RECONNAISSANCE OF GROUND-WATER QUALITY,
EASTERN SNAKE RIVER BASIN, IDAHO

By D. J. Parliman

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[Plates in pocket]

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CONVERSION FACTORS

Multiply English units	By	To obtain metric units
acre	4047	square meter
foot (ft)	0.3048	meter
gallon per minute (gal/min)	0.06309	liter per second
inch (in.)	25.4	millimeter
micromho (μmho)	1.00	microsiemen
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer

Temperature: Conversion of °C to °F is based on the equation, °F=(1.8)(°C)+32. All water temperatures are reported to the nearest 0.5 degree Celsius.

NGVD (National Geodetic Vertical Datum of 1929): A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "mean sea level." In this report, altitudes are based on NGVD.

Well-Numbering System

The well-numbering system (fig. 1) indicates the location of wells within the official rectangular subdivision of public lands, with reference to the Boise base line and meridian. The first two segments of the number designate the township (north or south) and range (east or west). The third segment gives the section number, followed by three letters and a numeral, which indicate the ¼ section (160-acre tract), ¼-¼ section (40-acre tract), the ¼-¼-¼ section (10-acre tract), and the serial number of the well within the tract, respectively.

The U.S. Geological Survey in Idaho indicates quarter sections by the letters A, B, C, and D in counterclockwise order from the northeast quarter of each section. Within the quarter sections, 40-acre and 10-acre tracts are lettered in the same manner. For example, well 6N-34E-24BCB1 is in the NW¼SW¼NW¼ sec. 24, T. 6 N., R. 34 E., and is the first well inventoried in that tract.

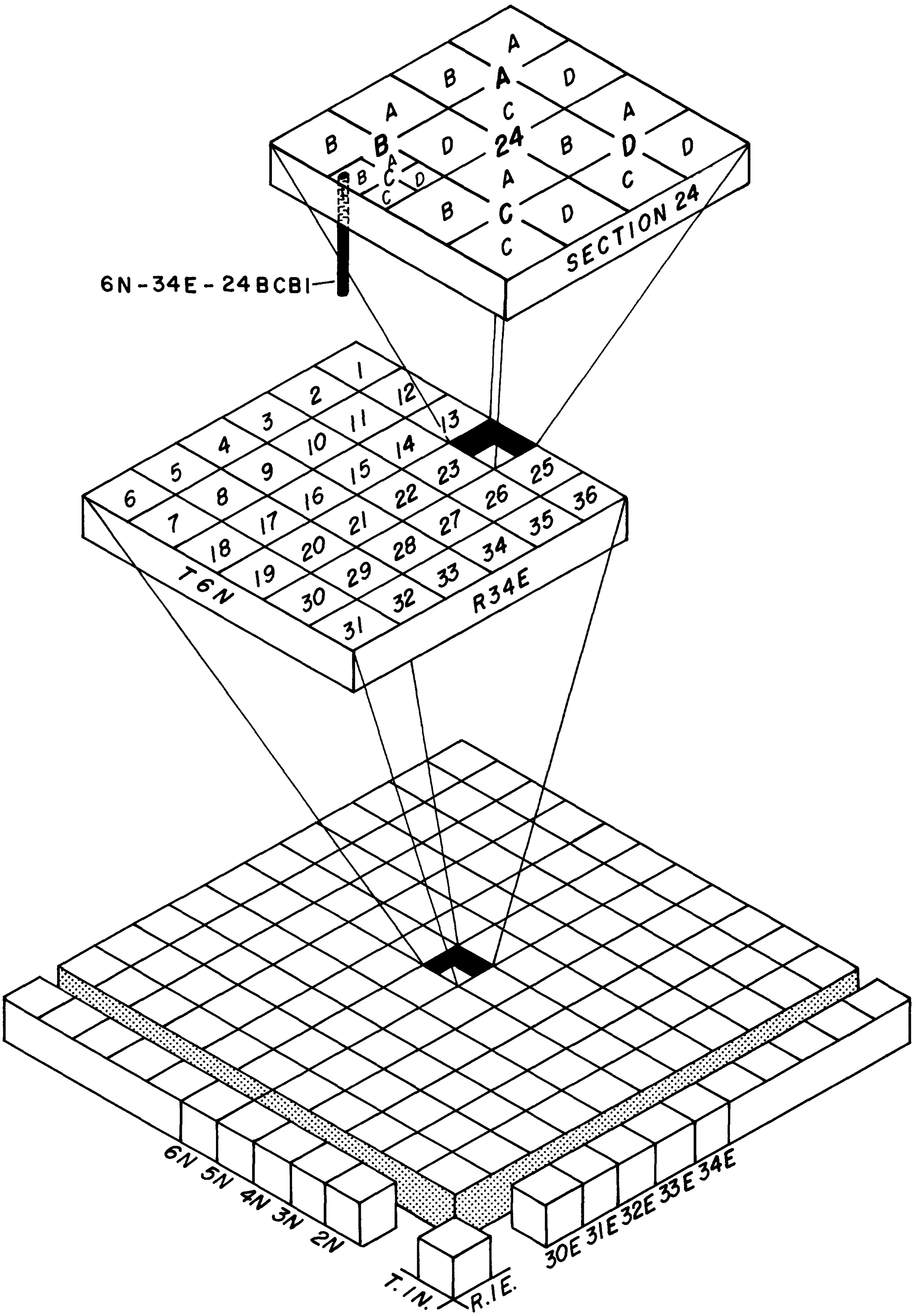

Figure 1. -- Well-numbering system.

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ABSTRACT

Water-quality, geologic, and hydrologic data were collected for 165 wells in the eastern Snake River basin, Idaho. Pre-1979 data from 189 wells were compiled with current (1979) data to define, on a reconnaissance level, water-quality conditions in major aquifers and to identify factors that may have affected ground-water quality.

Ground-water samples were analyzed for specific conductance, pH, water temperature, major dissolved ions, and coliform bacteria. Water from aquifers in all rock units generally contains predominantly calcium, magnesium, and bicarbonate plus carbonate ions.

In the uplands subareas, median values for selected ground-water characteristics from current analyses are 200 mg/L (milligrams per liter) hardness; 7.6 pH; 200 mg/L alkalinity; 13 degrees Celsius water temperature; 0.2 mg/L fluoride; 15 mg/L silica; 0.51 mg/L nitrite plus nitrate (as nitrogen); less than 1 colony per 100 milliliters coliform bacteria; 0.02 mg/L phosphorus (total); and 253 mg/L dissolved solids.

In the plains subarea, median values are 210 mg/L hardness; 7.7 pH; 180 mg/L alkalinity; 11 degrees Celsius water temperature; 0.4 mg/L fluoride; 26 mg/L silica; 1.2 mg/L nitrite plus nitrate; less than 1 colony per 100 milliliters coliform bacteria; 0.01 mg/L phosphorus; and 283 mg/L dissolved solids. Ground-water quality in most of the study area meets recommended standards or criteria for most uses.

INTRODUCTION

Demand for ground-water supplies is increasing in Idaho. As the demand increases, ground-water availability and quality become more significant to water users. An understanding of the factors that affect ground-water quality is needed to evaluate potential effects of stresses that will accompany changes in land and water use.

This study is part of a continuing program, in cooperation with the Idaho Department of Water Resources, to obtain ground-water quality data in areas where land- and water-resource development is expected to increase. Similar studies in this program were completed for southeastern Idaho (Seitz and Norvitch, 1979), north Idaho (Parliman and others, 1980), and east-central Idaho valleys (Parliman, 1981). Location of the eastern Snake River basin study area is shown in figure 2.

Purposes and Approach of Study

The purposes of this study were to: (1) Define, on a reconnaissance level, current (1979) water-quality conditions in major aquifers (water-yielding rock formations) in the eastern Snake River basin; (2) present available geologic and hydrologic data to assist in understanding the natural and man-caused factors that affect water-quality conditions; and (3) establish a hydrologic base upon which future comparisons can be made to evaluate changes.

To accomplish these purposes, ground-water samples and well-inventory data for 165 wells were collected from August to December 1979 (hereafter referred to as current analyses or samples). Selection of wells to be sampled was based on the following considerations: (1) availability of well-construction and borehole-lithology information; (2) hydrologic and geologic characteristics of the aquifers; (3) degree of development of the aquifers; (4) depth to water; (5) potential use of ground water; (6) previous water-quality problems; and (7) sources of potential contaminants, such as septic-tank drain-field leachates, landfill leachates, and drain-well wastes.

Because certain water-quality characteristics may change with time after sample collection, field determinations of the following were made onsite: air and water temperature, pH, specific conductance, bicarbonate and carbonate concentrations (by end-point titration method), and total and fecal coliform colony counts. Well-inventory data collected onsite included measurements of water level and well discharge, where possible.

Historic (pre-1979) water quality and well-inventory data (Data Tables section) were compiled for 189 wells in order to: (1) Provide ground-water quality information in areas where current data were not available, and (2) assess possible temporal changes in ground-water quality. Sixteen of these 189 wells were resampled in 1979 to provide comparative information. Locations of wells for which data are available are shown on plate 1.

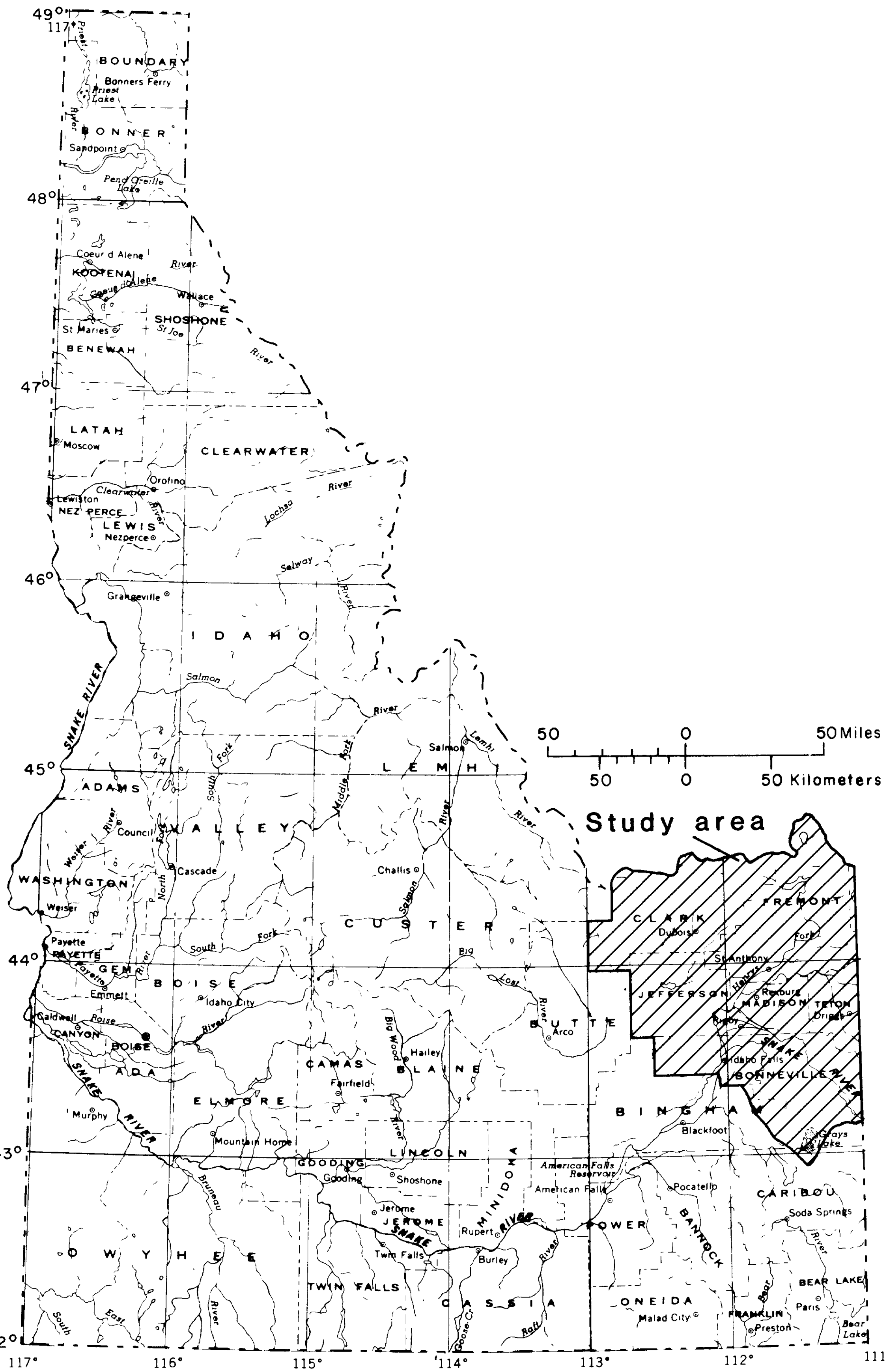

Figure 2. -- Location of the study area.

DESCRIPTION OF STUDY AREA

The eastern Snake River basin comprises about 7,500 mi^2 in Clark, Fremont, Jefferson, Madison, Teton, Bonneville, and parts of Bingham and Caribou Counties in Idaho (fig. 2). Boundaries of the major river and tributary stream basins in the study area and their designations for use in this report are shown in figure 3.

The eastern Snake River basin is divided into three subareas on the basis of geology and geomorphic province: (1) northern uplands, which comprise the foothills, mountains, and intermontane valleys of upper tributary basins in the northern section of the study area; (2) eastern uplands, which comprise the foothills, mountains, and intermontane valleys in the eastern section of the study area; and (3) plains, which comprise the Snake River Plain and benchlands in the central section of the study area. Subarea divisions and major landform features of the study area are shown in figure 4.

The northern uplands subarea is included in the Northern Rocky Mountain geomorphic province (Ross and Savage, 1967) and is characterized by generally northwest-trending landforms--high, massive mountains and intermontane valleys with variably thick accumulations of sedimentary deposits. Land surface in this subarea ranges generally from 6,000 ft to more than 10,000 ft in altitude.

The eastern uplands subarea is included in the Middle Rocky Mountain geomorphic province and is characterized by plateaus of volcanic origin near Ashton and complexly folded and faulted foothills and mountains of the upper Teton River, Swan Valley, and Willow Creek basins. Mountain ranges are characteristically distinct, subparallel, and trend in a generally northwest direction. Land surface in this subarea ranges generally from 5,000 ft to more than 9,800 ft in altitude.

The plains subarea is included in the eastern Snake River Plain section of the Columbia Intermontane geomorphic province and is characterized by (1) a gradually southwestward sloping land surface in a topographic basin, the Snake River Plain, and (2) foothills and benchlands adjacent to the plain. Several landform features in this subarea are of hydrologic and geologic significance to ground-water studies and will be discussed in more detail in later sections of this report. These features are: (1) Mud Lake and Market Lake basins, (2) Egin bench, and (3) Rexburg bench. Land surface in the plains subarea ranges generally from 4,600 to 6,300 ft in altitude.

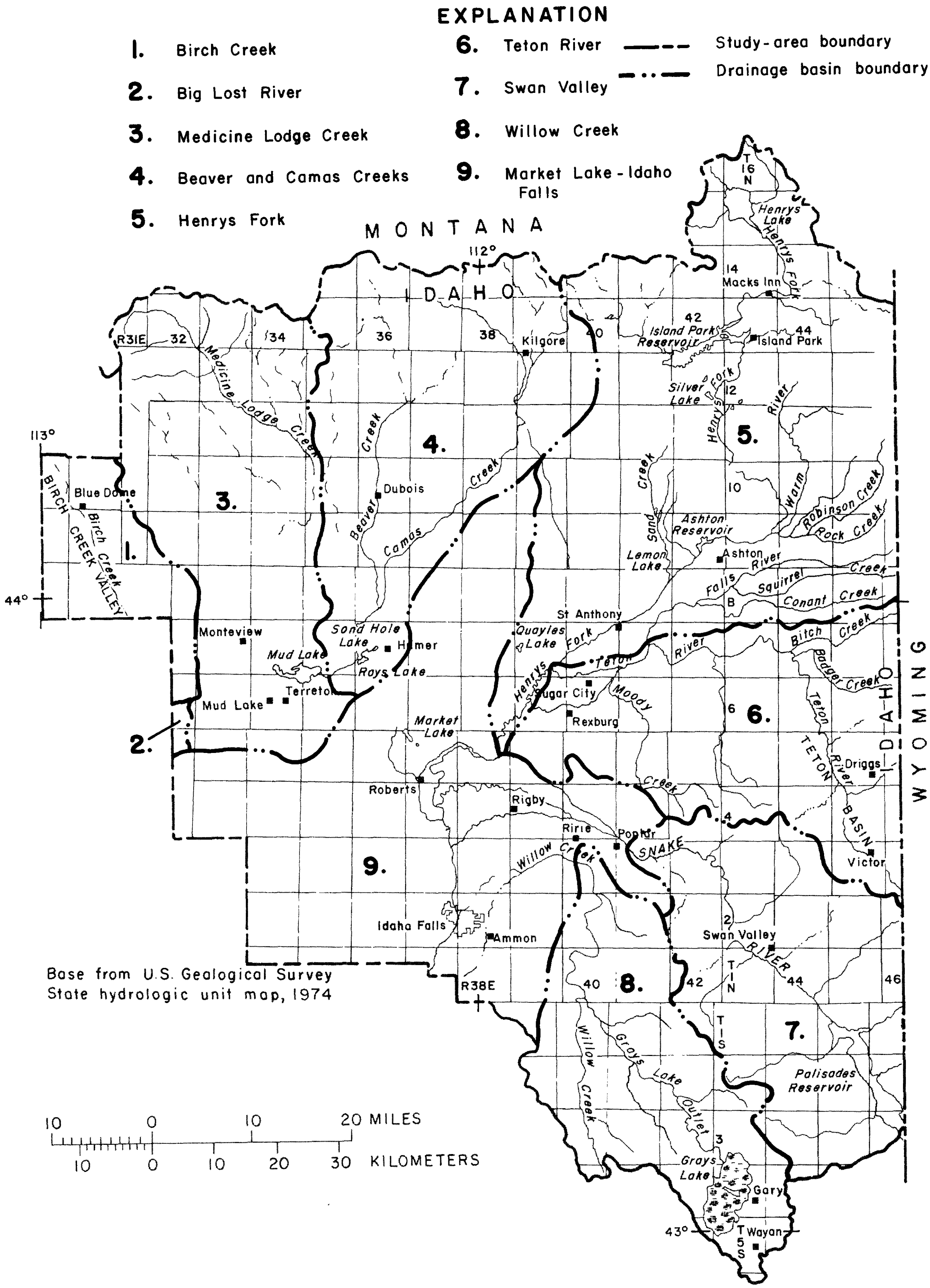

Figure 3. -- Surface-water drainage basins.

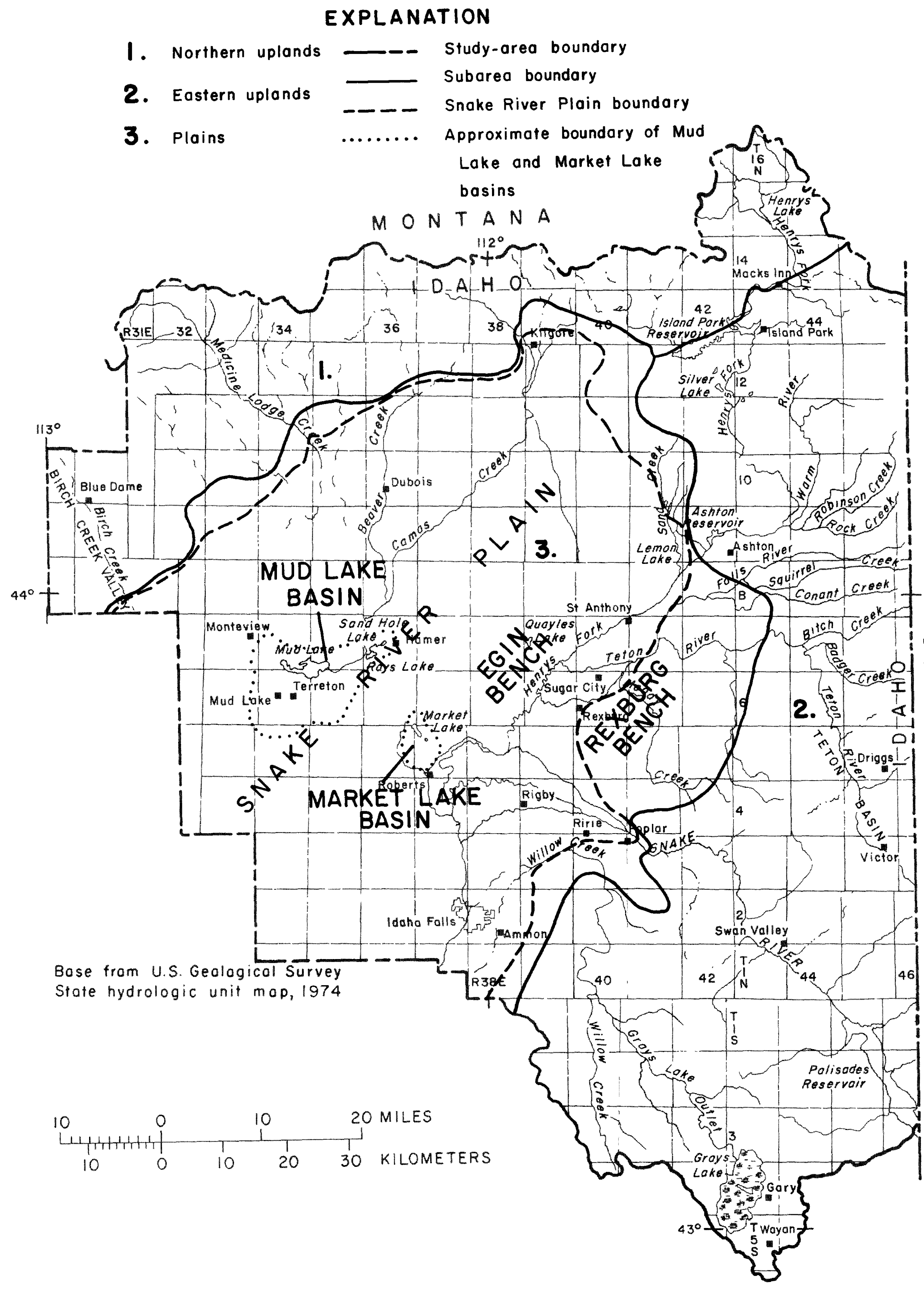

Figure 4.-- Subareas, boundaries, and major landform features.

Climate in the study area is controlled by land-surface altitude, relief, and prevailing westerly and southwesterly winds. Climatic characteristics include a wide annual range of temperature (generally -18°C to more than 38°C) and moderate to cool mean temperatures. Mean annual precipitation is variable (generally ranging from less than 6 in. to more than 40 in.). Semiarid conditions characterize the plains subarea, and subhumid conditions characterize the high mountains in the uplands subareas. In general, high altitudes have more precipitation, colder winters, and cooler summers than low altitudes. Winters are cool to cold and wet; summers are warm to hot and dry. Lines of equal precipitation, drawn on the basis of mean annual precipitation from 1930 to 1957, are shown in figure 5.

Estimated population in the study area in 1976 was about 105,000 (Idaho Division of Budget, Policy Planning, and Coordination, 1978). About 56 percent of the population live in the plains subarea. Towns of more than 1,000 inhabitants include Ashton, St. Anthony, Rigby, Rexburg, Idaho Falls, and Iona.

Economy is based on irrigated agriculture, primarily alfalfa and clover, hay, grain, potatoes, beans, and sugar beets; livestock production; tourism and seasonal recreation activities; forest products; and mining. Industries include sugar manufacturing, potato and vegetable processing, meatpacking, processing of dairy products, and grain milling.

Commercial development and population are increasing in most of the study area. Recent construction of urban subdivisions, recreation home, and second home developments is evident throughout the area but is most heavily concentrated on the flood plains and benchlands between Idaho Falls and Ashton and in the eastern uplands subarea. Continued urban and commercial development, together with increases in irrigated acreage, may affect both ground-water availability and quality.

