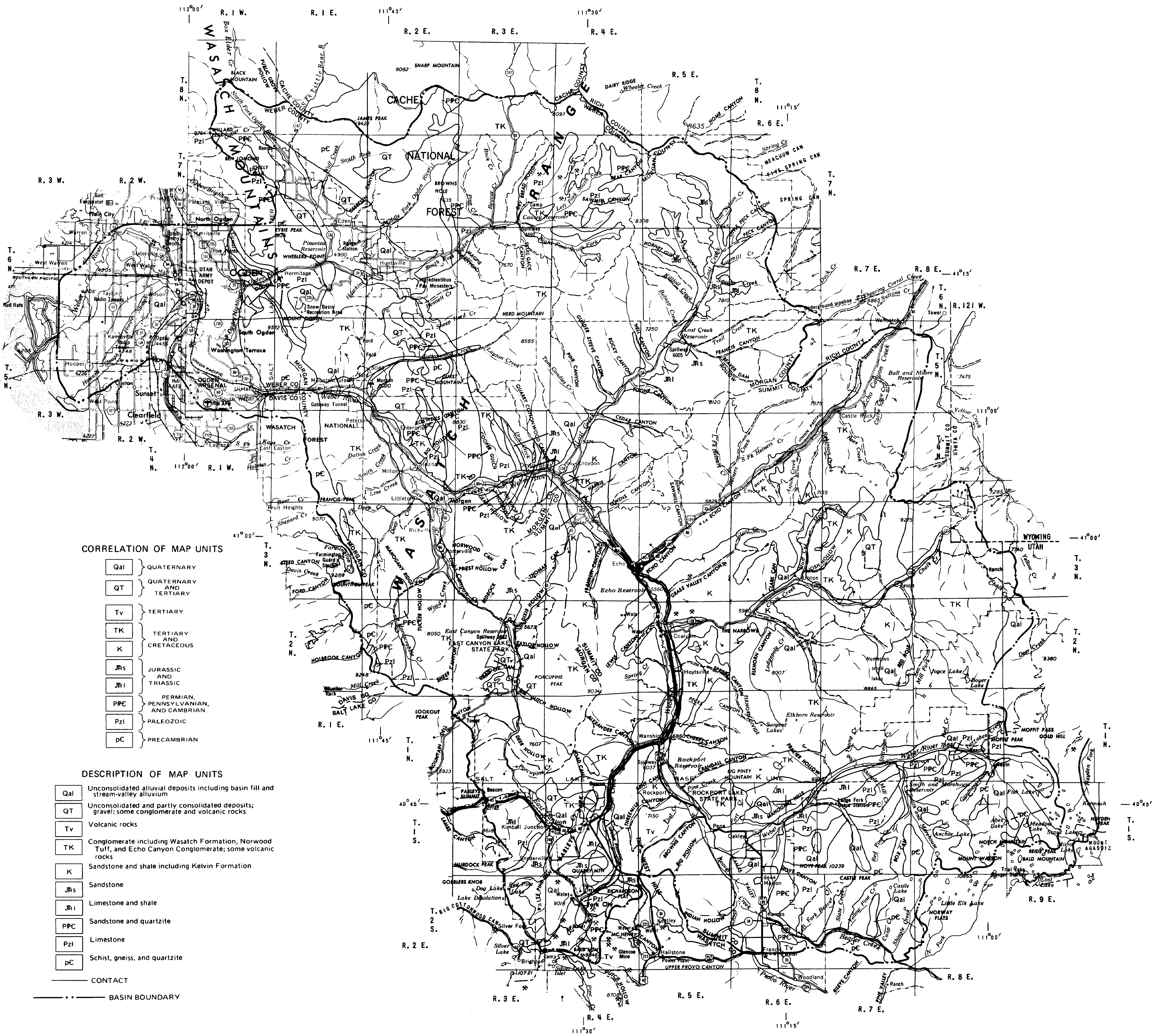
1983 PLATE 2



Base from U.S. Geological Survey 1:250,000 quadrangles:
Salt Lake City, Utah Wyoming, 1954 (revised 1970);
Ogden Utah Wyoming, 1954 (limited revision 1966);
Brigham City, Utah, Idaho 1954 (revised 1970)

5 0 5 10 MILES
5 0 5 10 KILOMETERS

Geology adapted from Stokes (1964)
by D. E. Wilberg, 1981

GENERALIZED GEOLOGIC MAP OF THE WEBER RIVER BASIN, UTAH.

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1983 PLATE 3

GRAPHS SHOWING DISSOLVED-SOLIDS CONCENTRATIONS AT SELECTED SITES, WEBER RIVER BASIN, UTAH.