GEOLOGIC AND HYDROLOGIC SETTING

Generalized Geology and Water-Yielding Characteristics of Rocks

Surface geology of the eastern Snake River basin (pl. 2) is generalized from the Idaho State Geologic Map (Bond, 1978). Rock units include Quaternary and Tertiary alluvium and sedimentary rocks, Quaternary and Tertiary basaltic rocks, Quaternary and Tertiary silicic volcanic

EXPLANATION

—25— Line of equal mean annual precipitation, interval 5 inches

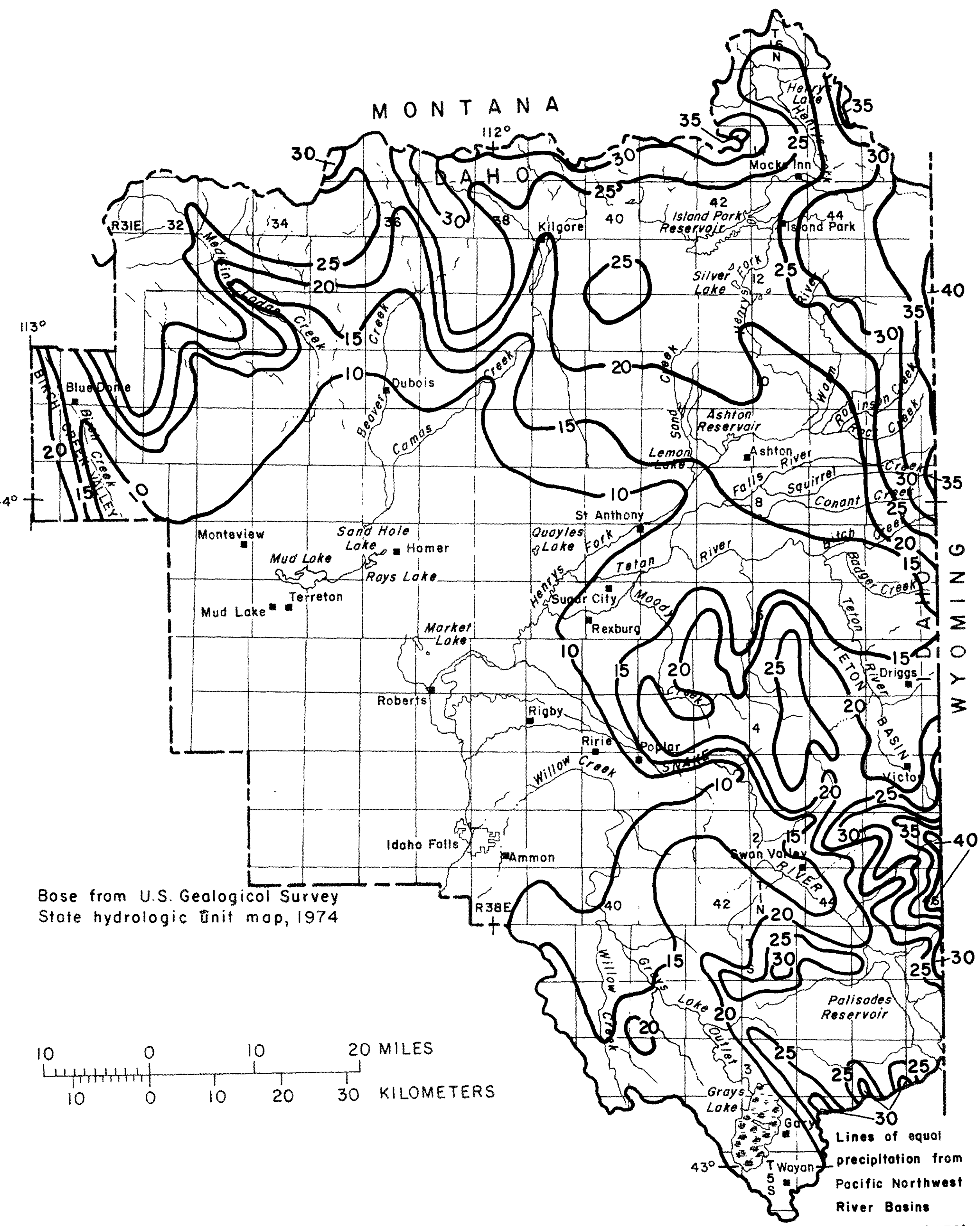

Figure 5.--Mean annual precipitation, 1930-57.

rocks and associated sedimentary deposits, Tertiary and Cretaceous undifferentiated sedimentary rocks, and pre-Cretaceous undifferentiated rocks (basement complex). For purposes of this report, these units hereafter will be referred to respectively as alluvium, basaltic, silicic volcanic, sedimentary, and basement complex rock units. Descriptions of rock units are shown in table 1. Selected aquifers within each rock unit also are listed.

Geologic structure in the area is complex. Major structural features of the northern and eastern uplands subareas include the Island Park caldera and associated volcanic vents, and regional faults and folds that trend in a northwest direction. Teton, Swan Valley, and Willow Creek basins in the eastern uplands subarea are included in a zone of folds and thrust faults, tear faults, and block faults, referred to as the Bannock thrust zone (Armstrong and Cressman, 1963).

The major structural feature of the plains subarea is the Snake River Plain, a broad, topographic depression or basin of undetermined structural origin that is composed of a thick (often thousands of feet) sequence of alluvium, basaltic, and silicic volcanic rock units. Topographic features on the plain include volcanic buttes, cones, and vents (sources for most basaltic and silicic volcanic rocks), Mud Lake and Market Lake basins, and benchlands near Rexburg (fig. 2).

Mud Lake basin encompasses a broad, shallow, closed depression with Mud Lake in the lowest part of the depression. Market Lake basin is a smaller depression with Market Lake in the lowest part of the depression. Although these basins and the areas immediately adjacent to them are within the Snake River Plain, their geology differs from that of most of the Plain. Mud Lake and Market Lake basins are located in a zone of transition from a sedimentary-basaltic rock sequence (at least 1,000 ft thick) to a predominantly basaltic sequence (more than 1,000 ft thick). This zone of transition, previously called the Mud Lake-Market Lake barrier (Stearns and others, 1938; Stearns and others, 1939; and Mundorff and others, 1964), occurs along a northwest-trending line that extends through Mud and Market Lakes.

Benchlands near Rexburg are depositional and stratigraphic features rather than structural features of the plains subarea. The Egin bench is a river terrace composed of alluvial and sedimentary deposits (alluvium rock unit). The Rexburg bench is composed of silicic volcanic rocks and sedimentary deposits (silicic volcanic rock unit).

Table 1.--Correlation, description, and water-yielding characteristics of rock units

Period	Epoch	Map unit (rock unit)	Aquifer code [1] and name	Description	Water-yielding characteristics
Quaternary and Tertiary	Holocene to Pliocene	Alluvium and sedimentary rocks (QTs)	110ALVM Quaternary alluvium 110QRNR Quaternary system 110SDMS Quaternary sediments 111ALVM Holocene alluvium 112ALVM Pleistocene alluvium 112OTSH Pleistocene glacial outwash	Alluvium, colluvium, terrace gravel, glacial lakebed, and wind-blown deposits. Clay, silt, sand, gravel, cobbles, and boulders. Bedding, sorting, and consolidation characteristics variable within rock unit. Alluvium floors the tributary valleys and flood plains of the main rivers and forms fans at mouths of some valleys; terrace gravel occurs locally along some streams; colluvium and glacial deposits are coalesced with alluvium at many places; lakebeds formed behind basalt dams near Roberts, Mud Lake, and other areas; windblown deposits mantle much of the Snake River Plain and at some places, notably near St. Anthony, are actively migrating.	Sandy and gravelly alluvium is an important aquifer; yields considerable water to wells. Terrace gravel locally yields moderate to large supplies of water to wells, but in many areas, the gravel occurs above the water table. Lakebeds yield only small amounts of water because of low hydraulic conductivity. Windblown deposits mostly occur above the water table.
Quaternary and Tertiary	Holocene to Miocene	Basaltic rocks (QTb)	110SKRV Quaternary Snake River Group 110VLCC Quaternary volcanics 112FLVR Falls River Basalt 112GRRT Unnamed [2]	Olivine basalt, dense to vesicular, aphanitic to prophyritic; irregular to columnar jointing; thickness of flows variable; includes beds of basaltic cinders, rubbly basalt, and interflow sedimentary deposits. Crops out over much of the Snake River Plain; mantled in many places with alluvium and sedimentary rock unit; overlies silicic volcanic and sedimentary rock units.	Hydraulic conductivity highly variable; formational hydraulic conductivity high because of jointing and rubbly contacts between flows; rock hydraulic conductivity low. One of the more important aquifers in Idaho. Yields large amounts of water to wells where saturated; receives and transmits recharge readily.
Quaternary and Tertiary	Holocene to Eocene	Silicic volcanic rocks and associated sediments (QTsv)	112PLTU Plateau Rhyolite 112LVCK Lava Creek Tuff 112MFLS Mesa Falls Tuff 112HKBR Huckleberry Ridge Ruff 120VLCC Tertiary volcanics 121SLLK Salt Lake Formation	Rhyolitic, latitic, and andesitic rocks; massive and dense; jointing ranges from platy to columnar; occurs as thick flows and blankets of welded tuff with associated fine- to coarse-grained ash and pumice beds and as clay, silt, sand, and gravel; locally folded, tilted, and faulted. Includes rhyolitic to basaltic rocks of the Challis Volcanics; tuff, tuffaceous sandstones, and conglomerates of the Salt Lake Formation; and rhyolitic ash-flow tuff of the Yellowstone Group underlies much of the Rexburg bench. Crops out in foothills and mountains of northern and eastern subareas.	Joints and fault zones in flows and welded tuff and interstices in coarse-grained ash, sand, and gravel beds yield small to moderate, and rarely large, amounts of water to wells. Commonly contain warm water under confined conditions. An important aquifer in places. Challis Volcanics generally have low hydraulic conductivity and are not an important aquifer. Porosity and hydraulic conductivity in Salt Lake Formation and Yellowstone Group are highly variable and are important aquifers in places.
Tertiary and Cretaceous	Paleocene to Early Cretaceous	Sedimentary rocks, undifferentiated (TKu)	211WAYN Wayan Formation	Brackish and freshwater limestone; calcareous, silicious, or highly organic shale and siltstone; calcareous and red-bed sandstone; breccia; conglomerate extensively faulted and folded. Crops out in foothills and mountains of eastern uplands subarea.	Generally low hydraulic conductivity except where jointed. An important source of spring water. Yields small to moderate amounts of water to wells. Not an important aquifer.
Pre-Cretaceous		Basement complex rocks, undifferentiated (Mzp€)	300CRBN Paleozoic carbonate rocks	Well-indurated sedimentary and metamorphic rocks that have been folded, faulted, and intruded by younger rocks. Crop out in foothills and mountains in northern and eastern uplands subareas.	Hydraulic conductivity generally low, except where jointed. Where saturated, of sufficient thickness, and uncemented, these units may yield small to moderate amounts of water to wells and springs. Not important aquifers.

[1]Price and Baker (1974); aquifer codes assigned on the basis of available driller's log lithologic descriptions. Range of age of rock units may exceed range of ages of assigned aquifer codes.

[2]See Gerritt Basalt (Whitehead, 1978).

Surface, subsurface, and structural geology of the study area are discussed in more detail in several reports, which include Kirkham (1927); Whitehead (1978); Stearns, Bryan, and Crandall (1939); Crosthwaite, Mundorff, and Walker (1970); Kilburn (1964); Savage (1961); Mundorff, Crosthwaite, and Kilburn (1964); Mundorff (1962a and 1962b); and Crosthwaite (1964).

All rock units in the study area contain some ground water. The water occurs under both artesian (confined) and water-table (unconfined) conditions. Perched water-table conditions also occur in the study area, particularly in the alluvium rock unit of the Mud Lake-Market Lake area and in the alluvium and silicic volcanic rock units of the benchlands near Rexburg. Water-yielding characteristics of geologic units are shown in table 1. Yields from wells completed in aquifers in alluvium, basaltic, and silicic volcanic rock units generally are adequate for most uses. Yields from wells completed in aquifers in sedimentary and basement complex rock units are generally sufficient for most domestic and stock uses.

Aquifer Recharge

Recharge to aquifers in foothills and mountains of northern and eastern uplands subareas (hereafter referred to collectively as uplands subareas) is primarily from infiltration of precipitation. Recharge to aquifers in the valleys of the uplands subareas and in the plains subarea may be from several sources: (1) infiltration from rivers, streams, irrigation canals, and drainage ditches; (2) leakage from reservoirs and lakes; (3) infiltration of applied irrigation water; (4) leakage from perched-water tables; (5) interaquifer flow; (6) drain-well waste disposal; (7) leakage from septic-tank drain fields; and (8) infiltration of precipitation. The amount of recharge is affected primarily by climatic and geohydrologic conditions in the study area.

Ground-water and surface-water relations in the study area are complex, especially in the plains subarea. All surface water from Birch Creek basin either infiltrates alluvium and basaltic aquifers in the plains subarea or is lost to evaporation and transpiration. Surface-water flow from Medicine Lodge, Beaver, and Camas Creek basins either infiltrates alluvium, basaltic, or silicic volcanic aquifers, is lost to evaporation and transpiration, or is discharged into lakes or sloughs in the Mud Lake basin. Infiltration of applied irrigation water and leakage from irrigation canals on the Egin bench are also major sources of recharge for perched-water tables in the Mud Lake and Market Lake areas. Discussion of the complex hydrologic systems of the Mud Lake and Market Lake transition zone and benchlands near Rexburg is beyond the scope of this report but is presented in Crosthwaite (1973); Crosthwaite, Mundorff, and Walker (1970); Mundorff (1962b); Crosthwaite (1964); and Haskett, Jensen, and Gangwer (1977).

More than 500 drain wells (Idaho Department of Water Resources, oral commun., 1981) inject irrigation-runoff water, runoff from city streets, septic-tank wastes, and wastes from a few industries into the basaltic rock unit of the study area; however, volume of recharge from drain-well inflow is negligible to the regional ground-water system (Seitz and others, 1977). The importance of drain-well recharge is the local and possible regional effects this water might have on quality of water in aquifers in the basaltic rock unit.

Ground-Water Movement

Ground-water movement in the eastern Snake River basin is generally in the direction of the hydraulic gradient, from places of high hydraulic head (pressure measured by water levels in wells) to places of low head, and from areas of recharge to areas of discharge. The direction of movement, as shown in figure 6, is based on potentiometric-surface contour maps (Stearns and others, 1938; Mundorff and others, 1964; Whitehead, 1978; Kilburn, 1964; and Crosthwaite and others, 1970). Current and historic water-level data are insufficient to define the potentiometric surface in much of the study area, especially in Swan Valley and Willow Creek basins in the eastern uplands subarea. Where data are sparse, topography, springs, and other hydrographic features are used to aid in defining direction of movement.

In the northern uplands subarea, ground water moves generally southeastward. In the eastern uplands subarea, ground water moves generally southward or westward in the upper Henrys Fork basin and northward to northwestward in upper Teton, Swan Valley, and Willow Creek basins. In the plains subarea, water in alluvium and basaltic rock units moves generally southwestward; in silicic volcanic rock units, ground water moves generally northwestward toward the Snake River Plain.

Water in confined aquifers probably moves in about the same direction as in unconfined aquifers. In general, where hydraulic heads in confined aquifers are above water levels in water-table aquifers, upward leakage recharges the unconfined aquifers (Crosthwaite, 1973). In perched-water tables, movement is downward toward the regional potentiometric surface.

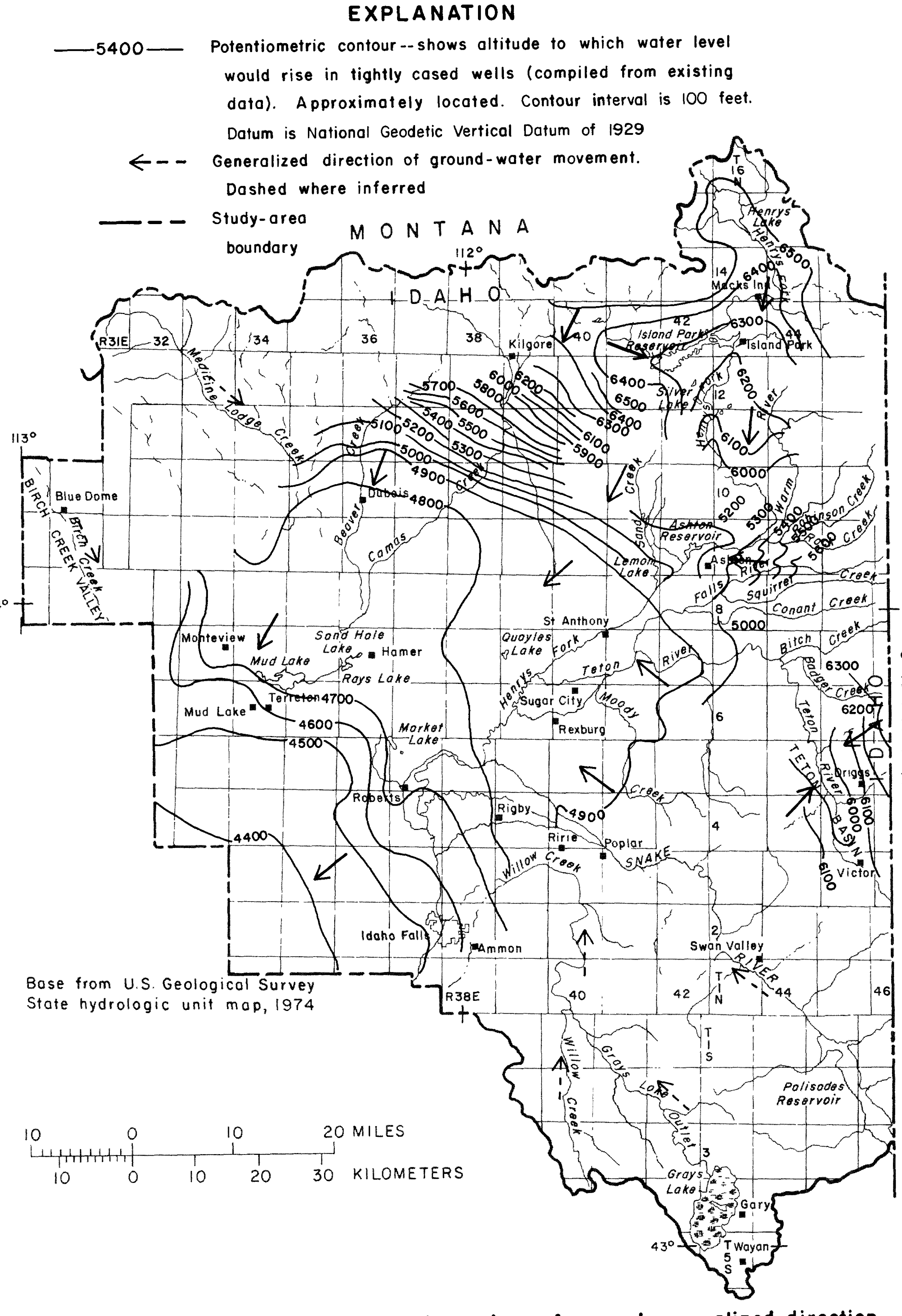

Figure 6.-- Contours on the potentiometric surface and generalized direction of ground-water movement.

GROUND-WATER QUALITY

Current analyses of ground-water samples collected during the period August to December 1979 are shown in table B (Data Tables section). Historic analyses of ground-water samples collected prior to 1979 are shown in table C (Data Tables section). The historic analyses provide data in areas where little or no current data are available, and provide a base for comparing current and historic ground-water quality.

Current analyses represent a cross section of water quality in most aquifers in the study area. Median (50th percentile) and range values for current data are used throughout this report to summarize and compare large numbers of data. No attempt was made specifically to include or exclude samples of thermal water (for purposes of this report, water having a 20°C or higher temperature), and analyses from wells with thermal water are included in both tables B and C.

Most concentrations of chemical constituents are reported in mg/L (milligrams per liter) or µg/L (micrograms per liter). One milligram equals 1,000 micrograms. Milligrams per liter and micrograms per liter, within the range of values presented, are numerically equal to parts per million or parts per billion, respectively.

Suitability of Water For Use

Ground-water quality characteristics (chemical constituents, physical properties, and bacterial concentrations) determine the suitability of water for use. Principal consumptive demands for ground water in the study area are for domestic, irrigation, industrial, public supply, and livestock uses. In relation to human needs, water-quality criteria determined by the U.S. Environmental Protection Agency (1976), hereafter referred to as EPA, designate maximum levels for some water-quality characteristics that, when not exceeded, will not harm water users.

In contrast, drinking water regulations (EPA, 1977a and 1977b), which may use criteria as a basis, describe legally established mandatory (primary) and recommended (secondary) limits for chemical constituents, physical properties, and bacterial concentrations. Local natural conditions, esthetic or economic considerations, and resource-protection considerations may result in variations of regulations in different areas. Federal drinking water regulations legally apply only to public water supplies, not supplies for private use. Regulation limits do, however, provide a comparative base for all water-quality discussion.

Selected water characteristics commonly important to water users are presented in table 2. Water-quality criteria and regulations are given where possible. Where concentrations of chemical constituents exceed EPA mandatory or recommended limits or are esthetically or economically undesirable, it may be possible to reduce, remove, or control concentrations through appropriate treatment. Some methods for treating water are discussed in Nordell (1961).

Water-quality criteria for many agricultural uses or industrial processes have been established by the National Academy of Sciences, National Academy of Engineering (1972), hereafter referred to as NASNAE. Criteria for these uses often vary, however, owing to differing industrial requirements and livestock and crop sensitivities. Some aspects of water quality for agricultural uses are discussed in this report. Quality of water for industrial processes is not discussed here but is included in Todd (1970) and NASNAE (1972).

Factors Affecting Water-Quality Characteristics

Variability in chemical, physical, and biological characteristics of ground water in eastern Snake River basin rock units may be due to one or more factors, including: (1) geochemical properties such as solubility and exchange characteristics of aquifer materials; (2) contact time of water with aquifer materials; (3) mineral composition (geologic environment) of aquifer materials; (4) relative proximity of sampling site to source of ground-water recharge; and (5) influences of man's activities. Geochemical properties, contact time, and mineral composition of aquifer materials are factors that may result in relatively long-term changes in water quality. A discussion of geochemical factors affecting water quality may be found in many texts, including Freeze and Cherry (1979) and Krauskopf (1967). Effects of contact time are difficult to determine specifically, but in general, tend to bring the chemistry of the water closer to equilibrium with the surrounding rock. Differences in water quality among the various aquifer materials are presented by means of median and range values for selected characteristics (table 3).

Except for water temperature and alkalinity, median values for water-quality characteristics in all rock units are nearly the same or higher in the plains subarea than in the uplands subareas. Greatest ranges of values are most common from the alluvium rock unit in the uplands subareas and the basaltic rock unit in the plains subarea. Median and range values for individual characteristics are discussed later in this report.

Table 2.-- Selected water quality characteristics and their relation to use

Constituent or property	Source or significance	Range of concentrations in sampled wells (current data)	Effects on usability
Specific conductance	An indicator of dissolved mineral content of water.	91-1,850 μmho/cm	Indicator of dissolved mineral content. A measure of the capacity of the water to conduct a current of electricity, and varies with the concentration and degree of ionization of the different minerals in solution; the more minerals, the larger the specific conductance.
pH	Hydrogen-ion concentration.	6.9-9.4	A pH of 7.0 indicates neutrality of a solution. Values higher than 7.0 denote increased alkalinity; values lower than 7.0 indicated increased acidity. Corrosiveness of water generally increases with decreasing pH, but excessively alkaline water also may be corrosive. Recommended level for public water supplies ranges from 6.5 to 8.5.[1]
Temperature (°C)	Variations may be due to deeper water circulation, thermal activity, seasonal air temperature variation, or disposal of surface waste water.	2.5°-22°C	Affects the usefulness of water for many purposes. Temperature may affect palatability of water, solubility of chemical constituents, and coagulation, sedimentation, filtration, or chlorination processes.
Silica (SiO_2)	Dissolved from practically all rocks and soils.	0.6-60 mg/L SiO_2	Together with calcium and magnesium, silica forms a low heat-conducting, hard, glassy scale in boilers and turbines. Silica inhibits deterioration of zeolite-type water softeners and corrosion of iron pipes by soft (0-75 mg/L $CaCO_3$) water.
Dissolved solids (calculated sum)	Mineral constituents dissolved from rocks and soils.	67-1,287 mg/L	Recommended maximum limit for public water supplies is 500 mg/L.[1] Water containing more than 1,000 mg/L of dissolved solids is unsuitable for many purposes.
Total coliform	Indicator of general bacterial pollution.	<1-250 colonies per 100 mL	Presence of coliform bacteria indicates possible pollution of water by intestinal bacteria or viruses. Mandatory maximum contaminant limits for public water supplies vary with sample method and frequency.[2]
Fecal coliform	Indicator of pollution, specifically from warm-blooded animals.	<1-180 colonies per 100 mL	Specifically indicates fecal waste contamination by warmblooded animals. Mandatory maximum contaminant limits for public water supplies vary with sample method and frequency.[2]
Nitrite (NO_2) plus nitrate (NO_3) as nitrogen (N)	Atmosphere, legumes, plant debris, animal excrement, nitrogenous fertilizer in soil, and sewage.	<0.1-22 mg/L N	Small amounts help reduce cracking of high-pressure boiler steel. Encourages growth of algae and other organisms that produce undesirable taste and odors. Concentrations in excess of 10 mg/L are suspected as cause of methemoglobinemia (blue-baby disease) in infants. Mandatory maximum limit for public water supplies is 10 mg/L.[2]
Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum, sulfides, and other sulfur compounds. May be derived from industrial wastes, both liquid and atmospheric.	1-420 mg/L SO_4	Sulfate in water containing calcium forms hard scales in steam boilers. In large amounts, sulfate, in combination with other ions, imparts bitter taste to water. Some calcium sulfate is considered beneficial in brewing processes. Recommended maximum limit for public water supplies is 250 mg/L.[1]
Chloride (Cl)	Dissolved from rocks and soils. Present in sewage and industrial wastes.	0.7-230 mg/L Cl	A salty taste can be detected when concentrations exceed 100 mg/L. In large quantities, increases the corrosiveness of water. Present available removal methods not generally economical for most uses. Recommended maximum limit for public water supplies is 250 mg/L.[1]

Table 2.--Selected water quality characteristics and their relation to use-Continued

Constituent or property	Source or significance	Range of concentrations in sampled wells (current data)	Effects on usability
Fluoride (F)	Dissolved in small quantities from most rocks and soils. Added to many public supplies.	0.1-3 mg/L F	Fluoride concentrations in limited amounts have beneficial effect on the structure and resistance to decay of children's teeth. Excessive concentrations produce objectionable dental fluorosis (tooth mottling). Optimum recommended limits for public water supplies range from 1.4 to 2.4 mg/L and are based on annual average maximum daily air temperatures.[2]
Hardness as calcium carbonate ($CaCO_3$)	In most waters, nearly all hardness is due to calcium and magnesium.	4-610 mg/L	Soap-consuming capacity of a water. Forms white scales on teakettles and plumbing and rings in bathtubs. Although hardness is less of a factor with synthetic detergents than with soap, it is sometimes desirable to soften hard water for esthetic as well as economic reasons.
Calcium (Ca), Magnesium (Mg)	Dissolved from practically all soils and rocks, but especially from limestone, dolomite, and gypsum.	1-170 mg/L Ca 0.3-61 mg/L Mg	Causes most of the hardness in water. Calcium and magnesium combine with bicarbonate, carbonate, sulfate, and silica to form heat-retarding, pipe-clogging scales in boilers and in other heat-exchange equipment. A high concentration of magnesium has a laxative effect, especially on new users of the supply.
Sodium (Na) Potassium (K)	Dissolved from practically all rocks and soils, especially feldspars, clay minerals, and evaporites. Present in sewage and commercial fertilizers.	0.8-200 mg/L Na 0.5-15 mg/L K	More than 50 mg/L sodium and potassium in the presence of suspended matter causes foam in boilers, which accelerates scale formation and corrosion. Dissolved sodium concentrations may be important to sodium-restricted diets.
Sodium-absorption-ratio[3] (SAR)	Dissolved calcium, magnesium, and sodium from rocks and soils.	0-13	Estimates the degree to which sodium in irrigation water tends to enter into cation-exchange reactions in soil. High values indicate that sodium replaces absorbed calcium and magnesium. This replacement damages soil structure and decreases hydraulic conductivity.
Alkalinity as calcium carbonate ($CaCO_3$)	Nearly all produced by dissolved bicarbonate and carbonate.	12-470 mg/L	Measure of water's capacity to neutralize acids. May produce objectionable taste.
Bicarbonate (HCO^3), Carbonate (CO_3), Carbon dioxide (CO_2)	Action of carbon dioxide in water on carbonate cementing material and rocks, such as limestone, dolomite, and travertine.	14-570 mg/L HCO^3 0-29 mg/L CO_3 0.2-113 mg/L CO_2	Produce alkalinity. When heated in the presence of calcium and magnesium, can form scales in pipes and release corrosive carbon-dioxide gas. Aid in coagulation for the removal of suspended matter from water.
Phosphate (P, total)	Dissolved from many rocks and minerals, particularly apatite. Phosphate fertilizer, sodium phosphate in detergent (component of sewage) may be pollution sources of phosphorus.	0.0-1.4 mg/L P	One of the major nutrients required for plant nutrition and is essential for life. May indicate organic contamination.
Iron (Fe)	Dissolved from practically all rocks and soils, especially igneous and sandstone rocks. Also caused by corrosion of pipes, pumps, and other cast iron or steel equipment or the presence of iron bacteria.	<0.01-1.5 mg/L Fe (<10-1,500 μg/L Fe)	When concentrations are more than 0.1 mg/L (more than 100 μg/L), iron commonly precipitates on exposure to air, causing turbidity, stain of plumbing fixtures and laundry, and tastes and colors that are objectionable in food, beverages, textile processes, and ice manufacture. Recommended maximum limit for public water supplies is 0.3 mg/L, or 300 μg/L.[1]

[1] U.S. Environmental Protection Agency (1977b)

[2] U.S. Environmental Protection Agency (1977a)

[3] U.S. Salinity Laboratory Staff (1954) $SAR = \frac{(Na^{+})}{\sqrt{\frac{(Ca^{+2})+(Mg^{+2})}{2}}}$, in milliequivalents per liter (milligrams per liter of constituent divided by atomic weight of constituent)

Table 3.--Median and range values for selected water-quality characteristics, by rock unit (current data)

< - Less than detection limit
-- - Data not available
ALL - Data for all samples from all rock units combined
QTs - Alluvium and sedimentary rocks
QTb - Basaltic rocks
QTsv - Silicic volcanic rocks
TKu - Sedimentary rocks
Mzp€ - Basement complex

MEDIAN

Water-quality characteristic	Uplands ALL	Uplands QTs	Uplands QTb	Uplands QTsv	Uplands TKu	Uplands Mzp€	Plains ALL	Plains QTs	Plains QTb	Plains QTsv
pH	7.6	7.6	7.6	7.5	7.5	7.7	7.7	7.7	7.7	7.7
Water temperature (°C)	13.0	13.0	10.0	12.5	14.5	12.0	11.0	10.5	11.5	14.0
Silica (mg/L SiO_2)	15	14.5	38	25	13	12	26	19	26	43
Dissolved solids (calculated sum)	253	234	242	261	283	273	283	274	303	237
Nitrite plus nitrate (mg/L as N)	0.51	0.76	3.9	0.29	0.39	0.63	1.2	1.0	1.4	1.0
Sulfate (mg/L SO_4)	13	14	8.6	13	10.5	19	38	37	40	13
Chloride (mg/L CL)	5.2	3.2	7.8	5.5	6.4	3.1	11	9.8	13	12
Fluoride (mg/L F)	0.2	0.2	1.0	0.3	0.2	0.2	0.4	0.4	0.4	1.0
Hardness (mg/L $CaCO_3$)	200	210	140	200	190	235	210	210	210	140
Calcium (mg/L Ca)	55	57.5	36	59	48	62	56	53	60	35
Magnesium (mg/L Mg)	15	16	12	14	13.5	19	15	15	16	12
Sodium (mg/L Na)	7.6	7.0	17	7.2	10.7	7.6	15	12	17	17
Potassium (mg/L K)	1.9	1.7	2.5	2.7	2.0	1.1	3.2	2.7	3.3	3.5
Alkalinity (bicarbonate plus carbonate as $CaCO_3$)	200	210	170	200	200	200	180	180	200	150
Phosphorus (total, mg/L as P)	0.02	0.01	0.03	0.06	0.03	0.01	0.01	0.01	0.01	0.01
Sample Population	72	39	7	11	12	3	91	23	63	5

RANGE

Water-quality characteristic	Uplands ALL	Uplands QTs	Uplands QTb	Uplands QTsv	Uplands TKu	Uplands Mzp€	Plains ALL	Plains QTs	Plains QTb	Plains QTsv
pH	6.9-8.9	6.9-8.3	7.2-8.9	7.0-7.7	7.0-8.2	7.5-7.8	7.0-9.4	7.1-9.3	7.0-9.4	7.3-8.2
Water temperature (°C)	2.5-21.0	9.0-21.0	2.5-14.0	7.0-19.0	4.5-20.5	9.5-14.5	8.0-22.0	8.0-17.0	8.0-17.0	8.5-22.0
Silica (mg/L SiO_2)	0.6-60	0.6-60	1.3-46	7.3-56	4.4-54	9.2-23	9.7-59	9.7-44	12-46	19-59
Dissolved solids (calculated sum)	69-982	103-982	69-278	82-742	101-584	232-321	113-1,300	138-444	113-1,300	200-338
Nitrite plus nitrate (mg/L as N)	<0.1-12	<0.1-12	<0.1-5	<0.1-0.49	<0.1-2.0	0.023-0.73	<0.1-22	<0.1-10	<0.1-22	0.4-3.1
Sulfate (mg/L SO_4)	1.0-210	1.0-210	6.6-10	1.0-200	4.3-140	16.0-99	3.4-420	4.3-67	3.4-420	13-46
Chloride (mg/L CL)	0.7-160	0.7-160	2.0-9.5	0.9-120	1.4-79	1.6-8.1	1.8-230	1.8-26	3.2-230	10-15
Fluoride (mg/L F)	0.1-3.0	0.1-1.0	0.2-3.0	0.1-1.1	0.1-0.7	0.1-0.4	0.1-2.8	0.1-1.4	0.1-1.8	0.4-2.8
Hardness (mg/L $CaCO_3$)	35-600	49-600	42-230	35-510	56-400	220-250	4-610	59-330	4-610	100-270
Calcium (mg/L Ca)	9.5-170	12-170	13-57	9.5-140	13-100	55-64	1-150	12-95	1-150	27-75
Magnesium (mg/L Mg)	2.3-44	4.6-44	2.3-21	2.5-39	3.6-37	15-22	0.3-61	5.4-23	0.3-61	7.8-20
Sodium (mg/L Na)	0.8-110	0.8-100	2.9-57	2.9-68	2.1-110	3.6-9	3.9-200	3.9-81	6.8-200	12-38
Potassium (mg/L K)	0.5-15	0.5-15	1.0-6.1	0.9-11	0.6-5.3	0.8-1.9	0.8-8.2	0.8-8.2	1.6-7.3	3.1-4.7
Alkalinity (bicarbonate plus carbonate as $CaCO_3$)	46-470	68-470	49-220	46-430	82-370	170-250	12-390	90-330	12-390	120-240
Phosphorus (total, mg/L as P)	<0.01-1.4	<0.01-1.4	<0.01-0.05	<0.01-0.26	<0.01-0.07	--	<0.01-1.8	<0.01-0.18	<0.01-0.11	<0.01-0.01
Sample Population	72	39	7	11	12	3	91	23	63	5

In addition to influences of mineral composition of aquifer materials on quality, water generally becomes more mineralized (greater dissolved-solids concentration) with increased depth below land surface. It is nearly impossible, in most cases, to isolate the influence of depth-of-sample on water quality from other complicating factors, such as mixing of aquifer waters in partly cased wells or wells perforated at several depths.

Proximity to the source of recharge and influences of land- and water-use practices may be important to the variability of ground-water quality. Precipitation is probably the least mineralized source of recharge to aquifers; in general, ground water near a precipitation recharge area has lower dissolved mineral concentrations than ground water farther downgradient. Quality of recharge water from sources such as streams, rivers, lakes, septic-tank drain fields, landfills, and drain wells is highly variable. The influence of man's activities on quality of recharge water may result in pronounced local changes in ground-water quality, sometimes over relatively short periods of time.

Characteristic ground-water contaminants that may be associated with selected land- and water-use practices include the following (modified from Whitehead and Parliman, 1979):

Source	Characteristic contaminants
Agriculture and feedlots	Fertilizers (chiefly nitrogen, phosphorus, and potassium), pesticides, bacteria, trace elements, petrochemicals.
Landfills and dumps	Organic compounds, iron, manganese, methane, carbon dioxide, phosphates, chloride, nitrogen compounds, trace elements, bacteria.
Cesspools, septic-tank drain fields	Dissolved solids, particularly chloride, sulfate, nitrogen compounds, and phosphates (detergents); bacteria.
Food processors	High biological-oxygen demand, iron, manganese, suspended solids, sodium, chloride, nitrogen compounds, phosphates, bacteria.

Drain wells (domestic sewage, street runoff, industrial waste, irrigation drainage)	Dissolved solids, particularly sodium, phosphates, bicarbonate, sulfate, chloride, and nitrogen compounds; trace elements, pesticides, petrochemicals, bacteria.

No attempt was made to sample specifically for point-source contamination of ground water during this study. Pesticides and trace-element data for ground water in the study area were previously reported by Whitehead (1974) and Crosthwaite (1979). Organic compound (other than pesticide) and radiochemical data are not available.

Figure 7 shows selected land-use features in the study area. These include: (1) Irrigated lands (on the basis of unpublished 1979-80 compilations by U.S. Bureau of Reclamation, Boise, Idaho, 1981); (2) active and inactive landfill sites (East Central Idaho Planning and Development Association, written commun., 1980); and (3) selected drain-well locations (Whitehead, 1974). Relatively small tracts of irrigated land are located in the large valleys of the uplands subareas. Relatively large tracts of irrigated land and the greatest number of landfill sites are located near Mud Lake and between St. Anthony and Idaho Falls. Most drain wells are located on the basalt plains between Roberts and Idaho Falls. Few records and no water-quality data are available for drain wells in the uplands subareas. Septic-tank drain fields are probably most concentrated in urban and rural areas.

General information on effects of leachate contaminants from landfill and septic-tank drain-field sources on the quality of ground water has been reported by Freeze and Cherry (1979); Campbell and Lehr (1973); Todd (1970); and Fairbridge (1972). The effects of drain wells on ground-water quality in the study area have been reported by Whitehead (1974); Seitz, La Sala, and Moreland (1977); and Abegglen, Wallace, and Williams (1970).

Chemical Composition of Ground Water

Plate 3 shows ion concentration diagrams (Hem, 1970; also referred to as Collins' diagrams) for selected samples representative of aquifers in alluvium, sedimentary, and basement complex rock units in the study area. Plate 4 shows Collins' diagrams for selected samples (current data) representative of aquifers in basaltic and silicic volcanic rock units in the study area.

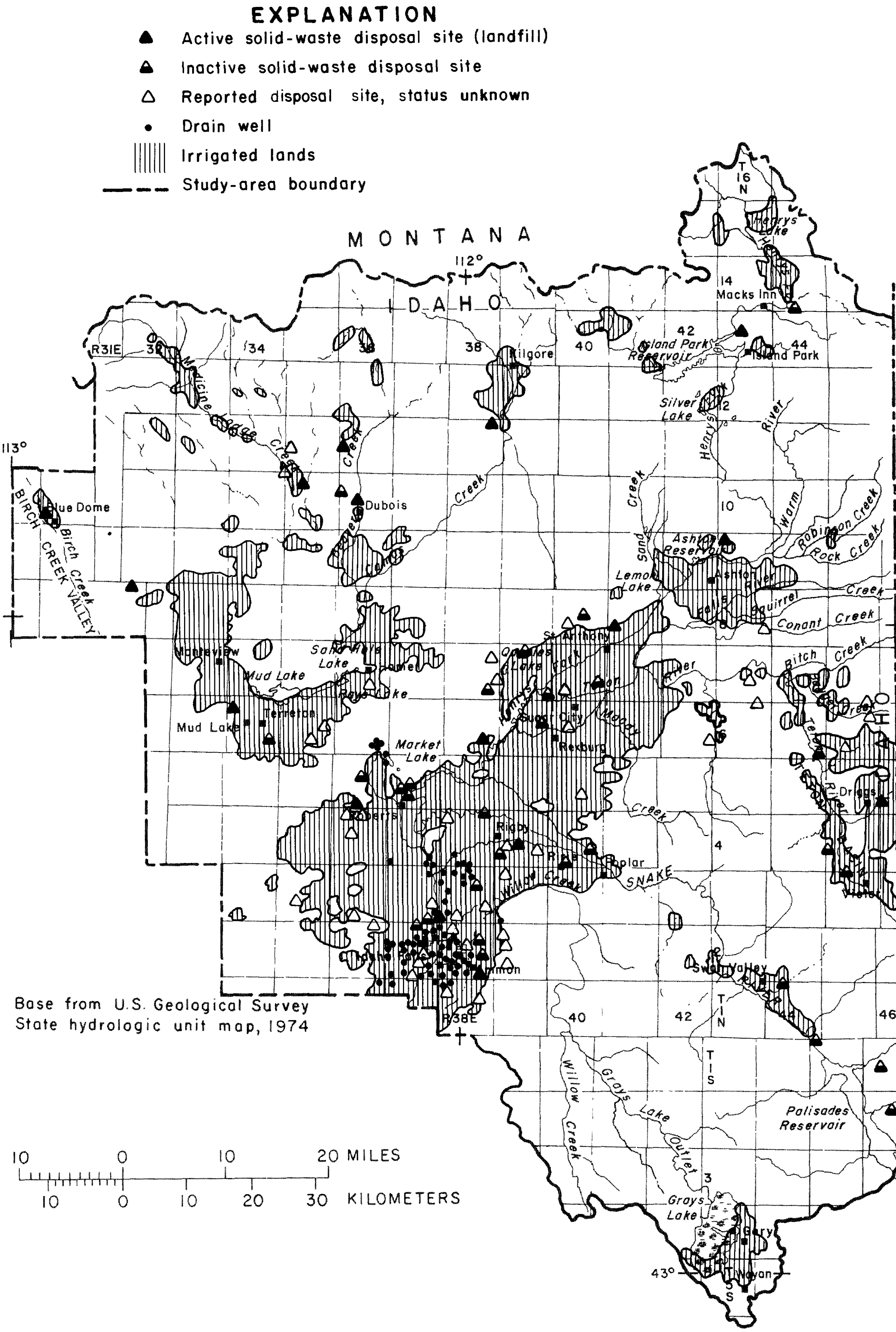

Figure 7.-- Selected land-use features.

In Collins' diagrams, major cations, or positively charged ions (calcium, magnesium, sodium, and potassium), and anions, or negatively charged ions (bicarbonate plus carbonate, sulfate, chloride, and fluoride plus nitrate) for each analysis are represented by vertical bar graphs. Total height of each bar graph is proportional to the total concentration of cations or anions, in milliequivalents per liter (milligrams per liter of a constituent divided by atomic or molecular weight of that constituent). Collins' diagrams not only show proportions of ions in each sample, but also, when compared to diagrams of other analyses and plotted on a map of the study area, show areal differences in ground-water composition.

The Collins' diagrams show that water from aquifers in all rock units generally contains predominantly calcium, magnesium, and bicarbonate plus carbonate ions. Total concentration of ions in water from all rock units is generally smallest in areas where recharge is due primarily to infiltration of precipitation and where possible effects of land use are minimal, such as in the upper Henrys Fork and upper Teton River basins. Variations in water composition probably are related to variability in aquifer composition, proximity to differing sources of recharge, or effects of man's activities.

Quality of Ground Water for Public and Domestic Uses

Ground water locally has chemical constituent concentrations, physical properties, or bacterial concentrations that could restrict its use (tables B and 2). Although no public water-supply limits have been established for hardness or alkalinity, very hard water, very soft water, or high concentrations of alkalinity may be esthetically or economically restrictive or may be a human health concern. In water from several wells, pH, dissolved fluoride, nitrite plus nitrate, fecal and total coliform bacteria, and dissolved solids exceed EPA public drinking water limits and are anomalously high for the study area. Concentrations of dissolved sulfate and dissolved iron exceed EPA public drinking water limits in water from only a few wells. Dissolved chloride, calcium, magnesium, sodium, potassium, and total phosphorus concentrations are anomalously high in water from several wells.

Hardness, pH, and Alkalinity

Hardness, expressed in milligrams per liter as calcium carbonate ($CaCO_3$), is caused principally by dissolved calcium and magnesium in water. Water hardness often is defined in terms of grains of hardness--1 grain per U.S. gallon = 17.12 mg/L $CaCO_3$ hardness (Johnson Division, Inc., 1966). The consumer often judges hardness by the amount of soap required to produce a lather and by scale buildup in water-supply pipes, plumbing fixtures, and cookware.

On a national basis, EPA (1976) has established the following water hardness categories: 0-75 mg/L is soft; 76-150 mg/L is moderately hard, 151-300 mg/L is hard, and more than 300 mg/L is very hard.

Hardness in domestic supplies probably is not objectionable at concentrations less than 100 mg/L (California Water Control Board, 1963). Chemically softened water may be preferable for esthetic reasons or for industrial uses but may be expensive. Also, use of sodium compounds in some water-softening processes may increase the sodium content of drinking water, a concern to people on sodium-restricted diets (EPA, 1977a).

Until recently, few reports were available on water hardness and public health. An increasing number of research articles discuss the importance of water hardness and health. One recent report (EPA, 1977c) shows an inverse correlation between incidence of cardiovascular disease and amount of hardness in drinking water.

Most ground water in the uplands subareas is hard to very hard. Hardest water occurs most frequently in aquifers in the alluvium rock unit, especially near Swan Valley. Softest water occurs most frequently in aquifers from the basaltic rock unit, especially in the upper Henrys Fork basin.

Most ground water in the plains subarea is moderately hard to hard. Hardest water occurs most frequently in aquifers in alluvium, sedimentary, and basaltic rock units between Idaho Falls and St. Anthony. Softest water occurs most frequently in aquifers in the basaltic rock unit near Mud Lake and in the alluvium and silicic volcanic rock units of the benchlands near Rexburg.

Hydrogen ion activity in water is measured in pH units. In general, pH describes whether a water is neutral (pH 7), acidic (pH less than 7), or basic (pH greater than 7). In most natural waters, pH values range from 5.0 to 9.0 (NASNAE, 1972), but the minimum and maximum pH values recommended for public water supplies (EPA, 1977b) are 6.5 and 8.5, respectively. Corrosion effects commonly are associated with pH values below 6.5. Bitter taste may occur if water has a pH greater than 8.5. The impact of pH on the use of any water varies depending on the overall chemistry and composition of the water. Importance of pH to ground-water chemistry is discussed in many texts, including those by Krauskopf (1967) and Freeze and Cherry (1979).

Values of pH are similar in water from all rock units in plains and uplands subareas. Highest pH values and greatest range of values are from aquifers in alluvium and basaltic rock units in the plains subarea. Lowest values and least range of values are from aquifers in alluvium, silicic volcanic, and sedimentary rock units in the uplands subareas.

Alkalinity indicates the capacity of a water to neutralize acid and therefore is a measure of the buffering capacity (the chemical ability of a water to resist a pH change) of a water. Anions such as bicarbonate, carbonate, hydroxide, sulfide, silicate, or phosphate, may contribute to the alkalinity of water (NASNAE, 1972). In most natural water, alkalinity is produced chiefly by dissolved bicarbonate and carbonate ions and is expressed as concentrations of bicarbonate plus carbonate as $CaCO_3$. The occurrence of bicarbonate and carbonate, the relation of these ions to pH, and the importance of these ions to ground-water quality are discussed by Hem (1970).

Alkalinity is not considered a health hazard in drinking water. Concentrations of 400 mg/L (as calcium carbonate) or greater may have an unpleasant, bitter taste (NAS-NAE, 1972). Alkalinity of water used for municipal and industrial supplies is important because it affects the amounts of chemical additives needed for coagulation, softening, and control of corrosion in distribution systems and manufacturing processes. Range of recommended threshold values for alkalinity in food processing, for instance, is reported to be 30-250 mg/L (California Water Control Board, 1963). Maximum alkalinity concentrations for industrial uses is discussed more fully by EPA (1976).

In the uplands subareas, greatest ranges of concentrations of alkalinity are from aquifers in alluvium and silicic volcanic rock units. Smallest ranges of concentrations and lowest median concentrations are from basaltic and basement complex rock units.

In the plains subarea, greatest ranges of concentrations and highest median concentrations are from aquifers in alluvium rock units. Smallest ranges of concentrations and lowest median concentrations are from aquifers in silicic volcanic rock units.

Figure 8 shows (1) ranges of hardness concentrations for current analyses, (2) hardness concentrations of more than 300 mg/L for historic analyses, (3) pH values for current and historic analyses that are less than 6.5 or more than 8.5, and (4) alkalinity concentrations for current and historic analyses that are more than 225 mg/L (upper 25 percent of current analyses).

Water Temperature, Dissolved Fluoride, and Silica

Ground-water temperature may be affected by many factors, including: (1) natural geothermal gradient (approximately 1°C increase for every 130 ft below land surface); (2) heat production at depth (from geologically recent volcanic sources); (3) daily and seasonal changes in air temperature (affects only shallow ground water, less than about 40 ft below land surface); and (4) injection of waste water into aquifers by drain wells. In the study area, anomalously high ground-water temperatures probably result from heat production at depth. Lands classified as potentially valuable for geothermal exploration include areas northwest of Mud Lake, northeast of Rexburg, and most of the upper Henrys Fork and Swan Valley basins (Young and Mitchell, 1973).

In the uplands subareas, highest median temperatures were measured in water from wells completed in alluvium and silicic volcanic rock units. Lowest median temperatures were measured in water from wells completed in basaltic and basement complex rock units.

In the plains subarea, highest median temperatures were measured in water from wells completed in silicic volcanic rock units. Lowest median temperatures were measured in water from wells completed in alluvium or basaltic rock units.

In the uplands subareas and in the plains subarea, median fluoride concentrations are highest in water from basaltic rock units and from silicic volcanic rock units, respectively.

In both the uplands subareas and in the plains subarea, highest median concentrations of silica are in water from basaltic and silicic volcanic rock units.

Concentrations of dissolved fluoride or silica that exceed public drinking water limits or are anomalously high are due to mineral composition of aquifer materials and solubility properties of the minerals.