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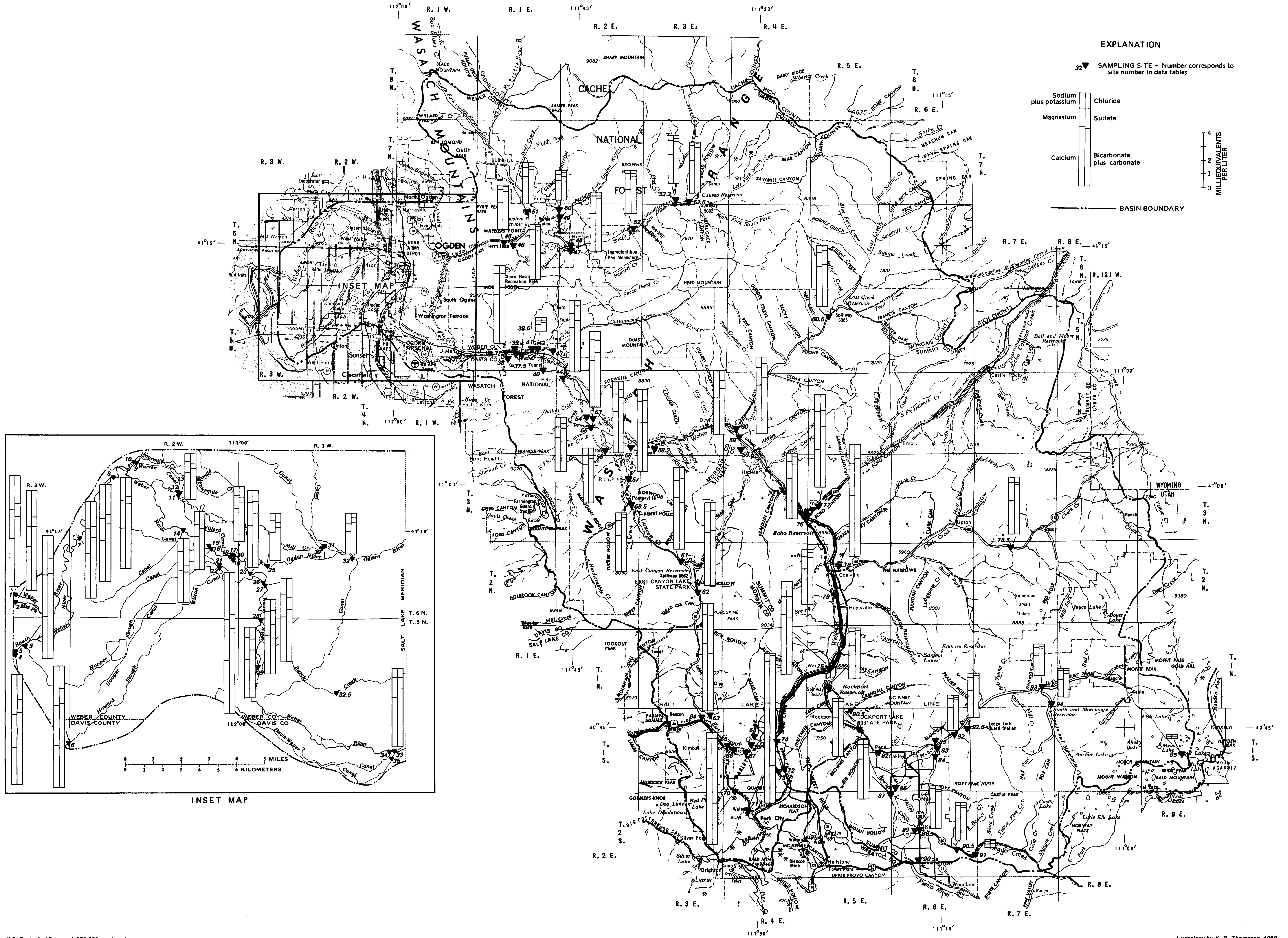

Base from U.S. Geological Survey 1:250,000 quadrangles:
Salt Lake City, Utah, Wyoming, 1954 (revised 1970);
Ogden, Utah, Wyoming, 1954 (limited revision 1966);
Brigham City, Utah, Idaho, 1954 (revised 1970)

Hydrology by K. R. Thompson, 1980

5 0 5 10 MILES
5 0 5 10 KILOMETERS

MAP SHOWING CHEMICAL CHARACTERISTICS OF SURFACE WATER AT SELECTED SITES IN THE WEBER RIVER BASIN, UTAH, DURING LOW-FLOW CONDITIONS, JULY 31-AUGUST 2, 1979.