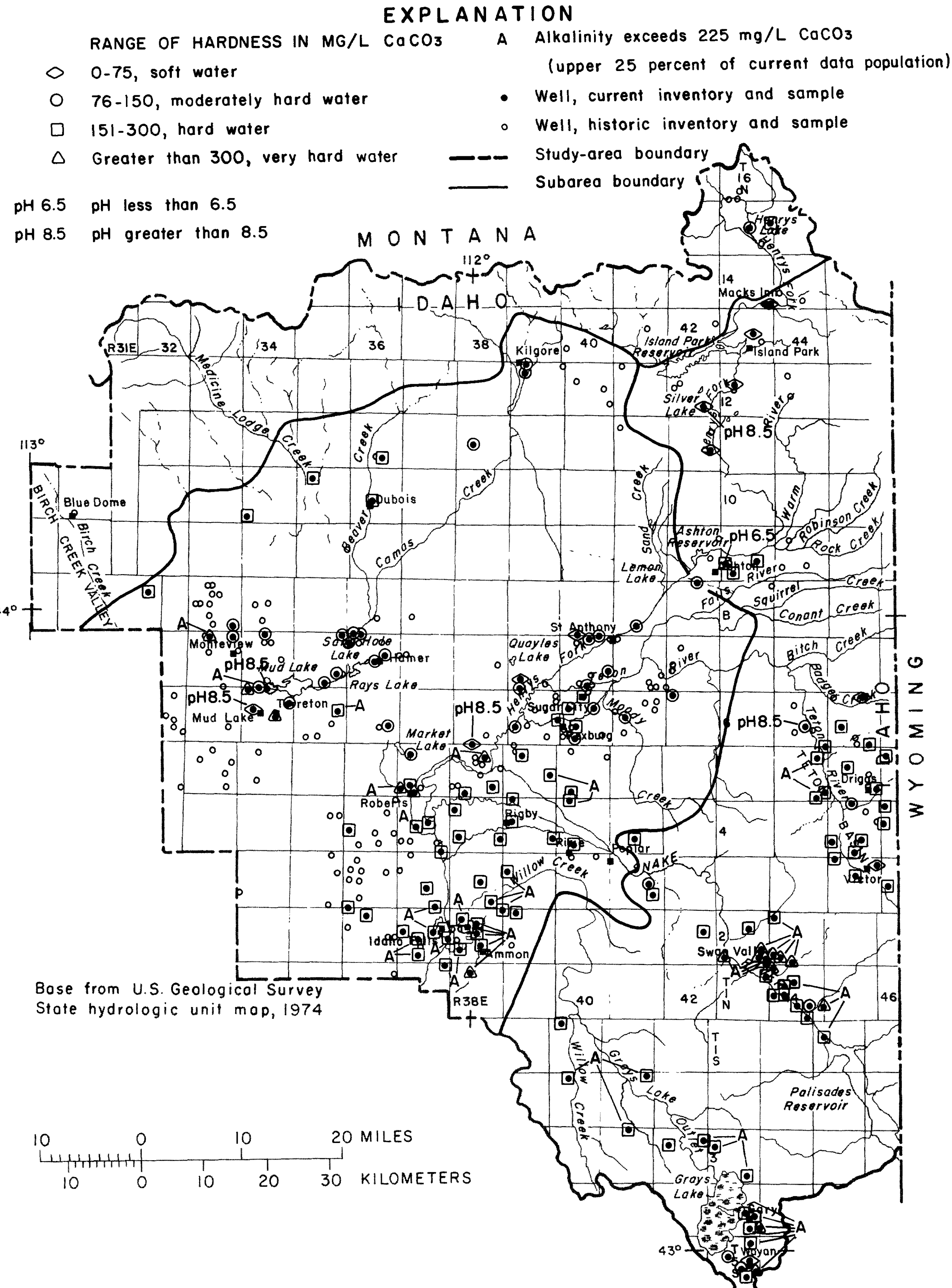

Figure 8.-- Range of hardness, and pH and alkalinity exceeding specified levels.

Some effects of temperature variations on the chemistry of ground water in the study area are discussed by Young and Mitchell (1973) and Crosthwaite (1979). Increased concentrations of fluoride and silica are observed in samples from hot water (greater than 20°C) wells, especially in the Teton basin northeast of Rexburg.

Figure 9 shows locations of current and historic ground-water sampling sites where (1) water temperatures exceed 20°C, (2) dissolved fluoride concentrations exceed the maximum public drinking water limit of 1.8 mg/L (EPA 1977a), and (3) dissolved silica concentrations exceed 33 mg/L (upper 25 percent of current analyses).

Nitrate, Coliform Bacteria, and Total Phosphorus

Dissolved nitrite plus nitrate, reported in milligrams per liter of dissolved nitrogen, is hereafter referred to collectively as nitrate. Nitrate in ground water may be dissolved from natural sources such as atmospheric nitrogen, decaying plants, and soluble compounds or minerals in soils and rock materials. Natural sources are usually minor contributors of nitrogen to most ground water. Anomalous concentrations of nitrate may be an indication of man-caused contamination. In the study area, potential man-caused sources of nitrate in water supplies are municipal and industrial waste, septic-tank effluent, cropland and lawn fertilizers, and leachates from barnyards, feedlots, garbage dumps, and landfills.

In the uplands subareas, nitrate concentrations exceed the maximum public drinking water limit of 10 mg/L nitrogen in only one sample from well 4S-43E-36BCB1, which is completed in the alluvium rock unit. Concentrations of 2-10 mg/L nitrogen (representing the upper 25 percent of all nitrate concentrations in the study area) occur in water from wells completed in basaltic or silicic volcanic rock units near Ashton and in alluvium and sedimentary rock units near Swan Valley, Gray, and Wayan.

In the plains subarea, nitrate concentrations exceed the maximum public drinking water limit in three current water samples from wells completed in alluvium and basaltic rock units. Concentrations of 2-10 mg/L of nitrogen are from wells completed in alluvium and basaltic rock units near Mud Lake, Rexburg to Roberts, and near Idaho Falls.

Coliform bacteria in water are considered to be indicators of the possible presence of disease-causing, intestinal bacteria or viruses (EPA, 1977a, 1977c). Common

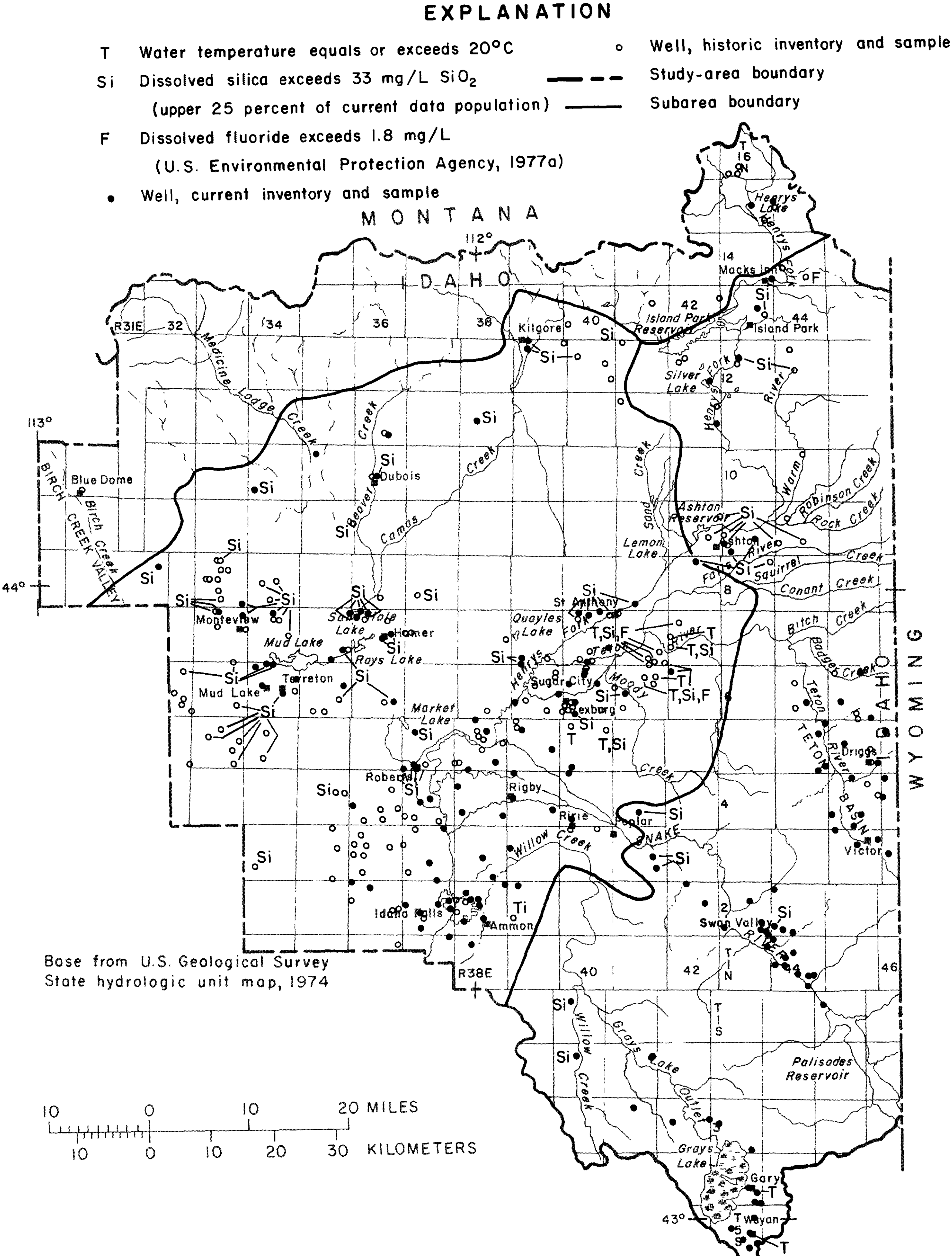

Figure 9.-- Water temperature, dissolved silica, and fluoride exceeding specified levels.

causes of bacteria in well systems are seepage of contaminated surface water into well casings that are perforated at shallow depths, leakage around casing or pump base, leakage through a gravel pack or broken casing, or proximity to a surface contamination source, such as septic-tank leachates or drain-well effluent.

Bacterial concentrations generally decrease with depth, owing to the filtering effects of fine-grained sediments or organic materials that build up near the source of bacterial contamination (Vecchioli and others, 1972). However, water containing bacteria may enter an aquifer by infiltration where overlying sediments are thin, by moving through fractured or faulted rocks that have little filtering ability, or by direct recharge from drain wells or inter-aquifer leakage between aquifers along well casings.

Sixteen species of bacteria are included in the total coliform group. The presence of total coliform bacteria in water indicates possible fecal waste contamination by a non-specific source. In the uplands subareas, total coliform counts exceed the maximum public drinking water limit (1 col/100 mL of water) in water samples from 10 of 27 wells. Greatest ranges of total coliform counts in the uplands subareas are from wells completed in alluvium and silicic volcanic rock units. In the plains subarea, total coliform counts exceed public drinking water limits in water samples from 8 of 62 wells. Greatest ranges of coliform counts are from wells completed in the basaltic rock unit.

The presence of fecal coliform bacteria, a subgroup of the total coliform bacteria, in water, generally but not always indicates fecal waste contamination from warmblooded animals. In the uplands subareas, fecal coliform counts exceed the maximum public drinking water limit (1 col/100 mL of water) in water samples from 4 of 27 wells. Greatest ranges of fecal coliform counts in the uplands subareas are from wells in the silicic volcanic rock unit.

In the plains subarea, fecal coliform counts exceed the maximum public drinking water limit in water samples from 6 of 65 wells. Greatest range of fecal coliform counts is in samples from wells in the basaltic rock unit.

Phosphorus is a major plant nutrient and is essential for life. The effects of high concentrations of phosphorus in surface water (0.025-0.1 mg/L or more, depending on flow rate) are important because phosphorus and phosphate compounds promote the eutrophication of water bodies (EPA, 1976). In ground water, effects of phosphorus concentrations on industrial use of the water have not been determined. Maximum drinking water limits have not been established for total phosphorus or phosphate compounds.

In both surface water and ground water, anomalous total phosphorus concentrations may result from the decomposition of phosphate-bearing rock material or from the activities of man. Phosphate-bearing rock is common in the foothills and mountains of the uplands subareas, especially in marine sediments of the basement complex rocks (table 1). Potential sources of phosphorus contamination in ground water are infiltration of, or drain-well disposal of, sewage effluent (including phosphate detergents), wastes from animal and plant processing, industrial wastes, and agricultural wastes (especially where phosphate fertilizers are used).

In the uplands subareas, the highest median concentration of phosphorus is in water from wells in the silicic volcanic rock unit, and the greatest range is in water from wells in the alluvium rock unit. Highest concentrations of phosphorus are from ground-water samples in Swan Valley and Willow Creek basins.

In the plains subarea, median concentrations of phosphorus are similar for water from all aquifers, but the greatest range of concentration occurs in wells completed in the alluvium rock unit. Highest concentrations of phosphorus occur in ground water near Monteview in the Medicine Lodge Creek basin and between Rexburg and Roberts in the Market Lake-Idaho Falls basin.

Figure 10 shows sampling locations where specified concentrations of dissolved nitrate, coliform bacteria, and total phosphorus occur in ground water. Nitrate concentrations that exceed 2 mg/L, bacteria concentrations that exceed 1 col/100 mL, and anomalous phosphorus concentrations associated with high nitrate or bacteria concentrations are observed most often in samples from wells in areas of concentrated land-use activities. (See fig. 7.)

Dissolved Solids, Sulfate, and Iron

DS (dissolved solids) concentrations represent the sum of dissolved mineral constituents calculated for each water sample. Calculations are based on the sum of major cations (calcium, magnesium, sodium, and potassium), and major anions (alkalinity, sulfate, chloride, fluoride, and nitrate), plus silica. The most common natural source of DS in ground water is solution of minerals from soils and rocks. High concentrations of DS may indicate variations in

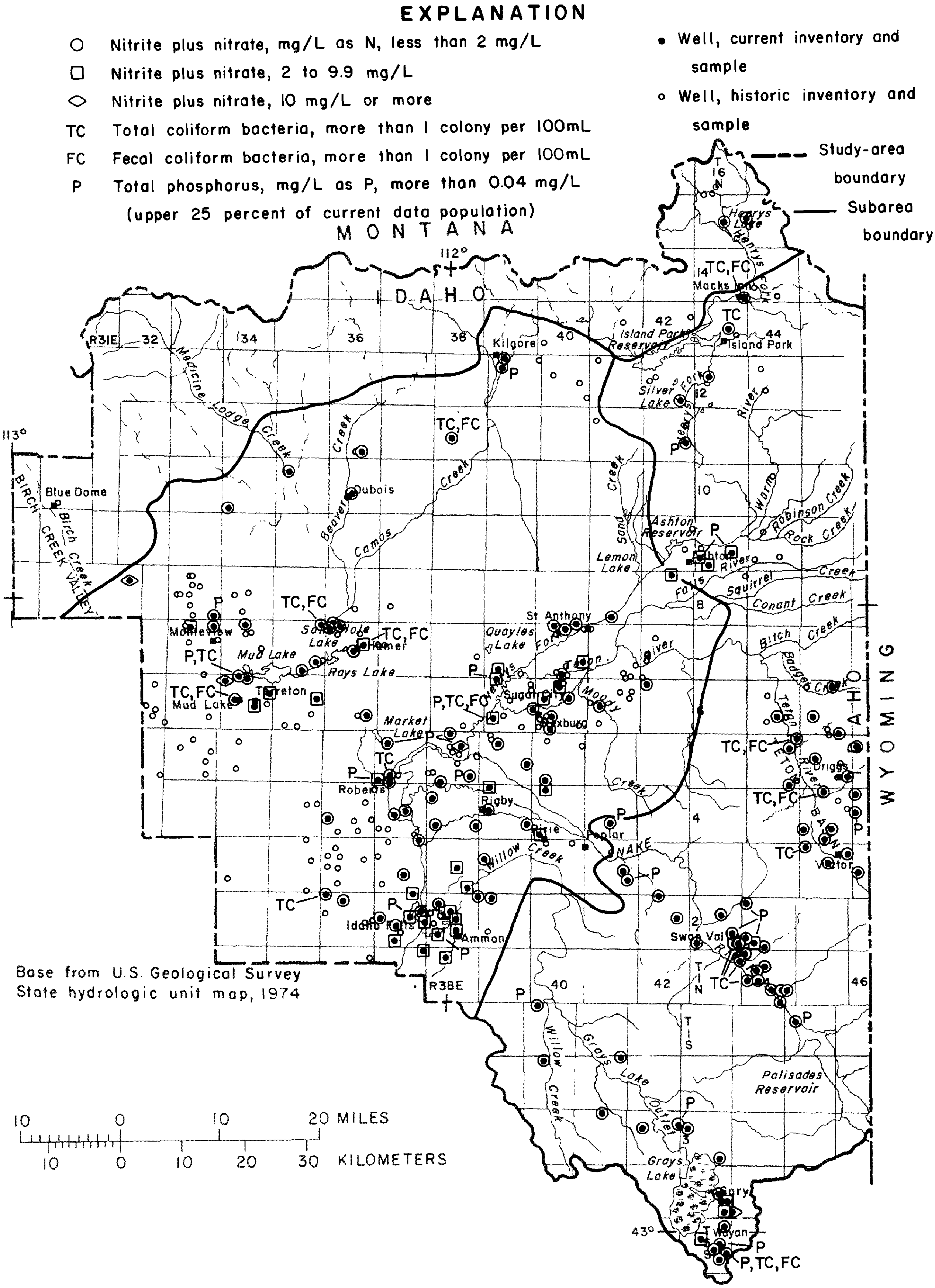

Figure 10.-- Ranges of dissolved nitrite plus nitrate, coliform bacteria, and total phosphorus concentrations exceeding specified levels.

aquifer composition or possible ground-water contamination. DS concentrations in ground water may be increased by infiltration of irrigation-return flow, waste-water disposal, or solid waste-disposal leachates. A high DS concentration may influence the suitability of water for use because it often is associated with the presence of excessive anion or cation concentrations that would be esthetically or otherwise objectionable to the consumer.

In the uplands subareas, median concentrations of DS vary only slightly in water from different aquifers. The greatest range of DS is in samples from wells completed in the alluvium rock unit, and the least range is in water from wells in the basement complex rock unit.

In the plains subarea, the highest median DS concentration and the greatest range of DS concentrations are in water from wells in the basaltic rock unit. The lowest median DS concentration and least range of DS concentrations are in water from wells in the silicic volcanic rock unit.

In the uplands subareas, DS concentrations exceed the public drinking water limit of 500 mg/L (EPA, 1977b) in 7 of 73 current samples from wells near Swan Valley completed in alluvium, silicic volcanic, or sedimentary rock units. In the plains subarea, DS concentrations exceed the public drinking water limit in 5 of 91 current samples from wells near Mud Lake in Medicine Lodge Creek basin or between Roberts and Idaho Falls in Market Lake-Idaho Falls basin. These wells are completed in the basaltic rock unit.

In the study area, excessive DS concentrations in ground water most commonly are due to natural variability of mineral composition in aquifer materials. Excessive DS concentrations due to anomalously large concentrations of sulfate, chloride, nitrate, or sodium, however, may indicate the influence of man's activities.

The concentration of sulfate in well 5N-37E-31CDB1 is 420 mg/L SO_4, which exceeds the EPA maximum public drinking water limit of 250 mg/L. This excessive concentration may be due to contamination from land-use activity. Water in three wells shown in figure 11 contains dissolved iron concentrations that exceed the EPA maximum limit of 300 μg/L. These concentrations may be caused by a number of different factors, including mineral variability of aquifer materials, corrosion of well casings, reducing ground-water conditions, or iron bacteria.

Figure 11 shows (1) ranges of DS concentrations for current ground-water analyses, and (2) dissolved sulfate and iron concentrations that exceed maximum public drinking

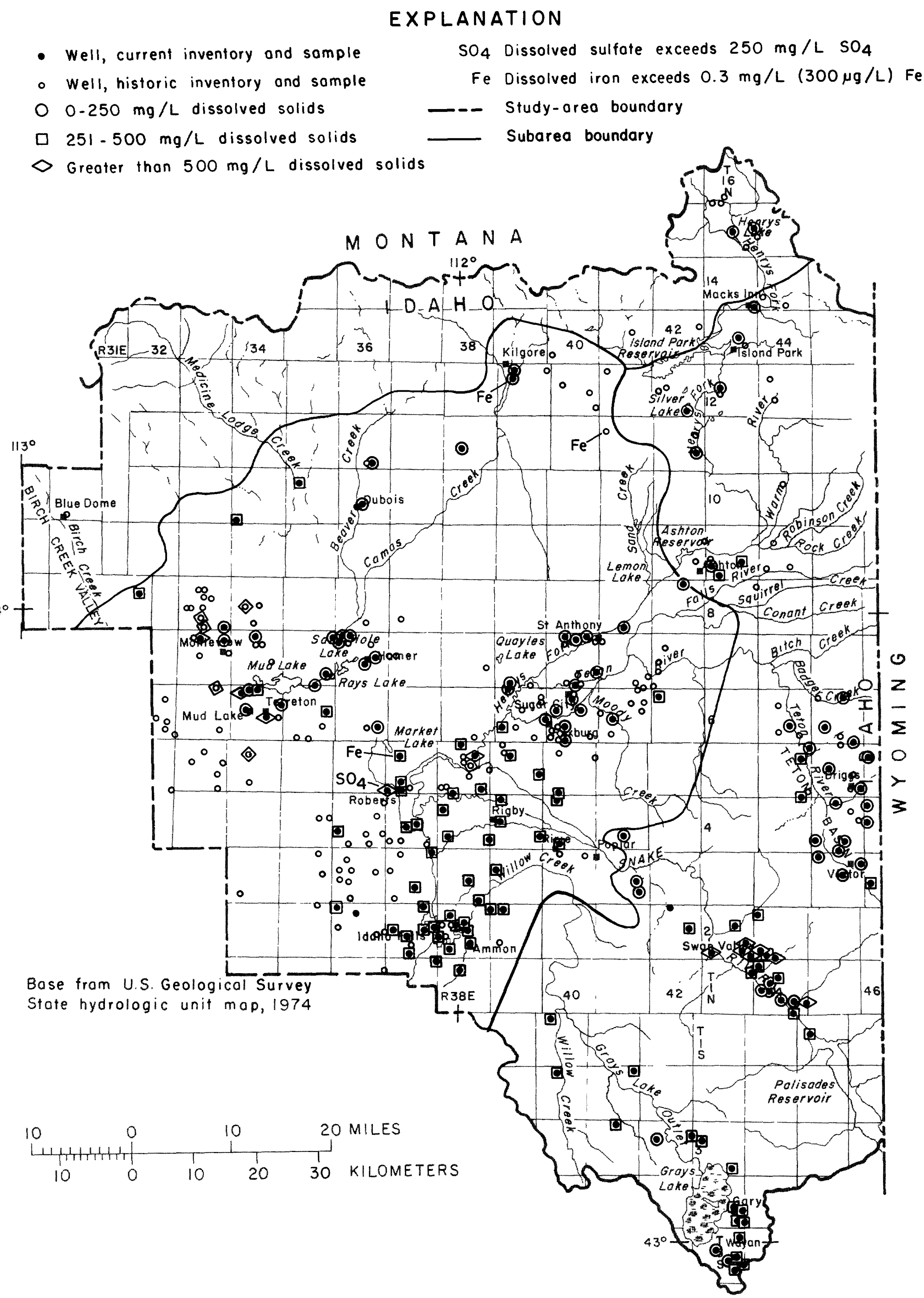

Figure 11. -- Ranges of dissolved-solids concentrations and dissolved sulfate and iron exceeding specified limits.

water limits (EPA, 1977b). Proportions of cations and anions used in the calculated DS concentrations are shown on plates 3 and 4 and are discussed in the section on "Chemical Composition of Ground Water."

Quality of Ground Water for Agricultural Use

Major agricultural uses of ground water in the study area are for livestock and irrigation. Concentrations of chemical constituents are within DS, salinity, and alkalinity tolerance levels for most livestock uses (Todd, 1970; and NASNAE, 1972). Fluoride concentrations exceed the recommended limit of 2 mg/L for livestock drinking water (NASNAE, 1972) in a few samples from thermal water wells completed in basaltic and silicic volcanic rock units of the plains subarea. Most dissolved fluoride concentrations in the study area are less than 1 mg/L, however.

In semiarid areas such as the valleys and plains of the eastern Snake River basin, irrigation-water quality is influenced by the total concentration of DS and the relative proportion of sodium to other cations.

On the basis of specific conductance (conductivity) and SAR (sodium-adsorption ratio, table 2), the U.S. Salinity Laboratory Staff (1954) has developed a general classification to illustrate the salinity and sodium (alkali) hazard of water used for irrigation. The suitability of ground water for irrigation in the study area, based on this classification, is shown in figures 12 and 13.

Most ground water in the study area has medium salinity hazard and low sodium hazard for irrigation uses. In the uplands subareas, the salinity hazard ranges from low to high, and sodium hazards are low. Lowest salinity and sodium hazard ratings are for samples of water from wells completed in alluvium, basaltic, and silicic volcanic rock units in the upper Henrys Fork basin. Highest salinity and sodium hazard ratings are for samples from wells completed in alluvium, silicic volcanic, and older sedimentary rock units in the Swan Valley and Willow Creek basins.

In the plains subarea, salinity hazard ranges from low to high, and all but one sodium hazard rating are low. Well 6N-34E-4AAA1, completed in the basaltic rock unit near Mud Lake, has the highest sodium hazard (medium rating) in the study area. Lowest salinity and sodium hazard ratings are for samples from wells in the Henrys Fork basin upstream from St. Anthony. Highest salinity and sodium hazard ratings are for samples from wells near Mud Lake and Market Lake.

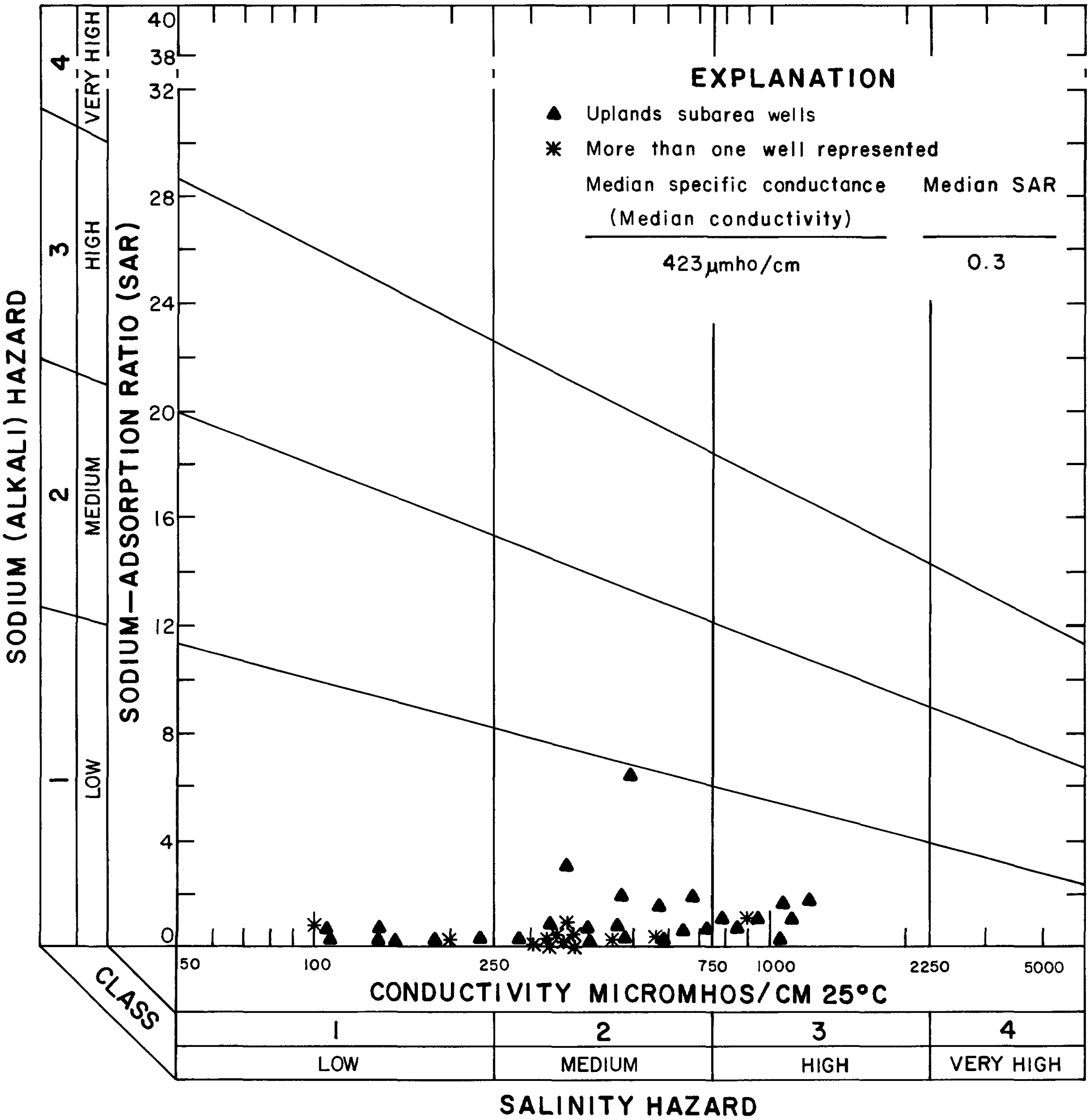

Figure 12.-- Salinity and sodium hazards of irrigation water in uplands subarea (current data).

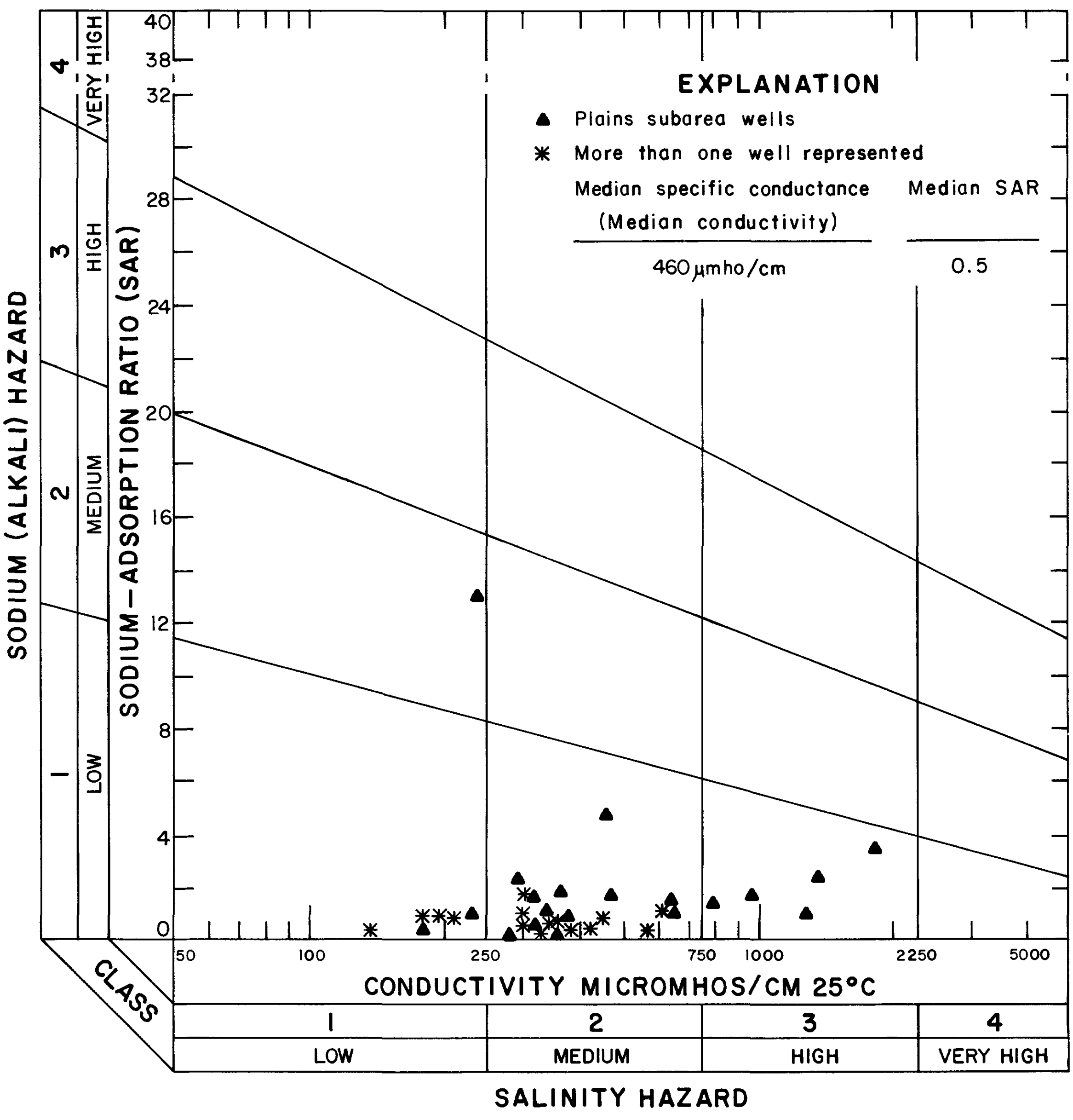

Figure 13.-- Salinity and sodium hazards of irrigation water in plains subarea (current data).

Use of medium- to high-salinity hazard water for irrigation may be limited to salt-tolerant plants in areas that have adequate drainage for soil-salinity control management.

Temporal Variation in Water-Quality Characteristics

Each analysis listed in tables B and C represents the quality of water in a very small part of an aquifer at a particular instant in time. Quality of ground water is not constant, and a comparison of current and historic data for a particular sampling site may show temporal change in one or more quality characteristics.

Short-term changes most often are due to seasonal fluctuations in volume or quality of recharge to aquifers. Long-term changes are the result of varying volume or quality of recharge to aquifers but are observed as trends in data over extended periods of time (several years or more). Trends may show either improvement or degradation of water quality, but in most instances, reflect the effects of changing land- and water-use practices (see section on "Factors Affecting Water-Quality Characteristics").

Reliability of available data is an important consideration when comparing analyses. Some apparent change in water-quality characteristics may be based on inaccuracies in data, the result of improvements in water-data collection techniques or onsite and laboratory analytical methods, or perhaps errors in data transcription or recording. Accuracy of data in this report has been checked by several techniques that include cation-anion balance, specific conductance to DS ratio, and comparison of characteristic concentrations (to detect possible gross reporting errors). Some historical analyses, however, are lacking one or more components necessary for these data checks.

Thirty-four of the total 338 wells listed in tables B and C have been resampled since 1950. Locations of these 34 wells are shown in figure 14. Intervals of time between samples (sampling periods) and number of times a particular site has been sampled are highly variable. Sampling periods range from 1 to 29 years and the number of analyses from each site ranges from 2 to 9. Data for comparison are generally sparse.

Thirteen of the 34 wells have more than two analyses. A graphical comparison of specific conductance and concentrations of dissolved chloride and sulfate for samples from

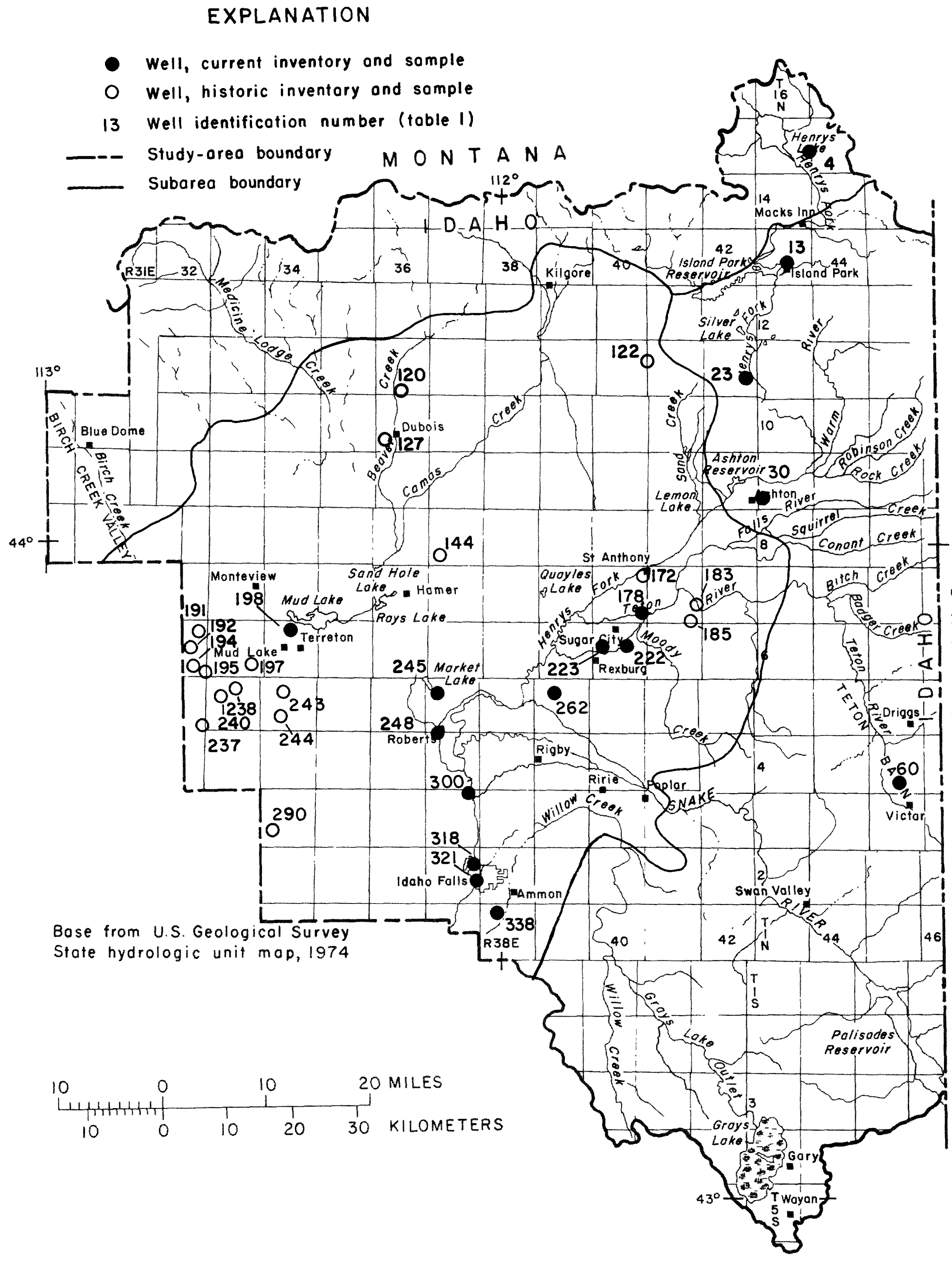

Figure 14.-- Locations of wells with multiple water-quality analyses.

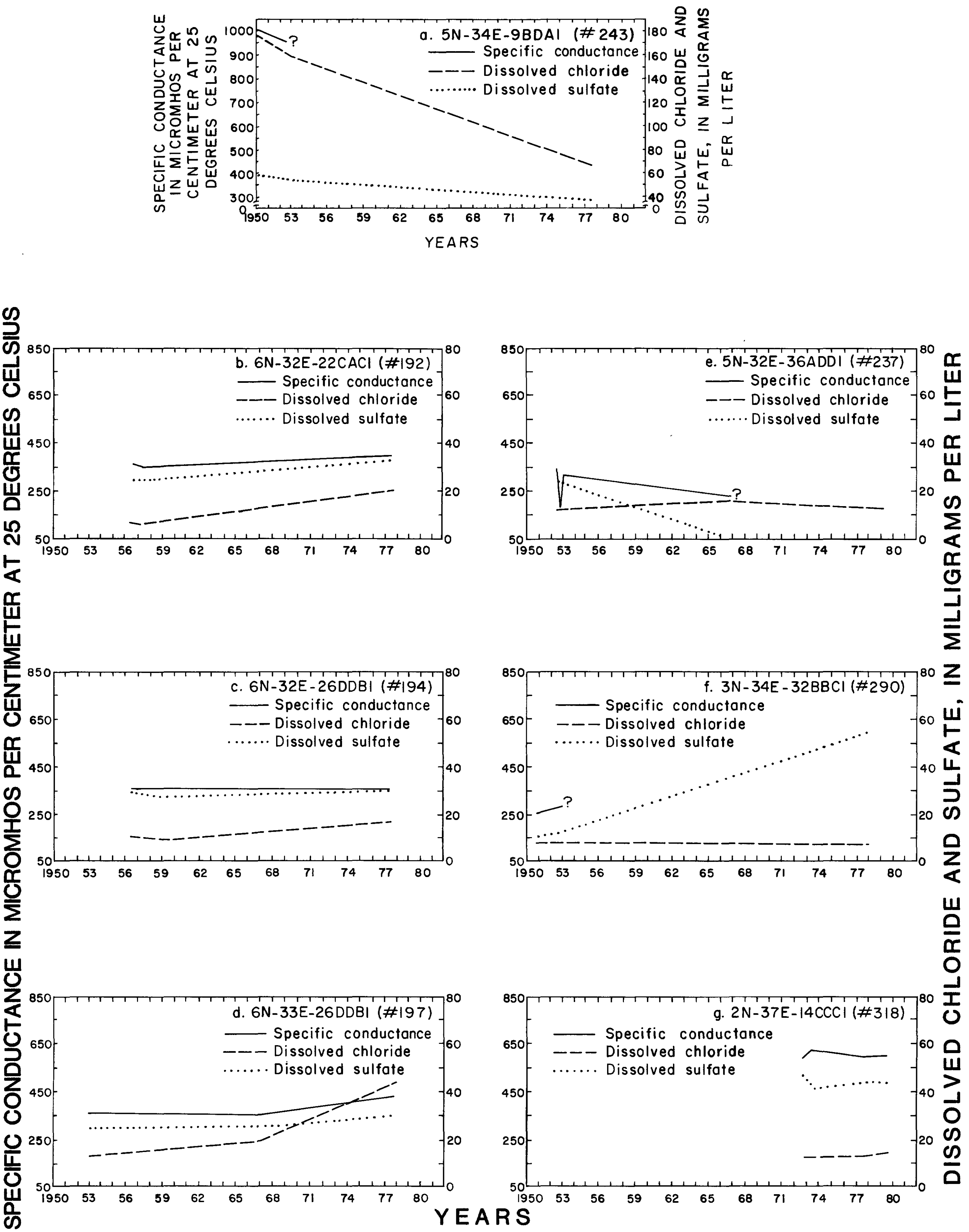

Figure 15.-- Temporal variation in specific conductance and dissolved chloride and sulfate concentrations for selected wells.

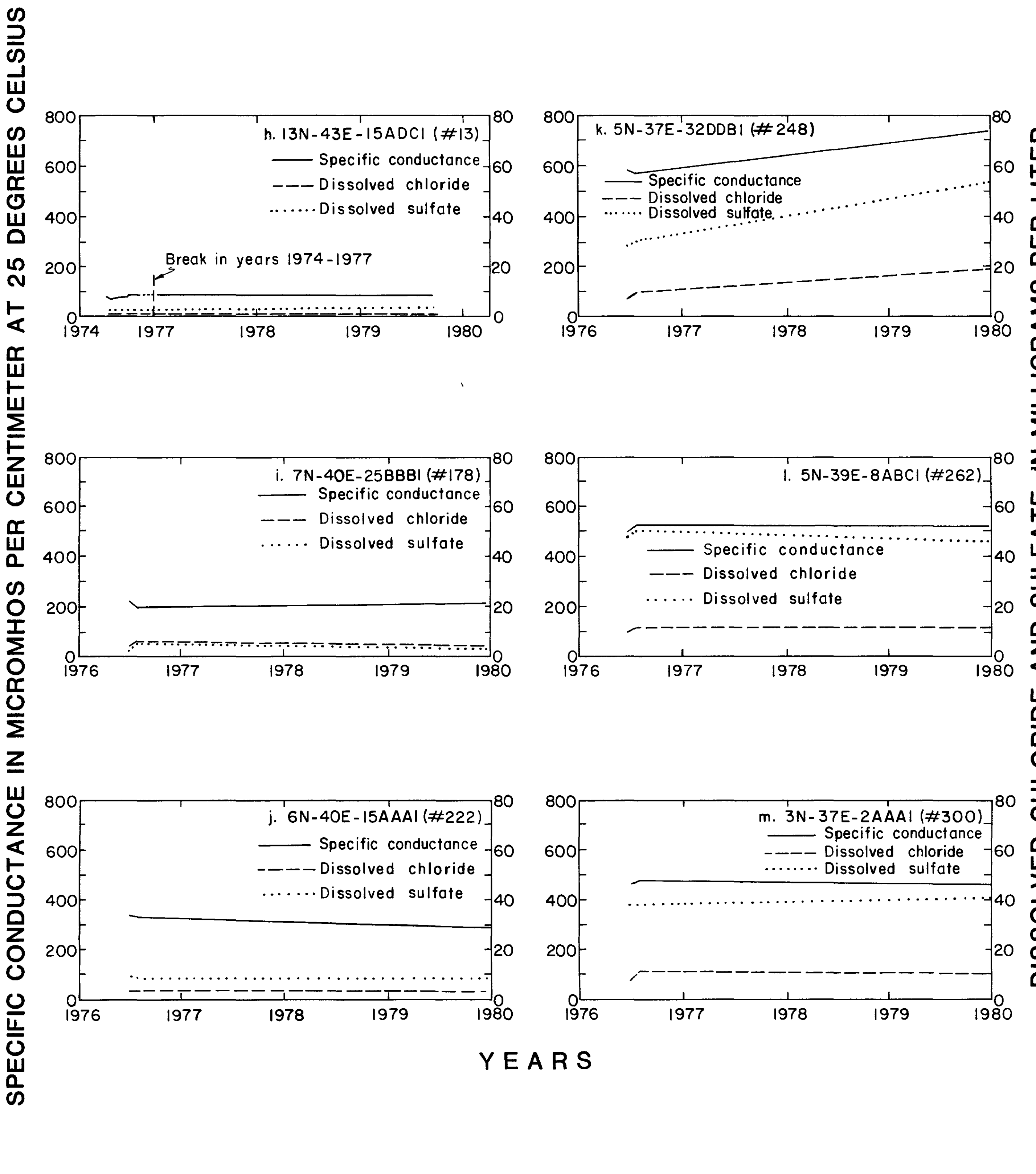

Figure 15.-- Temporal variation in specific conductance and dissolved chloride and sulfate concentrations for selected wells — continued.

these 13 wells are shown in figure 15a-m. Graphs are grouped by length of record and well location; scales for x and y axes vary by graph, depending on sampling period and range of constituent concentrations.

Figure 15a (well identification number 243) is the only graph that shows a trend toward decreasing constituent concentrations. Figures 15b, 15d, and 15k (well identification numbers 192, 197, and 248, respectively) show trends toward increasing constituent concentrations. Short- and long-term trends in all other graphs are inconclusive or show little temporal change. Cause and effect of water-quality change on a well-by-well basis is not included in this report. No areal trends in water-quality change are evident with available data.

A program of periodic resampling of selected wells, such as that suggested in Whitehead and Parliman (1979), would be helpful in providing additional data necessary for evaluating temporal change in major dissolved constituents in study area aquifers.

SUMMARY

From August to December 1979, water-quality, geologic, and hydrologic data were collected at 165 wells in the eastern Snake River basin, Idaho. Pre-1979 ground-water quality and well-inventory data were compiled for 189 wells to provide data in areas where current data were not available. Historic data also were used to assess possible changes in ground-water quality with time.

The study area comprises about 7,500 mi^2 and includes Clark, Fremont, Jefferson, Madison, Teton, Bonneville, and parts of Bingham and Caribou Counties. The study area is divided into subareas on the basis of geology and geomorphic province: northern uplands, eastern uplands, and plains. Distinctive topographic features of the two uplands subareas are mountains, foothills, and intermontane valleys. Distinctive features of the plains subarea are the Snake River Plain and benchlands.

Climate varies with land-surface altitude, relief, and direction of prevailing winds. Winters are cool to cold and wet; summers are warm to hot and dry. High altitudes have more precipitation, colder winters, and cooler summers than low altitudes.

Most of the population in the study area live in the plains subarea. Economy is based on irrigated agriculture and livestock production.

Rock units in the study area include Quaternary and Tertiary alluvium and sedimentary rocks, Quaternary and Tertiary basaltic rocks, Quaternary and Tertiary silicic volcanic rocks and associated sediments, Tertiary and Cretaceous undifferentiated sedimentary rocks, and pre-Cretaceous undifferentiated rocks (basement complex). Geologic structure is complex. Major geologic features include the Island Park caldera; volcanic buttes, cones, and vents; regional faults and folds (Bannock thrust zone); Mud Lake-Market Lake basins; and benchlands near Rexburg.

All rock units in the study area contain some water. Yields from wells completed in aquifers in alluvium, basaltic, and silicic volcanic rock units are generally adequate for most uses.

Recharge to aquifers is primarily from infiltration of water from precipitation, rivers, streams, or applied irrigation water. Ground water/surface water relations are complex, especially in the plains subarea.

Directions of regional ground-water movement generally approximate the directions of surface-water flow. Water in confined aquifers probably moves in about the same direction as unconfined water. Where perched water occurs, movement is downward toward the regional water table.

Factors affecting ground-water quality include geologic environment, geochemical properties of aquifer materials, differences in quality of recharge water, and influences of man's land- and water-use activities. Many aspects of land and water use in the study area, such as irrigation, landfill sites, drain wells, and urban and municipal development, may directly influence the quality of recharge water.

Water from aquifers in all rock units contains predominantly calcium, magnesium, and bicarbonate plus carbonate ions. Variations in water composition probably are most affected by variability in aquifer composition and proximity to sources of recharge. Effects of man's land- and water-use activities may be indicated by anomalous concentrations of selected dissolved cations and anions, such as sodium, bicarbonate plus carbonate, sulfate, chloride, or nitrate.

Ground-water quality is generally acceptable for most uses. Alkalinity or very hard water in some areas may be esthetically or economically restrictive or a public health concern. Concentrations of pH, dissolved fluoride, nitrate, fecal and total coliform, and DS exceed EPA public drinking water limits in several samples. Concentrations of sulfate and dissolved iron exceed EPA public drinking water limits in only a few samples. Dissolved chloride, calcium, magnesium, sodium, potassium, and total phosphorus concentrations are anomalously high in several samples.

Major agricultural uses of ground water are for livestock and irrigation. Concentrations of chemical constituents generally are within DS, salinity, and alkalinity tolerance levels for most livestock. Most ground water has a medium salinity hazard and a low sodium hazard. Use of medium- to high-salinity hazard water for irrigation may be limited to salt-tolerant plants in areas that have adequate drainage for soil-salinity control management.

Thirty-four of the total 338 wells sampled during the study had been sampled previously. Selected water-quality characteristics from thirteen of these 34 wells were compared to show decreasing or increasing concentrations with time. Most change in chemical constituents is relatively minor.

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DATA TABLES

HEADNOTES FOR DATA TABLE A

Well Inventory Data

Geologic, well-construction, and hydrologic data collected for 165 wells inventoried in 1979 and 173 wells inventoried from 1950-78 are shown in table A. Data for wells in the northern and eastern uplands subareas are listed first, followed by data for wells in the plains subarea. Well identification numbers refer to plate 1.

Geologic data from drillers' logs include lithologic description and thickness of geologic units penetrated. Well-construction information from drillers' logs includes diameter of borehole, diameter and depth of well casings, type and depth of surface seal, and manner of well completion, such as perforated casing or open hole. Hydrologic data include onsite water-level measurement and well-use information.