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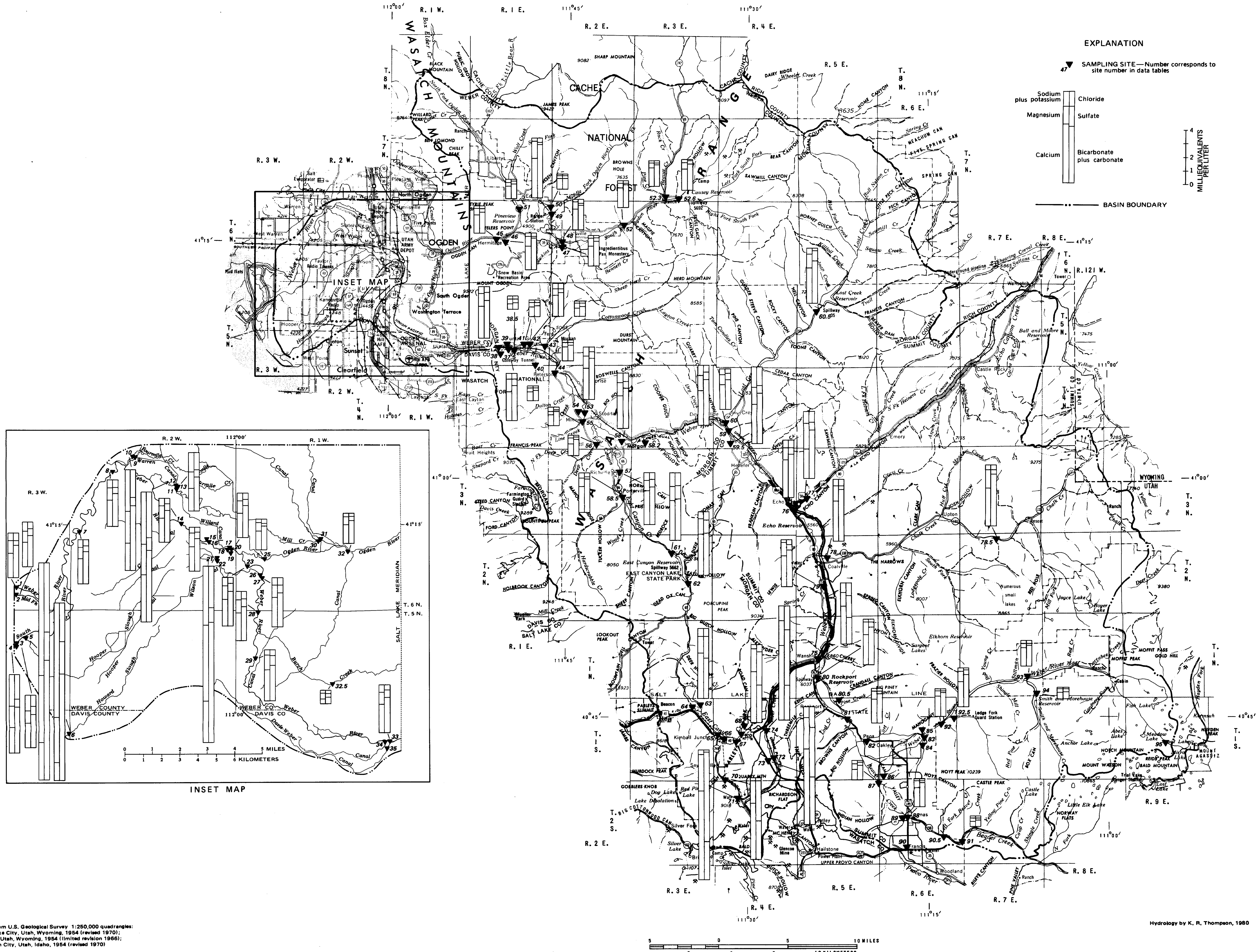
TECHNICAL PUBLICATION NO. 76
1983 PLATE 5



Base from U.S. Geological Survey 1:250,000 quadrangles:
Salt Lake City, Utah, Wyoming, 1954 (revised 1970);
Ogden, Utah, Wyoming, 1954 (limited revision 1966);
Brigham City, Utah, Idaho, 1954 (revised 1970)

Hydrology by K. R. Thompson, 1980

MAP SHOWING CHEMICAL CHARACTERISTICS OF SURFACE WATER AT SELECTED SITES IN THE WEBER RIVER BASIN, UTAH, DURING SPRING RUNOFF, MAY 12-14, 1980.