Well identification number: see plate 1

Subarea:
- N - northern uplands
- E - eastern uplands
- P - plains

County:
- C - Clark
- F - Fremont
- J - Jefferson
- M - Madison
- T - Teton
- B - Bonneville
- CA - Caribou
- BI - Bingham

Rock units:
- QTs - Quaternary and Tertiary alluvium
- QTb - Quaternary and Tertiary basaltic rocks
- QTsv - Quaternary and Tertiary silicic volcanic rocks and associated sediments
- TKu - Tertiary and Cretaceous undifferentiated sedimentary rocks
- Mzp€ - Pre-Cretaceous, undifferentiated (basement complex)

Aquifer: Aquifer code and rock name--see table 1

Lithology of water-yielding zones:

- VLCC - volcanics, undifferentiated
- SNDS - sandstone
- SHLE - shale
- GRVL - gravel
- SAND - sand
- CLAY - clay
- CGLM - conglomerate
- ALVM - alluvium
- SILT - silt
- BSLT - basalt
- TUFF - tuff
- CNDR - cinder
- OBSN - obsidian
- RHYL - rhyolite
- BLDR - boulder
- PUMC - pumice
- LMST - limestone
- CBLS - cobbles
- "Rock" - description from drillers' logs, lithology uncertain

Altitude: From U.S. Geological Survey quadrangle maps

Notations:

- < - greater than
- > - less than
- -- no data available
- E - estimated or reported

Depth: LSD - Land surface datum

Well finish:

- O - open end
- P - perforated casing
- T - sandpoint
- X - open hole

Use of well:

- C - commercial
- H - domestic
- I - irrigation
- N - industrial
- O - observation
- P - public supply
- R - recreation
- S - stock
- U - unused

Depth to water:

- F - flowing
- P - pumping at time of measurement
- R - recently pumped

Headnotes for Data Table A--Continued

Date measured/reporting source:

D - driller
IDWR - Idaho Department of Water Resources
O - owner
USBR - U.S. Bureau of Reclamation
USGS - U.S. Geological Survey

TABLE A.--Well inventory data

Well identification number	Well location	Subarea	County	Rock unit	Aquifer 1/	Lithology of water-yielding zone(s) in aquifer	WELL CONSTRUCTION: Altitude of land surface (ft National Geodetic Vertical datum, 1929)	Reported depth of well (ft below LSD)	Casing diameter (in.)	Depth to first perforation or bottom of casing (ft below LSD)	Well finish	Date of well completion	Use(s) of well	WATER LEVEL: Depth to water (ft below LSD) + pumping status	Date measured/source	Date(s) sampled
						NORTHERN AND EASTERN UPLANDS SUBAREAS										
1	16N-43E-31CCB1	N	F	QTsv	112MFLS	VLCC	6,520.00	80	6	30	X	7-21-70	H	44.63	9-10-75 USGS	1974
2	32AAC1	N	F	QTs	111ALVM	SNDS	6,525.00	240	6	220	X	10-17-69	H	16.73	8- 2-74 USGS	1974
3	32DAA1	N	F	QTs	111ALVM	SHLE, GRVL	6,500.00	80	6	80	O	1956	H	3.20	9-10-75 USGS	1974
4	15N-43E-13BCA1	N	F	QTs	112ALVM	SAND, GRVL, CLAY	6,620.00	155	6	155	O	8- 7-72	H	106.97R	8-22-79 USGS	1979,77,74
5	22BBB1	N	F	QTs	112OTSH	CLAY, CGLM	6,510.00	322	8	271	X	7- 8-67	P	74.40R	8-22-79 USGS	1979
6	24AAB1	N	F	QTsv	112HKBR	SAND, VLCC	6,625.00	202	6	180	X	11-15-60	S	102.06	10-21-75 USGS	1975
7	26CDD1	N	F	QTs	112OTSH	ALVM, SILT	6,470.00	60	-	--	-	1939	H	28.93	9-11-75 USGS	1974
8	14N-43E-36DBA1	E	F	QTsv	112LVCK	BSLT	6,422.00	E100	6	--	-	1976	H	41.26	10-10-79 USGS	1979
9	14N-44E-30AAC1	E	F	QTs	112ALVM	SAND, GRVL	6,420.00	62	6	62	O	9-18-62	H	20.89	9-11-75 USGS	1974
10	34BCD1	E	F	QTsv	112PLTU	brown TUFF	6,410.00	85	7	85	O	7- 3-61	P	-1.11	9-11-75 USGS	1974
11	13N-41E-15AAD1	N	F	QTb	110SKRV	BSLT, CNDR	6,497.00	126	8	4	X	7-27-67	H	99.70	9-10-75 USGS	1974
12	13N-42E-12ACB1	N	F	QTs	112ALVM	GRVL, CLAY	6,390.00	80	6	72	X	8- 2-68	P	13.18	9-11-75 USGS	1974
13	13N-43E-15ADC1	E	F	QTsv	112LVCK	"sandstone" (TUFF?)	6,300.00	58	6	38	X	4-62	C	17.50R	8-22-79 USGS	1979,77,74
14	23ABA1	E	F	QTsv	112LVCK	BSLT	6,292.00	75	6	44	X	9-20-73	P	3.62	9-11-75 USGS	1974
15	12N-42E-17BDA1	E	F	QTsv	112LVCK	TUFF	6,343.00	82	6	60	P	8-24-64	P	53.14	9-11-75 USGS	1974
16	18CDB1	E	F	QTs	111ALVM	SAND, GRVL	6,399.00	18	42	18?	O	1941	S	1.55	9-11-75 USGS	1974
17	26CAA2	E	F	QTb	110SKRV	BSLT	6,120.00	285	8	205	X	1- 4-76	P,S	58.98R	8-23-79 USGS	1979
18	12N-43E-17CDD1	E	F	QTs	112ALVM	SAND, GRVL, BSLT	6,147.00	50	6	21.3	X	8-26-79	H,P	6.43R	8-23-79 USGS	1979
19	17DBA2	E	F	QTb	112GRRT	BSLT	6,153.00	74	6	37	X	9-16-61	H	11.00	9-61 D	1974
20	12N-44E- 8BAA1	E	F	QTb	112GRRT	BSLT	6,314.00	62	6	55	X	8-24-69	H	8.89	9-11-75 USGS	1975
21	20ADB1	E	F	QTb	112GRRT	BSLT	6,280.00	105	4	40	X	1969	U	65.51	7-10-74 USGS	1975
22	11N-42E-11DAD1	E	F	QTb	112GRRT	BSLT, CNDR	6,116.00	80	6	18	X	6-21-66	H	36.75	9-11-75 USGS	1974
23	23DAA1	E	F	QTsv	112LVCK	BSLT, CNDR, CLAY	6,084.00	128	6	108	P	8-19-64	P	107	8-64 D	1979,74
24	10N-44E- 9BCB1	E	F	QTb	112GRRT	BSLT	5,960.00	74	6	--	-	--	U	21.49	9-11-75 USGS	1975
25	9N-42E-12DCA1	E	F	QTsv	112HKBR	TUFF	5,390.00	E300	12	44	X	7-28-72	H?	184.35P	9-12-75 USGS	1975
26	23DDA1	E	F	QTb	112FLRV	BSLT	5,204.00	85	4	46	X	8-29-72	H	5.63	9-13-75 USGS	1974
27	9N-43E-19CDB1	E	F	QTsv	112HKBR	TUFF	5,264.00	127	4	51	X	6-30-71	H	15.80	9-12-75 USGS	1975
28	26BBC1	E	F	QTb	112FLRV	BSLT, CLAY	5,592.00	400	6	100	X	4-30-77	H	352	4-77 D	1979
29	30CCA1	E	F	QTsv	112HKBR	BSLT	5,285.00	130	16	8	X	6- 2-67	I	22.12R	6-24-75 USGS	1970
30	30CCC2	E	F	QTb	112FLRV	BSLT, OBSN	5,280.00	73	10	13	X	Fall 1956	I	14.06P	8-23-79 USGS	1979,75
31	9N-43E-32BBB1	E	F	QTb	112FLRV	BSLT	5,294.00	60	6	17	X	5-29-78	C,I	16.13	11- 8-79 USGS	1979
32	9N-44E- 8CDA1	E	F	QTsv	112HKBR	TUFF, CLAY	5,574.00	410	6	152	X	7-21-72	S	199.57R	9-14-75 USGS	1975
33	27CBC1	E	F	QTb	112FLRV	BSLT, CNDR	5,712.00	385	20	43.5	X	12-61	H	120	12-61 D	1975
34	30DAA1	E	F	QTb	112FLRV	BSLT	5,652.00	260	6	--	-	--	H,S	--	--	1975
35	8N-42E- 3BAB1	E	F	QTb	112FLRV	BSLT, CLAY, CNDR	5,189.00	82	6	--	-	1940	H,S,C	1.48R	11- 8-79 USGS	1979
36	8N-43E-1DDB12	E	F	QTsv	112HKBR	BSLT	5,610.00	266	6	52.9	X	7-25-53	I	213.06P	7-26-69 USGS	1975
37	6N-44E- 9CCA1	E	T	QTb	110VLCC	SAND, BSLT, BSLT	6,619.70	460	8	420	P	1955	H,S	374.78	8- 8-58 USGS	1958
38	22DDC1	E	T	QTb	110VLCC	CLAY, SAND, BSLT	6,027.27	257.5	8	242.5	X	7- 8-58	U	196.81	10-17-74 USGS	1979
39	26BAA1	E	T	QTb	110VLCC	BSLT?	5,934.00	114	6	47	X	1947	H	88.03	4-20-59 USGS	1950
40	28BCB1	E	T	QTb	110VLCC	BSLT?	6,079.50	405	4	380	X	1950	H,S	--	--	1958
41	6N-45E- 3DDC1	E	T	QTb	110VLCC	GRVL, BSLT	6,230.00	101	6	35	P	--	S	--	--	1979
42	6DDA1	E	T	QTb	110VLCC	BSLT	6,040.33	140	6	--	-	--	H,N	--	--	1958
43	20DDC1	E	T	QTs	110ALVM	GRVL	6,045.00	71	5	--	-	Fall 1932	S	58.34	4-21-59 USGS	1979
44	34BDA1	E	T	QTs	110ALVM	GRVL?	6,115.34	28	6	22	X	1948	H	5.41	7-28-58 USGS	1950
45	34CDC1	E	T	QTs	112ALVM	GRVL?	--	93	-	--	-	--	-	--	--	1976
46	35DCB1	E	T	QTs	110ALVM	GRVL	6,194.00	98	4.5	98	O	--	H,S	63.95	4-21-59 USGS	1979
47	5N-44E- 1AAA1	E	T	QTs	110ALVM	SAND, GRVL	5,980.00	18	5	18	O	--	H,S	6.4	10-50 USGS	1979
48	11AAA1	E	T	QTs	110ALVM	SAND, GRVL	5,970.00	26	5	26	T	1928	H,S	--	--	1979
49	35DDD1	E	T	QTs	110ALVM	SAND, CLAY, GRVL	6,070.00	110	6	110	O	1945	H	17.2	5-47 USBR	1979
50	36AAD1	E	T	QTs	110ALVM	SAND, GRVL	6,005.80	--	36	--	O	--	H	4	1947 USBR	1950

							WELL CONSTRUCTION							WATER LEVEL		
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51	5N-45E-17DBB1	E	T	QTs	110ALVM	SAND, GRVL	6,035.00	46	-	--	-	--	H	--	--	1979
52	23ABC1	E	T	QTs	110ALVM	SAND, GRVL	6,138.01	80	6	80	O	1943	H,S	55.78	5-12-58 USGS	1950
53	25DDD1	E	T	QTs	110ALVM	GRVL	6,190.00	80	6	--	O?	Before 1950	P,I	--	--	1979
54	26DAA1	E	T	QTs	112ALVM	CLAY, GRVL	6,151.49	225	-	85	P	Before 1950	P	--	--	1957
55	5N-46E- 7BDA1	E	T	QTs	112ALVM	black SAND	6,270.00	130	6	130	O	Fall 1948	H,S	28	Fall 1948 O	1979
56	4N-41E-28DAC1	E	J	TKu	211WAYN	SHLE	5,805.00	435	8	--	-	11- 9-77	P,R	280.87	12-18-79 USGS	1979
57	4N-45E- 4AAA1	E	T	QTs	110ALVM	GRVL	6,025.00	12	5.5	12	P?,O	1947	H,S	6.92	8-11-58 USGS	1979
58	11ABA1	E	T	QTs	110ALVM	GRVL	6,117.00	52	48	52	O	1908	H,S	47.41	4-21-59 USGS	1950
59	13AAD1	E	T	QTs	110QRNR	SAND, GRVL	6,271.75	321	6	313.5	X	6-11-58	U	163.55	7-29-58 USGS	1958
60	27DDA1	E	T	QTs	110ALVM	SAND, GRVL, CBLS	6,095.00	60	5.5	60	O	1947	H,S	21.0	10-50 O	1979,50
61	4N-45E-30CAC1	E	T	Mzp€	300CRBN	"rock"	6,088.00	110	6	110	O	1928?	H,S	37.81	8- 9-58 USGS	1979
62	34CCD1	E	T	QTs	112ALVM	black SAND	6,080.00	50	6	50	P?,O	1943	H,S	--	--	1979
63	4N-46E- 6CBC1	E	T	QTs	112ALVM	GRVL	6,235.00	174	6	174	O	1945	H,S	--	--	1979
64	18CCB1	E	T	QTs	112ALVM	SAND, GRVL	6,280.00	219	6	219	O	1948	H	--	--	1979
65	3N-41E-23CAA1	E	B	TKu	211WAYN	CLAY, SHLE, GRVL	5,530.00	230	8	230	X	8-30-63	H	F	8-79 USGS	1979
66	26DBB1	E	B	QTsv	121SLLK	brown + red SHLE	5,720.00	47	6	47	X	8-24-72	H	80	1972 D	1979
67	3N-45E- 6ABB1	E	T	QTs	110ALVM	LMST GRVL	6,080.00	85	6	85	O	12-10-76	H	40	12-76 D	1979
68	12ABB1	E	T	TKu	211WAYN	SHLE	6,240.00	180	5	158	X	8-18-76	H	130	8-76 D	1979
69	15BAA1	E	T	QTs	112ALVM	SAND, GRVL	6,170.00	140	6	140	O	7-26-78	H	90	7-78 D	1979
70	3N-46E-19ACC1	E	T	Mzp€	300CRBN	CLAY, SHLE	6,520.00	160	4	140	X	10-75	H	4	10-75 D	1979
71	2N-42E- 4BBC1	E	B	QTs	110SDMS	SNDS, GRVL	5,680.00	615	6	504	X	2-17-77	H	380	2-77 D	1979
72	14BCC1	E	B	QTs	110SDMS	CLAY, GRVL	5,810.00	360	8	--	-	11-20-63	H	285	1963 D	1979
73	2N-43E-15BDA1	E	B	QTs	211WAYN	SHLE	5,730.00	560	8	560	O	11-29-77	H	500	11-77 D	1979
74	26DDD1	E	B	TKu	211WAYN	SHLE	5,690.00	525	6	345	X	11- 8-75	H	470	11-75 D	1979
75	31ADD1	E	B	QTsv	120VLCC	RHYL, SAND	5,270.00	268	16	146	X	12-18-54	I	49	12-54 D	1979
76	35DAD1	E	B	QTs	110SDMS	CGLM, GRVL	5,350.00	190	6	137	X	12-20-73	H	119.73R	8-20-79 USGS	1979
77	36DCC1	E	B	QTsv	120VLCC	BSLT	5,270.00	90	6	37.5	X	6-10-73	H	7	6-73 D	1979
78	2N-44E- 7BBB1	E	B	QTsv	120VLCC	BSLT	5,650.00	300	6	40	X	6- 5-78	H	20	6-78 D	1979
79	31BBA1	E	B	QTs	110SDMS	GRVL	5,430.00	218	8	216	X	11- 5-67	H	155	11-67 D	1979
80	32BCC1	E	B	QTs	110SDMS	GRVL	5,480.00	265	6	65	P	7- 5-79	S	75	7-79 D	1979
81	33CCD1	E	B	QTs	110SDMS	GRVL	5,420.00	171	6	171	O	6- 1-78	H	110	6-78 D	1979
82	1N-43E-12ACB1	E	B	QTs	110ALVM	GRVL	5,287.00	60	6	16	P	7-31-53	H	7	7-53 D	1979
83	1N-44E- 5CCD1	E	B	QTs	110SDMS	GRVL, CLAY, SNDS	5,300.00	116	16	25	P	6-16-67	H	18.5	6-67 D	1979
84	16ABA1	E	B	QTs	110SDMS	SAND, GRVL	5,340.00	100	6	100	O	5-12-78	H	75	5-78 D	1979
85	17ADD1	E	B	QTs	110ALVM	SAND, GRVL	5,320.00	50	6	49	X	6-27-74	H	15	6-74 D	1979
86	19ADA1	E	B	QTs	110SDMS	CLAY, GRVL	5,320.00	170	6	170	O	9- 9-73	H	16	9-73 D	1979
87	20AAB1	E	B	QTs	110ALVM	SAND, GRVL	5,330.00	69	8	69	O	7-30-56	P	15	7-56 D	1979
88	26CCD1	E	B	QTs	110SDMS	GRVL, CLAY	5,380.00	77	6	77	O	10-18-75	H	18	10-75 D	1979
89	26DAC1	E	B	QTs	110SDMS	CLAY, GRVL, BLDR	5,440.00	35	6	20	P	7-17-78	H	5	7-78 D	1979
90	27BCB1	E	B	QTsv	120VLCC	"broken rock"	5,350.00	100	6	53	X	2-67	H	--	--	1979
91	1N-44E-35DBD1	E	B	QTs	110ALVM	SAND, GRVL, BLDR	5,370.00	42	6	34	X	8- 2-71	H	15	8-71 D	1979
92	1S-40E- 5CDD1	E	B	QTsv	121SLLK	PUMC	5,775.00	100	6	57	X	5- 9-78	S	25	1978 D	1979
93	1S-45E-17ACC1	E	B	TKu	211WAYN	CLAY, SHLE	5,680.00	125	6	97	X	10-28-63	P	81	1963 D	1979
94	2S-40E- 4CAC1	E	BI	QTs	110SDMS	SAND, blue CLAY	6,240.00	155	8	140	P	6-26-77	H	80	6-77 D	1979
95	2S-41E- 2ACA1	E	BI	Mzp€	300CRBN	SHLE, SNDS, LMST	6,560.00	13,555	10	7,438	X	8-15-78	U	F	--	1979
96	3S-41E- 4ADD1	E	BI	TKu	211WAYN	SNDS, SHLE, CLAY	6,500.00	150	6	18	X	7-17-71	H	18	7-71 D	1979
97	3S-42E-12DCC1	E	B	QTsv	120VLCC	BSLT	5,340.00	100	6	88	X	9- 8-55	S	--	--	1979
98	17BDA1	E	B	-	--	--	6,350.00	--	6	--	-	--	S	--	--	1979
99	3S-43E-18AAD1	E	B	QTs	110SDMS	red CLAY, BLDR	6,415.00	180	8	170	P	9-77	S	18	1977 D	1979
100	35BCB1	E	B	-	--	--	6,450.00	--	-	--	-	--	H	--	--	1979

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101	4S-43E-25BBB1	E	B	QTs	110SDMS	red CLAY	6,480.00	100	8	100	O	5-10-68	H	60	1968 D	1979
102	26CBC1	E	B	QTs	110SDMS	CLAY, SAND, GRVL	6,400.00	82	6	56	P	10-20-56	S	--	--	1979
103	35ADB1	E	B	TKu	211WAYN	brown + green SHLE	6,420.00	218	8	193	P	6-15-76	P	29	1976 D	1979
104	36BCB1	E	B	QTs	110SDMS	CLAY, GRVL	6,420.00	205	6	1.5	P	9-18-53	H	18	1953 D	1979
105	5S-43E-11CBB1	E	CA	TKu	211WAYN	grey SHLE	6,395.00	225	6	225	O	1-20-58	H	--	--	1979
106	16CBD1	E	CA	TKu	211WAYN	brown CLAY, SNDS	6,550.00	195	6	25	P	12- 8-60	S	120	1960 D	1979
107	22DCC1	E	CA	QTs	110SDMS	yellow CLAY, GRVL	6,445.00	103	6	24	P	11-11-67	H	20	1967 D	1979
108	23ADA1	E	CA	TKu	211WAYN	red CLAY, SHLE	6,450.00	325	6	280	P	12-31-57	P	29	1957 D	1979
109	25BBD1	E	CA	QTsv	120VLCC	BSLT	6,475.00	56	8	18	P	7-23-77	S	19	1977 D	1979
110	26CAC1	E	CA	TKu	211WAYN	GRVL, CLAY, LMST	6,450.00	70	6	35	P	9- 9-77	H	15	1977 D	1979
						PLAINS SUBAREA										
111	13N-40E-30CAC2	P	C	QTb	110SKRV	BSLT	6,408.00	--	-	--	-	--	H	--	--	1974
112	12N-39E- 1DBA1	P	C	QTb	110SKRV	BSLT	6,408.00	196	6	1	-	--	S	48.38	7-28-69 USGS	1975
113	5CCB1	P	C	QTs	110SDMS	GRVL, SAND	6,312.00	212	16	180	P	9-66	I	F	8-79 USGS	1979
114	8BBB1	P	C	QTs	110ALVM	GRVL, SAND	6,305.00	E30	-	--	-	1940's	H,I	--	--	1979
115	12N-40E-17ABC1	P	F	QTb	110SKRV	BSLT	6,488.00	230	6	20	X	Before 1921	S	154.65	9-25-74 USGS	1975
116	23ACD1	P	F	QTb	110SKRV	BSLT	6,655.00	15	36	15	O	old	S	4.26	9-10-75 USGS	1974
117	25CCB1	P	F	QTb	110SKRV	BSLT	6,703.00	17	36	17	O	old	S	5.45	9-10-75 USGS	1974
118	12N-41E- 7BAD1	P	F	QTb	110SKRV	BSLT	6,475.00	190	6	170	X	1940	S	58.60	9-10-75 USGS	1975
119	11N-36E-34AAB1	P	C	QTb	110SKRV	BSLT	5,500.00	856	-	--	-	--	H,S,P	--	--	1979
120	34AAC1	P	C	QTb	110SKRV	"gravel," BSLT	5,495.00	765	10	765	O	--	U	--	--	1966,57
121	11N-38E-20ADA1	P	C	QTb	110SKRV	BSLT, CNDR	6,145.00	1,115	10	203	X	2-14-69	S	1,011	2-69 D	1979
122	11N-41E- 7CBA1	P	F	QTb	110SKRV	BSLT	6,765.00	8.6	72	8	X	1940	S	3.92	9-10-75 USGS	1974,57
123	10N-30E-32BBC1	N	C	QTs	110SDMS	--	6,100.00	102	-	--	-	--	-	--	--	1978
124	10N-34E-31CCD1	P	C	QTs	110SDMS	CLAY, GRVL	4,917.00	189	6	189	O	1944	H,S	174.92	4- 2-68 USGS	1979
125	10N-35E- 8BBB1	P	C	QTb	110SKRV	BSLT	5,254.00	360	8	--	-	6-49	H	250.73	8-31-79 USGS	1979
126	10N-36E-21CAC1	P	C	QTb	110SKRV	BSLT, SAND	5,145.00	498	16	370	X	1968	P	358	4-79 O	1979
127	21CAD2	P	C	QTb	110SKRV	BSLT, SAND	5,148.61	610	10	610	X	1931	P	346	1958 O	1966,57
128	9N-35E-24AAA1	P	C	QTb	110SKRV	BSLT, SAND	4,918.00	207	6	--	X	1946	S	131.13	4- 3-68 USGS	1957
129	8N-31E-14AAA1	P	C	QTs	112ALVM+ 110SKRV?	"red sandstone" (rhyolite?) + GRVL	5,110.00	540	8	--	-	--	H,S	--	--	1979
130	8N-33E- 9DAB1	P	J	QTb	110SKRV	BSLT	4,787.00	590	20	42	X	6-54	I	219.18	9-16-55 USGS	1957
131	9DAC1	P	J	QTb	110SKRV	BSLT	4,790.00	185	12	--	-	1951	U	95.7	11-27-51 ?	1970
132	15CAD1	P	J	QTb	110SKRV	BSLT	4,804.00	200	20	67	X	3-60	I	144.30P	7-24-70 USGS	1970
133	16ACB1	P	J	QTb	110SKRV	BSLT	4,811.00	--	-	--	-	--	I	219.70P	9- 9-70 USGS	1970
134	19DAC1	P	J	QTb	110SKRV	BSLT	4,821.00	--	-	--	-	--	I	235.43	4-23-70 USGS	1970
135	20CBC1	P	J	QTb	110SKRV	BSLT	4,877.00	350	20	36	X	2-58	I	230.77	3-27-68 USGS	1970
136	21CAB1	P	J	QTb	110SKRV	BSLT	4,800.00	--	-	--	-	--	I	--	--	1970
137	28DBD1	P	J	QTb	110SKRV	BSLT	4,799.70	232	18	90	X	1955	I	82.38	3-19-58 USGS	1970
138	33DDD1	P	J	QTb	110SKRV	BSLT	4,791.00	145	6	90	X	8-54	H,S	80.00	3-26-68 USGS	1957
139	35DDD1	P	J	QTs	110SDMS	SAND, GRVL	4,789.00	19-20	1.5	19-20	T	1928	S,I	7.57	10-11-79 USGS	1979
140	8N-34E-20CDA2	P	J	QTb	110SKRV	BSLT	4,818.94	55	20	--	-	1950	I	34.77	3-17-58 USGS	1957
141	22AAA1	P	J	QTb	110SKRV	BSLT, CNDR, SAND, GRVL	4,824.74	81	26	5	X	8-10-53	I	37.87	3-26-68 USGS	1956
142	33BAD1	P	J	QTb	110SKRV	BSLT, CNDR, SAND	4,804.00	48	30	8	X	9-54	I	--	--	1957
143	8N-36E-27DAC1	P	J	QTb	110SKRV	BSLT	4,830.00	150	20	--	X	4-66	I	45.05P	7-27-70 USGS	1970
144	8N-37E-29CAC1	P	F	QTb	110SKRV	BSLT	4,915.00	200	16	17	X	4-55	I	125.17P	7-27-70 USGS	1970,57
145	8N-41E-33ABB1	P	F	QTb	110SKRV	BSLT, CNDR	5,010.00	180	6	67	X	5- 9-67	H,P	49.42R	11- 8-79 USGS	1979
146	7N-33E- 9BAA1	P	J	QTb	110SKRV	BSLT, CNDR	4,809.00	268	18	48	X	2-57	I	116	2-57 D	1957
147	9BAA1	P	J	QTb	110SKRV	BSLT, CNDR	4,791.00	167	10	45	X	3-30-57	I	106.05	10-24-79 USGS	1979
148	12BBB1	P	J	QTb	110SKRV	BSLT	4,787.00	395	6	325	X	Fall 1959	H	62.89R	10-24-79 USGS	1979
149	13DAC1	P	J	QTb	110SKRV	BSLT	4,782.00	285	20	202	X	5-13-65	I	103.80P	7-22-70 USGS	1970
150	15CDC1	P	J	QTb	110SKRV	BSLT	4,787.00	600	-	--	-	1969	I	--	--	1970

Well identification number	Well location	Subarea	County	Rock unit	Aquifer 1/	Lithology of water-yielding zone(s) in aquifer	WELL CONSTRUCTION						Use(s) of well	WATER LEVEL		Date(s) sampled
							Altitude of land surface (ft National Geodetic Vertical datum, 1929)	Reported depth of well (ft below LSD)	Casing diameter (in.)	Depth to first perforation or bottom of casing (ft below LSD)	Well finish	Date of well completion		Depth to water (ft below LSD) + pumping status	Date measured/source	
151	7N-34E- 4DAD1	P	J	QTb	110SKRV	BSLT, SAND, CNDR	4,794.00	71	36	25	X	1949	I	29.04P	10-24-79 USGS	1979
152	9ABD1	P	J	QTb	110SKRV	BSLT	4,792.00	--	36	--	-	1949	I	3.74	4-23-70 USGS	1970
153	10CDD1	P	J	QTb	110SKRV	BSLT	4,804.07	75	20	--	-	1959	I	38.10	8- 4-59 USGS	1970
154	23BAB1	P	J	QTb	110SKRV	BSLT	4,793.00	26	22	6	X	1947	I	8.7	3-19-59 USGS	1957
155	7N-35E- 1DBB1	P	J	QTb	110SKRV	BSLT, CNDR, SAND, GRVL, CLAY	4,800.00	203	24	62	X	1957	I	18.51P	9-20-79 USGS	1979
156	25CAD1	P	J	QTb	110SKRV	BSLT, SAND	4,785.00	42.5-300	6-16	--	X	1931-38	I	F	--	1956
157	25CDA1	P	J	QTb	110SKRV	BSLT, SAND	4,785.00	42.5-65?	16	--	X	1930's	I	F	9-21-79 USGS	1979
158	34DCC1	P	J	QTb	110SKRV	BSLT	4,785.00	240	6	170	X	7- 5-78	H	120	7-78 D	1979
159	7N-36E- 5CAA1	P	J	QTb	110SKRV	BSLT, CNDR	4,798.00	239	18	74.75	X	10- 5-78	I	19.21P	9-20-79 USGS	1979
160	6ACD1	P	J	QTb	110SKRV	BSLT, CNDR	4,800.00	40-60	-	--	X	--	H	--	--	1979
161	6DBA1	P	J	QTb	110SKRV	BSLT, CNDR, CLAY, SAND	4,800.00	165	24	75	X	Fall 1957	I	6.35	10-30-57 USGS	1979
162	8BBC1	P	J	QTb	110SKRV	BSLT	4,799.84	200	10	190	X	1939	I	11.64	1-12-56 USGS	1957
163	10AAB1	P	J	QTb	110SKRV	BSLT	4,880.00	163	20	3	X	4-61	I	97.54	4- 3-68 USGS	1970
164	13AAA1	P	J	QTb	110SKRV	BSLT	4,852.75	153	16	9	X	6-18-56	I	66.05P	9-10-70 USGS	1970
165	14CBA1	P	J	QTb	110SKRV	BSLT	4,790.00	130-150	-	--	O	--	I	F	9-20-79 USGS	1979,21
166	22BAD1	P	J	QTb	110SKRV	BSLT	4,800.00	50	-	10	X	1978?	P	--	--	1979
167	7N-37E-18CBC1	P	J	QTb	110SKRV	BSLT	4,820.00	--	-	--	-	1963	I	34.35P	9-10-70 USGS	1970
168	7N-38E-23DBA3	P	M	QTb	110SKRV	BSLT	4,855.75	202	8	178	X	8-26-58	U	43.45	9- 8-58 USBR	1960
169	7N-39E-32CBA1	P	M	QTs	110ALVM	GRVL	4,845.00	159	6	159	O	12- 4-73	H	22.20R	11-29-79 USGS	1979
170	32CCA1	P	M	QTs	110ALVM	GRVL	4,845.00	55	6	55	O	4-17-79	H	15.23R	11-29-79 USGS	1979
171	35CDD1	P	M	QTs	112ALVM	SAND, GRVL	4,842.53	24.5	1.25	22.5	T	11-66	U	3.18	6-16-76 USGS	1976
172	7N-40E- 1ADA1	P	F	QTb	110SKRV	BSLT	4,960.00	238	10	--	X	1924	P	--	--	1957,50
173	1ADA2	P	F	QTb	110SKRV	BSLT	4,960.00	238	8	157	X	1926	P	--	--	1950
174	2BBB1	P	F	QTb	110SKRV	BSLT	4,948.50	224	10	40	X	--	P	138.97P	11- 7-79 USGS	1979
175	3CBC1	P	F	QTb	110SKRV	BSLT	4,935.00	87	6	53.5	X	10-30-78	H	62.97	11-28-79 USGS	1979
176	5ADB1	P	F	QTb	110SKRV	RHYL, CNDR	4,935.00	185	12	155	X	8- 1-78	P	120	8-78 D	1979
177	5DBC1	P	F	QTs	110ALVM	SAND	4,919.86	33	7	33	O	4-25-59	P	--	--	1976
178	25BBB1	P	F	QTb	110SKRV	BSLT, "SAND," (CNDR?)	4,930.00	90	-	--	-	1976	H	17.00	6-76 O	1979,76
179	27CCC1	P	F	QTb	110SKRV	BSLT	4,904.99	75	6	--	-	1971	H	18.67	7-22-76 USGS	1976
180	33BAA1	P	M	QTs	110ALVM	--	4,899.99	--	-	--	-	--	-	--	--	1976
181	7N-40E-34BBC1	P	M	QTs	110ALVM	GRVL	4,905.00	E90	5	--	-	--	-	21.96	11- 7-79 USGS	1979
182	34DCD1	P	M	QTs	110ALVM	--	4,910.00	78	-	--	-	--	-	--	--	1976
183	7N-41E-25CBD1	P	F	QTsv	112HKBR	--	5,124.20	--	20	15	X	9- 6-61	I	266.44	3-24-70 USGS	1977,76
184	34ADD1	P	F	QTb	110SKRV	BSLT	5,090.00	275	20	16	X	2-57	I	--	--	1977
185	35CDD1	P	F	QTsv	120VLCC	silicic VLCC	5,150.00	350	-	--	-	Before 1950	I	--	--	1977,72
186	35DCD1	P	F	QTsv	120VLCC	silicic VLCC, RHYL	5,180.00	400	6	400	O	2-11-72	I	320	2-11-72 D	1977
187	36DDA2	P	F	QTsv	120VLCC	BSLT, RHYL, CNDR	5,261.50	525	20	62	X	7-31-62	I	385.08	4-22-66 USGS	1976
188	7N-42E- 8CAA1	P	F	QTsv	120VLCC	TUFF	5,341.90	802	16	255	X	5-61	I	340.95	4- 7-78 USGS	1977,76
189	19BBB1	P	F	QTsv	120VLCC	RHYL, CLAY	5,260.00	764	20	52	X	6-23-76	I	280	6-23-76 USGS	1977
190	19CCA1	P	F	QTsv	120VLCC	BSLT, CLAY	5,333.60	635	20	66	X	5- 1-69	I	--	--	1976
191	6N-32E-11ABA1	P	J	QTb	110SKRV	BSLT	4,789.97	266.5	6	232	P	10-52	U,O	--	--	1977,52
192	22CAC1	P	J	QTb	110SKRV	BSLT	4,789.40	309	8	233	P	7-56	N	209.31	7-12-56 USGS	1977,57,56
193	26CAB1	P	J	QTb	110SKRV	BSLT	4,790.00	681	10	577	P	7- 1-59	U,O	--	--	1977
194	26CDB1	P	J	QTb	110SKRV	BSLT	4,787.00	322	8	237	P	7-56	U,O	--	--	1977,59,56
195	36ADD1	P	J	QTb	110SKRV	BSLT, SAND	4,785.00	310	4	286	X	1950	U	222.59	11-16-49 USGS	1977,52
196	6N-33E- 2BAB1	P	J	QTb	110SKRV	BSLT	4,783.00	245	8	140	X	1922	S	198.18	9-27-49 USGS	1957
197	26DDB1	P	J	QTb	110SKRV	BSLT	4,784.00	312	6	250	P	11- 1-52	U,O	--	--	1977,66,52
198	6N-34E- 4AAA1	P	J	QTb	110SKRV	BSLT, CLAY, SAND	4,780.00	420	4	420	O	1946	H	55.89R	10-25-79 USGS	1979,57
199	4BAB1	P	J	QTb	110SKRV	BSLT	4,783.00	370	6	345	X	9-28-74	H	162.94R	10-25-79 USGS	1979
200	6DDD1	P	J	QTb	110SKRV	--	4,785.00	170	-	--	-	--	H,S	--	--	1979

Map number	Well location	Subarea	County	Rock unit	Aquifer 1/	Lithology of water-yielding zone(s) in aquifer	WELL CONSTRUCTION: Altitude of land surface (ft National Geodetic Vertical datum, 1929)	Reported depth of well (ft below LSD)	Casing diameter (in.)	Depth to first perforation or bottom of casing (ft below LSD)	Well finish	Date of well completion	Use(s) of well	WATER LEVEL: Depth to water (ft below LSD) + pumping status	Date measured/source	Date(s) sampled
201	6N-34E-13AAA1	P	J	QTb	110SKRV	BSLT	4,782.00	175	6	--	-	--	H	202.23R	10-26-79 USGS	1979
202	17DDC1	P	J	QTb	110SKRV	BSLT, CNDR	4,785.00	330	10	291	X	11-19-74	P	150	11-74 D	1979
203	22ABB1	P	J	QTb	110SKRV	BSLT	4,786.29	271.5	6	108.5	X	1938	P	206	1938 D	1979
204	24BBB1	P	J	QTb	110SKRV	BSLT, CNDR	4,790.00	268	6	116	X	1954	H	--	--	1957
205	6N-35E-14CCC1	P	J	QTb	110SKRV	BSLT	4,791.00	250	8	66	X	8-23-73	H	142.15	10-26-79 USGS	1979
206	26BAC1	P	J	QTb	110SKRV	BSLT	4,791.00	327	20	39	X	1957	-	--	--	1957
207	32CDD1	P	J	QTb	110SKRV	BSLT	4,792.28	387	22	104	X	2-23-56	I	241.79	5-26-70 USGS	1970
208	33CDA1	P	J	QTb	110SKRV	BSLT	4,792.28	400	16	101	X	10- 5-56	I	244.17	5-26-70 USGS	1970
209	6N-36E-26DBC1	P	J	QTb	110SKRV	BSLT, CNDR	4,830.00	198	8	115	P	10-29-70	P	-.89	8-29-79 IDWR	1979
210	27BAA1	P	J	QTb	110SKRV	BSLT	4,884.31	228	8	7.75	X	1960	U,O	--	--	1960
211	6N-38E-34BDB1	P	M	QTb	110SKRV	TUFF	4,816.00	40	16	--	-	1947	I	23.68	9-18-63 USGS	1957
212	6N-39E-12BBA1	P	M	QTs	110ALVM	SAND, GRVL	4,860.68	28	2.5	26?	T	--	U	6.11	6-16-76 USGS	1976
213	12BBA2	P	M	QTs	110ALVM?	--	--	--	-	--	-	--	-	--	--	1976
214	16DAA1	P	M	QTs	111ALVM	SAND, GRVL	4,834.85	26.7	1.25	24.7	T	10-66	U	3.84	6-16-76 USGS	1976
215	24ACC1	P	M	QTs	110ALVM	GRVL	4,852.00	96.5	6	96.5	O	8-29-72	H,C	14.36	11- 7-79 USGS	1979
216	28BBB1	P	M	QTs	110ALVM	SAND, GRVL	4,828.69	26	1.25	24.3	T	6-10-67	U	3.89	6-16-76 USGS	1976 1/
217	30ABB1	P	M	QTb	110SKRV	BSLT, SAND, GRVL	4,825.00	44	6	26	X	6-10-67	P	17	6-67	1979 1/
218	35CBB2	P	M	QTs	111ALVM	SAND, GRVL	4,840.57	27.1	1.25	25.1	T	10-66	U	3.22	6-16-76 USGS	1976
219	6N-40E- 4CCD1	P	M	QTb	110SKRV	BSLT, CNDR, CLAY	4,895.00	195	12	99.5	X	6- 3-74	P	--	--	1978
220	4DBD1	P	M	QTb	110SKRV	BSLT, CNDR, CLAY	4,897.00	183	12	70	P	--	P	--	--	1979
221	13ADA1	P	M	-	--	--	--	--	-	--	-	--	H	--	--	1977
222	15AAA1	P	M	QTs	110ALVM	GRVL, CLAY	4,900.00	55	6	--	-	1974	H	15.34	11-29-79 USGS	1979,76
223	18AAD1	P	M	QTs	110ALVM	GRVL	4,869.99	63.5	6	63.5	O	6-23-76	H	13.44	11-29-79 USGS	1979,76
224	29CCC1	P	M	QTsv	120VLCC	BSLT, CNDR	5,070.00	305	20	225	X	3-28-75	P	203	3-75 D	1979
225	29CCD1	P	M	QTb	110SKRV	BSLT, CNDR	5,125.00	363	16	13	X	7-61	I	288.40P	9-15-70 USGS	1970
226	30BDA1	P	M	QTb	110SKRV	BSLT, CNDR	4,862.00	172	24	100.5	X	1950	P	135	2-60 D	1957
227	31BDB1	P	M	QTb	110SKRV	BSLT, CNDR	4,937.10	136	16	58	X	6-19-58	I	101.85	4-25-62 USGS	1970
228	31DAA1	P	M	QTb	110SKRV	BSLT	5,153.50	351	20?	15?	X	5-60	I	345.66	5-27-62 USGS	1977
229	32CBC1	P	M	QTsv	120VLCC	BSLT, CNDR	5,155.00	388	16	337	X	4- 4-75	P	324	3-75 D	1979
230	35BDD1	P	M	QTb	110SKRV	BSLT, CNDR, CLAY	5,220.00	1,377	26	30	X	4-65	I	400	5-65 D	1977
231	6N-41E-10DBB1	P	M	-	--	--	--	--	-	--	-	--	I	--	--	1977
232	11CDB1	P	M	QTsv	110VLCC	TUFF, CNDR	5,216.08	489.3	18	--	-	2- 7-61	I	358.80	7-24-71 USGS	1977
233	14CAD1	P	M	-	--	--	--	--	-	--	-	--	I	--	--	1977
234	20BCD1	P	M	QTsv	120VLCC	RHYL, CNDR, BSLT, CLAY	5,116.00	650	12	12	X	9-24-65	H,C	224.88	4-14-72 USBR	1979
235	31AAC1	P	M	-	--	--	--	--	-	--	-	--	I	--	--	1977
236	6N-42E- 6BCB1	P	M	QTsv	120VLCC	RHYL, CNDR	5,290.00	500	8	406	X	8-21-66	H	435	8-66 D	1979
237	5N-32E-36ADD1	P	J	QTb	110SKRV	BSLT	4,839.00	405.5	6	360	P	5- 1-52	U,O	--	--	1977,66,61,52
238	5N-33E-10CDC1	P	J	QTb	110SKRV	BSLT	4,886.19	429	8	285	P	1953	U	253.39	6-11-53 USGS	1977,53
239	13BDC1	P	J	QTb	110SKRV	BSLT	4,794.58	405	8	276	P	4- 1-53	U	--	--	1953
240	17ADD1	P	J	QTb	110SKRV	BSLT	4,771.61	334	6	254	P	2-53	U	240.00	2-13-53 USGS	1977,53
241	5N-33E-23DDA1	P	J	QTb	110SKRV	BSLT	4,812.38	374	6	306	P	1953	U	284.90	6-24-53 USGS	1977,70
242	35DAA1	P	J	QTb	110SKRV	BSLT	4,885.10	513	6	374	P	7-53	U	--	--	1953
243	5N-34E- 9BDA1	P	J	QTb	110SKRV	BSLT	4,791.28	322	6	292	P	1-50	U	--	--	1977,52,50
244	29DAA1	P	J	QTb	110SKRV	BSLT	4,877.52	422.5	6	363	P	--	-	--	--	1977,53
245	5N-37E- 8CCC1	P	J	QTb	110SKRV	BSLT	4,760.00	196	6	--	X	1919	S	F	10-31-79 USGS	1979,57
246	31CDB1	P	J	QTb	110SKRV	BSLT, CNDR	4,800.00	60	6	20	X	8-26-72	H,S	40.29	11- 1-79 USGS	1979,76
247	32ACA1	P	J	QTb	110SKRV	SAND, CLAY, BSLT	4,770.00	140	8	90	X	1957?	P	33.21R	8- 8-80 USGS	1979
248	32DDB1	P	J	QTs	110ALVM	SAND, GRVL, CLAY	4,770.00	21	-	21	T	1976	H	--	--	1979
249	33BDC1	P	J	QTs	110SDMS	--	4,770.00	105	6	--	-	1970	H	4.38	7-21-76 USGS	1976
250	5N-38E- 4DBA1	P	J	QTs	110SDMS	GRVL, SAND, CLAY	4,820.00	70	6	--	-	1976	H	--	--	1979

Well identification number	Well location	Subarea	County	Rock unit	Aquifer 1/	Lithology of water-yielding zone(s) in aquifer	WELL CONSTRUCTION: Altitude of land surface (ft National Geodetic Vertical datum, 1929)	Reported depth of well (ft below LSD)	Casing diameter (in.)	Depth to first perforation or bottom of casing (ft below LSD)	Well finish	Date of well completion	Use(s) of well	WATER LEVEL: Depth to water (ft below LSD) + pumping status	Date measured/source	Date(s) sampled
251	5N-38E- 9DDC1	P	J	QTb	110SKRV	BSLT	4,825.00	--	16	8	X	1949	I	30.67	10-11-61 USGS	1970
252	10ADD1	P	M	QTb	110SKRV	PUMC, GRVL, SAND	4,900.00	E165	6	--	-	1976-77?	H	111.53	12-17-79 USGS	1979
253	15CCC1	P	M	QTb	110SKRV	black SAND	4,810.00	90	18	--	-	About 1932	H,S,I	--	--	1957
254	16ADA1	P	J	QTb	110SKRV	TUFF	4,816.00	40	-	--	-	1949	I	25.88	9-25-61 USGS	1970
255	22CCB2	P	J	QTs	110ALVM	SAND, GRVL	4,805.00	30	2	--	T?	1971	I	--	--	1976
256	24BCC1	P	J	QTs	110ALVM	SAND, GRVL	4,819.99	21	3	--	T?	1976	H	--	--	1976
257	31BBB1	P	J	QTs	110ALVM	SAND, GRVL	4,774.99	--	3	--	T	--	H	5	6-76 O	1976
258	31BBC1	P	J	-	--	--	--	--	-	--	-	--	-	--	--	1976
259	32CBB1	P	J	QTs	110ALVM	SAND, GRVL	4,790.00	E60	-	--	-	1975?	H	--	-- .	1979
260	35ADA2	P	J	QTb	110SKRV	TUFF, SAND, CLAY	4,820.00	E100	-	--	-	--	H	--	--	1979
261	5N-39E- 5BBA1	P	M	QTs	110ALVM	GRVL	4,815.00	12	3	--	-	6-75	I	3.0	7-23-76 O	1976
262	8ABC1	P	M	QTs	110ALVM	GRVL	4,820.00	35	6	--	-	--	H	6.06	7-20-76 USGS	1979,76
263	8DAD1	P	M	QTs	111ALVM	SAND, GRVL	4,830.36	27.5	1.75	25.5	T	10- 1-66	U	--	--	1976
264	24BDA1	P	M	QTs	110ALVM	GRVL	4,874.00	60	59	--	X	8-21-70	H	8	8-70 D	1979
265	5N-40E- 8BCC1	P	M	QTb	110SKRV	BSLT, CNDR	5,109.80	372	20	18	X	--	I	--	--	1977
266	12CAA1	P	M	-	--	--	--	--	-	--	-	--	I	--	--	1977
267	32CCB1	P	M	QTs	110ALVM	SAND, GRVL	4,915.00	82	6	82	O	10-18-65	P	27	10-65 D	1979
268	4N-35E-14DBC1	P	J	QTb	110SKRV	BSLT	4,972.00	505	20	12	X	1-14-59	I	439.61	3-29-70 USGS	1970
269	15DBA1	P	J	QTb	110SKRV	BSLT	4,981.00	495	20	11	X	6- 1-60	I	449.92	5-12-70 USGS	1970
270	4N-36E- 1DAC1	P	J	QTb	110SKRV	SAND, GRVL, CLAY	4,832.00	942	18	530	P	3-54	I	--	--	1957
271	4N-36E-14ACA1	P	J	QTb	110SKRV	BSLT	4,832.00	388	22	74	X	3-13-61	I	316.70P	7-23-70 USGS	1970
272	25DAB1	P	J	QTb	110SKRV	BSLT	4,837.00	430	22	48	X	5-27-58	I	290.00	5-27-58 USGS	1970
273	27CAB1	P	J	QTb	110SKRV	BSLT	4,826.00	--	-	--	-	1962	I	298.19P	3-21-72 USGS	1970
274	30CBB1	P	J	QTb	110SKRV	CNDR, BSLT	4,945.00	440	20	100	X	3-28-75	H,I	378	3-75 D	1979
275	32CDA1	P	J	QTb	110SKRV	BSLT	4,860.00	412	20	53	X	1- 3-65	I	344.20P	7-23-70 USGS	1970
276	34DAC1	P	J	QTb	110SKRV	BSLT	5,005.00	580	-	--	-	1965	I	--	--	1970
277	4N-37E-21DCD1	P	J	QTb	110SKRV	CNDR	4,770.00	230	8	24	X	8-18-79	H	190	8-79 D	1979
278	22BAD1	P	J	QTb	110SKRV	SAND, GRVL, BSLT	4,770.00	806	10	375	P	8-23-68	N	37	8-68 D	1979
279	31BBD1	P	J	QTb	110SKRV	BSLT	4,918.00	454	26	78	X	12-30-58	I	356.00	12-30-58 USGS	1970
280	32BDC1	P	J	QTb	110SKRV	BSLT	4,818.00	380	22	27	X	10-10-55	I	--	--	1957
281	35CBD1	P	J	QTb	110SKRV	BSLT	4,787.00	220	18	34	X	3-55	I	166.70P	7-21-70 USGS	1970
282	4N-38E- 7DCC1	P	J	QTb	110SKRV	BSLT, CNDR	4,790.00	140	6	20	X	5-25-78	H	110.00	12-18-79 USGS	1979
283	25DAC1	P	J	QTs	110SDMS	SAND, GRVL	4,847.00	120	6	120	O	5-18-73	P	32.58	11- 7-79 USGS	1979
284	30DDD1	P	J	QTb	110SKRV	BSLT	4,782.00	E184	6	--	-	1965-67?	H	124.10	12-18-79 USGS	1979
285	4N-39E- 7AAA1	P	J	QTs	110ALVM	SAND, GRVL	4,850.00	102	6	102	O	8- 8-79	P	10.42	11-8-79 USGS	1979
286	18CDA1	P	J	QTs	110SDMS	GRVL	4,850.00	175	16	123	P	6-20-61	P	19.86	10-31-57 USGS	1979
287	25DBB1	P	J	QTs	110ALVM	ALVM	4,932.00	90	6	90	O	7-73	H	17.73	7-31-75 USGS	1979
288	4N-40E- 5ADB1	P	M	QTsv	120VLCC	BSLT, CNDR	4,927.00	96	6	73	X	12-21-73	H	42.93	12-17-79 USGS	1979
289	32DBD1	P	J	QTs	110SDMS	SAND, GRVL	4,963.00	120	16	50	P	6- 1-53	P	40	1953 D	1979
290	3N-34E-32BBC1	P	B	QTb	110SKRV	BSLT	5,216.55	786	8	741	P	8-29-50	N,O	--	--	1977,52,50
291	3N-35E- 2BCB1	P	B	QTb	110SKRV	BSLT	5,035.00	690	20	16	X	11-11-66	I	502.00	11-67 D	1980
292	14DDC1	P	B	QTb	110SKRV	BSLT	5,057.00	--	-	--	-	1965	I	--	--	1970
293	3N-36E- 8BAD1	P	B	QTb	110SKRV	BSLT	4,907.00	470	20	21.75	X	11- 8-62	I	383.50P	7-16-70 USGS	1970
294	14ACA1	P	B	QTb	110SKRV	BSLT	4,951.00	--	-	--	-	1960	I	--	--	1970
295	17ACD1	P	B	QTb	110SKRV	BSLT	4,893.00	493	20	17	X	3-15-65	I	375.70P	7-14-70 USGS	1970
296	18BAB1	P	B	QTb	110SKRV	BSLT	4,941.00	500	-	--	-	1965	I	418.11P	7-14-70 USGS	1970
297	19ADA1	P	B	QTb	110SKRV	BSLT	4,918.00	556	20	40	X	5-13-66	I	421.00	5-66 D	1970
298	20CDB1	P	B	QTb	110SKRV	BSLT	4,909.00	--	20	--	-	1966	I	383.53P	3-21-72 USGS	1970
299	32DDC1	P	B	QTb	110SKRV	BSLT	4,889.00	438	21	9	X	5- 1-57	I	367.10	10- 7-57 USGS	1957
300	3N-37E- 2AAA1	P	B	QTb	110SKRV	BSLT	4,760.00	165	8	22	X	10-10-69	H	118.06	7-21-76 USGS	1979,76

							WELL CONSTRUCTION							WATER LEVEL		
Well identification number	Well location	Subarea	County	Rock unit	Aquifer 1/	Lithology of water-yielding zone(s) in aquifer	Altitude of land surface (ft National Geodetic Vertical datum, 1929)	Reported depth of well (ft below LSD)	Casing diameter (in.)	Depth to first perforation or bottom of casing (ft below LSD)	Well finish	Date of well completion	Use(s) of well	Depth to water (ft below LSD) + pumping status	Date measured/source	Date(s) sampled
301	3N-37E- 5CDA1	P	B	QTb	110SKRV	BSLT	4,861.00	470	22	42	X	8-20-56	I	--	--	1957
302	18BBA1	P	B	QTb	110SKRV	BSLT	4,915.00	--	-	--	-	--	I	415.91	4- 1-70 USGS	1970
303	27BBB1	P	B	QTb	110SKRV	BSLT	4,788.00	263	6	59	X	11-10-67	P	216.63P	12-18-79 USGS	1979
304	31DBC1	P	B	QTb	110SKRV	BSLT	4,801.00	360	20	46	X	4-21-61	I	233.95P	9-10-70 USGS	1970
305	3N-38E-22BAB1	P	B	QTb	110SKRV	BSLT, SAND lens	4,790.00	155	8	66	X	11- 1-71	H	106.16R	12- 7-79 USGS	1979
306	35CCB1	P	B	QTb	110SKRV	SAND, BSLT	4,785.00	181	8	157	X	8-50	P	123.84	3-19-80 USGS	1979
307	3N-39E-18BDB1	P	B	QTb	110SKRV	--	4,840.00	E130	-	--	-	--	-	--	--	1979
308	3N-40E- 2CCC1	P	B	QTs	112ALVM	GRVL, CLAY	5,070.00	202	14	125	P	5-18-53	I	110.10	9-56 USGS	1957
309	5CAD1	P	B	QTb	110SKRV	BSLT	4,958.00	142	18	90	X	2-53	I	--	--	1957
310	2N-35E- 2BBC1	P	B	QTb	110SKRV	BSLT	5,090.00	682	10	108	X	8- 1-50	U	576.69	9- 8-50 USGS	1952
311	2N-36E- 6CBB1	P	B	QTb	110SKRV	BSLT, CNDR	4,930.00	E500	6	--	X	Late 1950's	H	--	--	1979
312	9ADA1	P	B	QTb	110SKRV	BSLT	4,880.00	>400	6	--	-	1978	H	364.75R	9-19-79 USGS	1979
313	18CDA1	P	B	QTb	110SKRV	BSLT	4,885.00	476	22	16	X	5- 9-61	I	108.00	5- 9-61 D	1970
314	23DAA1	P	B	QTb	110SKRV	BSLT	4,731.00	--	-	--	-	--	I	208.05P	9-11-70 USGS	1970
315	24DBA1	P	B	QTb	110SKRV	BSLT	4,734.00	335	16	4	X	4-57	I	214.12P	3-21-72 USGS	1970
316	2N-37E- 2BBD1	P	B	QTb	110SKRV	BSLT	4,725.00	E200	-	--	-	1924?	H	--	--	1979
317	13CBB1	P	B	QTb	110SKRV	SAND, CNDR, BSLT	4,760.00	1,910	22	1,050	P	2-27-54	P	183	1954 D	1979
318	14CCC1	P	B	QTb	110SKRV	BSLT	4,719.00	168	8	--	-	10-57	P	--	--	1979,77,73,72
319	18DBA1	P	B	QTb	110SKRV	BSLT	4,745.00	235	6	57	X	11-23-74	H	185	11-74 D	1979
320	21CDD1	P	B	QTb	110SKRV	BSLT, CNDR	4,682.00	165	8	28	X	4-20-71	H	128	4-71 D	1979
321	24ADD1	P	B	QTb	110SKRV	BSLT, CNDR, SAND	4,705.00	378	24	235	X	1937-48	P	--	--	1979,51
322	28AAA1	P	B	QTb	110SKRV	BSLT, CLAY	4,689.00	152	-	--	-	1951?	P	127.10	7-30-57 D	1977
323	33AAA1	P	B	QTb	110SKRV	BSLT	4,690.00	180	8	--	-	6-26-72	H	122.19	12-19-79 USGS	1979
324	2N-38E- 1DAC1	P	B	QTb	110SKRV	BSLT	4,785.00	165	-	--	-	1950's	P	--	--	1979
325	8CBB1	P	B	QTb	110SKRV	BSLT, GRVL	4,730.00	415	8	--	-	10- 9-70	P	142	10-70 D	1979
326	16ADD1	P	B	QTb	110SKRV	BSLT, SAND	4,738.00	225	4	185	X	4- 6-65	H	110.95	1- 8-76 USGS	1979
327	16BCC1	P	B	QTb	110SKRV	BSLT, CNDR, CLAY, GRVL	4,730.00	412	20	223	P	5- 5-75	P	156	5-75 D	1979
328	16DDC1	P	B	QTb	110SKRV	BSLT, CNDR, GRVL	4,733.00	387	22	200	X	Before 1960	P	150	--	1979
329	17CCB1	P	B	QTb	110SKRV	BSLT, CLAY, SAND	4,725.00	1,630	22	1,090	X	4-47	P	--	--	1961,49
330	18CBC1	P	B	QTb	110SKRV	BSLT	4,720.00	394	20	314	X	1940	P	--	--	1951
331	2N-38E-19DBB1	P	B	QTb	110SKRV	BSLT	4,700.00	400	20	--	X	1926	P	--	--	1961
332	27ACB1	P	B	QTb	110SKRV	BSLT, SNDS, GRVL, CLAY	4,720.00	365	16	263	X	3-74	P	59	3-74 D	1979
333	29CCC1	P	B	QTb	110SKRV	BSLT, CNDR	4,707.00	225	6	167.5	X	8-24-76	P	140	8-76 D	1979
334	2N-39E- 5CCC1	P	B	QTb	110SKRV	BSLT, CNDR	4,910.00	365	16	265	X	9-24-71	P	207	9-71 D	1979
335	30ADA1	P	B	QTb	110SKRV	BSLT	5,550.00	--	-	--	-	1965	I	204.80	9- 8-70 USGS	1970
336	1N-36E-12DCD1	P	B	QTb	110SKRV	BSLT	4,650.00	150	-	--	-	--	-	--	--	1977
337	1N-37E- 1DCC1	P	B	QTs	110ALVM	SAND, GRVL?	4,673.00	--	-	--	-	--	P	--	--	1979
338	1N-38E- 9BCB1	P	B	QTb	110SKRV	BSLT, CNDR	4,688.00	183	8	79	X	7- 7-70	P	52.97	8-24-79 USGS	1979,77

1/ Pitcher pump

Headnotes for Table B.--Current water-quality data

Notations:
- 0 - analyzed for but not detected
- -- not analyzed
- < - less than
- > - greater than
- E - estimated or reported
- K - less than ideal colony count (coliform bacteria)

Units:
- MICROMHOS - micromhos per centimeter at 25°C
- DEG C - degrees Celsius
- COLS/100 ML - colonies per 100 mL (coliform bacteria)

Well identification number: See plate 1 and table A
* - wells with multiple analyses available

Aquifers: See table 1 for aquifer code, name, and rock unit

TABLE B.--CURRENT WATER-QUALITY DATA

WELL IDENTIFICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH FIELD (UNITS)	TEMPERATURE, WATER (DEG C)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)
				UPLANDS SUBAREAS							
4.*	15N 43E 13BCA1	112ALVM	79-08-22	155	363	7.8	12.0	14	209	<1	<1
5.	15N 43E 22BBB1	112OTSH	79-08-22	322	253	7.4	10.0	22	163	<1	<1
8.	14N 43E 36DBA1	112LVCK	79-10-10	--	105	7.0	7.0	34	88	K6	K19
13.*	13N 43E 15ADC1	112LVCK	79-08-22	58	91	7.5	15.0	30	82	K1	K4
17.	12N 42E 26CAA2	110SKRV	79-08-23	285	367	8.6	12.5	33	242	<1	<1
18.	12N 43E 17CDD1	112ALVM	79-08-23	50	143	7.0	9.5	40	119	<1	<1
23.*	11N 42E 23DAA1	112LVCK	79-08-23	128	108	7.5	12.5	38	95	<1	<1
28.	09N 43E 26BBC1	112FLRV	79-11-08	400	434	7.8	9.0	38	276	<1	<1
30.*	09N 43E 30CCC2	112FLRV	79-08-23	73	395	7.6	14.0	46	254	<1	<1
31.	09N 43E 32BBB1	112FLRV	79-11-08	60	425	7.3	2.5	44	278	--	--
35.	08N 42E 03BAB1	112FLRV	79-11-08	82	340	7.6	10.0	45	225	--	--
38.	06N 44E 22DDC1	110VLCC	79-09-18	258	183	8.9	10.0	1.3	84	--	--
41.	06N 45E 03DDC1	110VLCC	79-09-14	101	114	7.2	14.0	10	69	--	--
43.	06N 45E 20DDC1	110ALVM	79-09-18	71	380	7.7	12.5	32	228	--	--
46.	06N 45E 35DCB1	110ALVM	79-09-14	98	331	7.8	10.0	8.8	203	--	--
47.	05N 44E 01AAA1	110ALVM	79-09-18	18	403	7.7	16.0	16	231	K3	K2
48.	05N 44E 11AAA1	110ALVM	79-09-18	26	465	7.5	16.0	15	276	--	--
49.	05N 44E 35DDD1	110ALVM	79-09-19	110	478	7.5	12.0	19	331	--	--
51.	05N 45E 17DBB1	110ALVM	79-09-18	46	378	7.8	14.0	14	210	--	--
53.	05N 45E 25DDD1	110ALVM	79-09-14	80	321	7.8	9.0	5.1	178	--	--
55.	05N 46E 07BDA1	112ALVM	79-09-14	130	405	7.7	12.0	15	235	--	--
56.	04N 41E 28DAC1	211WAYN	79-12-18	435	327	7.9	4.5	35	203	<1	<1
57.	04N 45E 04AAA1	110ALVM	79-09-19	12	292	8.0	10.0	8.3	156	K2	>160
60.*	04N 45E 27DAA1	110ALVM	79-09-14	60	325	7.9	16.5	7.0	180	--	--
61.	04N 45E 30CAC1	300CRBN	79-09-19	110	426	7.7	12.0	12	232	--	--
62.	04N 45E 34CCD1	112ALVM	79-09-19	50	361	7.8	12.5	8.4	205	--	--
63.	04N 46E 06CBC1	112ALVM	79-09-14	174	386	7.9	11.5	11	228	--	--
64.	04N 46E 18CCB1	112ALVM	79-09-14	219	313	7.7	13.0	8.4	180	--	--
65.	03N 41E 23CAA1	211WAYN	79-08-17	270	280	7.4	16.0	54	209	--	--
66.	03N 41E 26DBB1	121SLLK	79-08-17	235	350	7.4	11.5	51	238	--	--
67.	03N 45E 06ABB1	110ALVM	79-09-19	85	328	7.6	9.0	16	193	<1	>160
68.	03N 45E 12ABB1	211WAYN	79-09-13	180	164	7.0	15.5	13	101	--	--
69.	03N 45E 15BAA1	112ALVM	79-09-13	140	369	7.7	15.0	11	214	--	--
70.	03N 46E 19ACC1	300CRBN	79-09-14	160	491	7.8	14.5	23	321	--	--
71.	02N 42E 04BBC1	110SDMS	79-08-22	615	334	7.8	19.0	--	--	--	--
72.	02N 42E 14BCC1	110SDMS	79-08-24	360	447	7.5	11.5	31	264	--	--
73.	02N 43E 15BDA1	211WAYN	79-08-22	560	503	7.6	17.0	24	317	--	--
74.	02N 43E 26DDD1	211WAYN	79-08-20	525	898	7.2	17.0	16	584	--	--
75.	02N 43E 31ADD1	120VLCC	79-08-22	268	1010	7.2	13.0	15	613	<1	8
76.	02N 43E 35DAD1	110SDMS	79-08-20	190	859	7.2	13.0	14	574	--	--

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLORIDE, DIS-SOLVED (MG/L AS CL)	FLUORIDE, DIS-SOLVED (MG/L AS F)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNESIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORPTION RATIO	POTASSIUM, DIS-SOLVED (MG/L AS K)	ALKALINITY (MG/L AS CACO3)
79-08-22	.71	8.5	1.4	.1	190	1	51	16	1.9	.1	.9	190
79-08-22	<.10	5.3	1.3	.5	120	0	33	8.9	5.7	.2	1.7	140
79-10-10	.49	<1.0	1.5	1.1	35	0	9.7	2.5	6.2	.5	2.3	48
79-08-22	.21	3.8	.9	.3	36	0	10	2.6	4.4	.3	1.7	46
79-08-23	<.10	6.6	7.8	3.0	63	0	13	7.4	57	3.1	6.1	180
79-08-23	.83	5.1	2.4	1.0	49	0	12	4.6	10	.6	2.3	68
79-08-23	.19	3.8	1.6	.8	39	0	9.5	3.7	7.2	.5	1.9	48
79-11-08	5.0	10	3.9	.3	230	9	57	21	7.5	.2	1.5	220
79-08-23	3.9	9.8	9.5	1.1	170	0	47	13	19	.6	2.5	170
79-11-08	5.0	10	9.2	1.0	190	0	55	13	17	.5	4.0	200
79-11-08	4.0	8.6	8.8	1.3	140	0	36	12	17	.6	2.7	150
79-09-18	<.10	7.2	7.8	.2	80	9	14	11	6.4	.3	1.0	72
79-09-14	<.10	7.7	2.0	.4	42	0	13	2.3	2.9	.2	1.3	49
79-09-18	.57	9.7	1.2	.2	190	1	50	16	2.5	.1	2.1	190
79-09-14	.53	11	.9	.1	170	6	49	11	1.2	.0	.7	200
79-09-18	1.1	11	3.2	.1	210	5	56	17	3.2	.1	3.1	200
79-09-18	.60	14	2.4	.2	230	0	68	15	10	.3	1.2	250
79-09-19	1.3	71	5.6	.2	240	10	70	17	7.1	.2	1.4	230
79-09-18	.77	9.5	1.2	.1	190	1	53	14	2.6	.1	.7	190
79-09-14	.49	13	1.1	.1	170	6	49	11	1.4	.0	.5	160
79-09-14	.96	11	1.9	.1	210	0	62	14	2.7	.1	1.2	210
79-12-18	.34	5.4	3.6	.3	160	0	39	15	6.7	.2	1.8	160
79-09-19	.83	1.0	.7	.1	150	2	42	11	1.6	.1	.6	150
79-09-14	.43	11	.8	.1	180	16	47	16	.8	.0	.6	160
79-09-19	.73	19	1.6	.1	220	23	55	19	3.6	.1	.8	200
79-09-19	.64	5.3	.9	.1	190	0	54	14	1.4	.0	.6	200
79-09-14	1.7	13	1.1	.2	210	0	56	17	1.5	.0	.5	210
79-09-14	1.0	4.8	.9	.2	180	8	47	14	1.1	.0	.5	170
79-08-17	.65	11	13	.2	130	7	36	9.9	8.4	.3	3.5	120
79-08-17	.39	13	16	.2	160	12	43	12	8.9	.3	3.6	150
79-09-19	.55	22	1.4	.2	170	22	41	16	4.8	.2	.8	150
79-09-13	.46	9.0	1.4	.1	74	0	19	6.4	2.1	.1	.8	82
79-09-13	.89	15	1.2	.2	200	11	55	15	1.6	.1	.6	190
79-09-14	.23	99	3.1	.4	250	78	62	22	7.6	.2	1.9	170
79-08-22	.20	20	7.5	.3	--	--	--	--	--	--	6.1	200
79-08-24	1.4	11	6.7	.1	220	10	68	11	7.0	.2	2.2	210
79-08-22	1.1	41	33	.2	230	33	46	28	21	.6	3.1	200
79-08-20	.32	140	52	.3	400	82	100	37	41	.9	5.3	320
79-08-22	.42	46	120	.3	390	20	98	35	68	1.5	7.8	370
79-08-20	.35	140	57	.4	410	120	110	34	39	.8	5.8	300

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
79-08-22	230	0	5.8	.010	<10
79-08-22	170	0	11	.010	<10
79-10-10	59	0	9.4	<.010	20
79-08-22	56	0	2.8	.020	40
79-08-23	210	7	.9	.030	170
79-08-23	83	0	13	.040	<10
79-08-23	59	0	3.0	.060	40
79-11-08	270	0	6.8	.050	<10
79-08-23	210	0	8.4	.050	<10
79-11-08	240	0	19	.030	<10
79-11-08	180	0	7.2	.040	<10
79-09-18	63	12	.2	<.010	--
79-09-14	--	--	6.0	.030	--
79-09-18	230	0	7.3	.020	--
79-09-14	200	0	5.1	.010	--
79-09-18	250	0	8.0	.010	--
79-09-18	300	0	15	.010	--
79-09-19	280	0	14	.030	--
79-09-18	230	0	5.8	<.010	--
79-09-14	200	0	5.1	.010	--
79-09-14	260	0	8.3	.010	--
79-12-18	200	0	4.0	.050	<10
79-09-19	180	0	2.9	.010	--
79-09-14	200	0	4.0	.010	--
79-09-19	240	0	7.7	.010	--
79-09-19	250	0	6.3	<.010	--
79-09-14	260	0	5.2	.040	--
79-09-14	210	0	6.7	.090	--
79-08-17	150	0	9.6	.030	--
79-08-17	180	0	11	.060	--
79-09-19	180	0	7.2	.030	--
79-09-13	100	0	16	.010	--
79-09-13	230	0	7.3	<.010	--
79-09-14	210	0	5.3	.010	--
79-08-22	200	0	5.1	.030	--
79-08-24	250	0	13	.030	--
79-08-22	240	0	9.6	.030	--
79-08-20	390	0	39	.060	--
79-08-22	--	--	--	.020	--
79-08-20	360	0	36	.010	--

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

WELL IDENTI- FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML)
77.	02N 43E 36DCC1	120VLCC	79-08-21	90	1110	7.2	19.0	12	742	<1	<1
78.	02N 44E 07BBB1	120VLCC	79-08-20	300	462	7.6	12.5	17	295	--	--
79.	02N 44E 31BBA1	110SDMS	79-08-21	218	790	7.2	18.5	41	564	--	--
80.	02N 44E 32BCC1	110SDMS	79-08-21	265	605	7.9	14.0	24	369	K1	<1
81.	02N 44E 33CCD1	110SDMS	79-08-21	171	900	7.1	19.0	15	588	--	--
82.	01N 43E 12ACB1	110ALVM	79-08-20	60	461	7.5	15.5	15	275	<1	K2
83.	01N 44E 05CCD1	110SDMS	79-08-22	116	518	7.4	12.0	10	313	K1	K4
84.	01N 44E 16ABA1	110SDMS	79-08-23	100	480	7.6	14.0	21	281	--	--
85.	01N 44E 17ADD1	110ALVM	79-08-21	50	381	7.7	18.0	11	232	<1	K1
86.	01N 44E 19ADA1	110SDMS	79-08-17	170	394	7.4	13.0	14	226	<1	K250
87.	01N 44E 20AAB1	110ALVM	79-08-23	69	423	7.6	18.0	11	253	<1	<1
88.	01N 44E 26CCD1	110SDMS	79-08-23	77	1330	6.9	17.5	7.6	982	--	--
89.	01N 44E 26DAC1	110SDMS	79-08-23	35	206	8.3	18.0	.6	103	--	--
90.	01N 44E 27BCB1	120VLCC	79-08-23	100	345	7.7	19.0	7.3	217	--	--
91.	01N 44E 35DBD1	110ALVM	79-08-23	42	519	7.4	17.0	17	277	--	--
92.	01S 40E 05CDD1	121SLLK	79-09-12	100	497	7.6	13.5	56	346	--	--
93.	01S 45E 17ACC1	211WAYN	79-08-24	125	489	7.5	18.0	7.9	303	--	--
94.	02S 40E 04CAC1	110SDMS	79-09-12	155	448	8.3	12.0	60	316	--	--
95.	02S 41E 02ACA1	300CRBN	79-09-12	13600	448	7.5	9.5	9.2	273	--	--
96.	03S 41E 04ADD1	211WAYN	79-09-12	150	578	7.5	12.0	9.4	340	--	--
97.	03S 42E 12DCC1	120VLCC	79-08-31	100	480	7.6	9.0	25	261	--	--
98.	03S 42E 17BDA1	--	79-08-31	--	349	8.1	15.0	4.3	209	--	--
99.	03S 43E 18AAD1	110SDMS	79-08-31	180	611	7.9	12.5	15	394	--	--
100.	03S 43E 35BCB1	--	79-08-30	--	583	7.5	13.5	14	286	--	--
		--	79-10-03	--	317	8.1	--	--	--	--	--
101.											
102.	04S 43E 25BBB1	110SDMS	79-08-30	100	695	7.2	21.0	22	403	--	--
103.	04S 43E 26CBC1	110SDMS	79-08-30	82	781	7.6	11.0	12	450	--	--
104.	04S 43E 35ADB1	211WAYN	79-08-30	218	513	7.5	11.5	8.3	263	--	--
105.	04S 43E 36BCB1	110SDMS	79-08-30	205	1150	7.5	16.5	9.0	500	--	--
	05S 43E 11CBB1	211WAYN	79-08-31	225	524	8.0	14.0	13	388	<1	<1
106.	05S 43E 16CBD1	211WAYN	79-08-29	195	245	7.2	10.5	19	138	<1	<1
107.	05S 43E 22DCC1	110SDMS	79-08-29	103	230	7.1	14.0	19	143	<1	<1
108.	05S 43E 23ADA1	211WAYN	79-08-29	325	532	8.2	20.5	8.1	353	<1	<1
109.	05S 43E 25BBD1	120VLCC	79-09-13	56	743	7.5	7.5	18	445	K170	K198
110.	05S 43E 26CAC1	211WAYN	79-08-29	70	510	7.6	11.0	4.4	251	<1	<1

PLAINS SUBAREA

WELL IDENTI- FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML)
113.	12N 39E 05CCB1	110SDMS	79-08-30	212	199	7.6	10.0	38	143	<1	<1
114.	12N 39E 08BBB1	110ALVM	79-08-30	E30	183	7.1	17.0	41	138	<1	<1
119.	11N 36E 34AAB1	110SKRV	79-08-30	856	341	7.7	12.0	26	208	<1	<1
121.	11N 38E 20ADA1	110SKRV	79-08-29	1120	252	8.0	16.0	37	170	K13	34
124.	10N 34E 31CCD1	110SDMS	79-10-24	189	475	7.9	11.0	35	304	--	--

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)
79-08-21	.29	200	79	.5	510	160	140	39	5.5	.1	7.3	430
79-08-20	.37	14	1.7	.1	270	0	77	18	3.7	.1	1.4	270
79-08-21	1.1	120	44	.3	380	77	98	33	41	.9	5.1	300
79-08-21	4.9	30	8.7	.3	320	25	67	37	13	.3	3.8	300
79-08-21	.76	130	52	.5	380	43	99	32	45	1.0	9.6	340
79-08-20	1.1	28	8.2	.3	250	32	67	19	8.1	.2	1.9	210
79-08-22	1.7	20	3.9	.2	300	20	80	24	3.8	.1	1.3	280
79-08-23	2.9	22	2.3	.3	260	30	59	28	7.3	.2	2.9	230
79-08-21	.89	22	2.4	.2	210	24	62	14	3.6	.1	1.9	190
79-08-17	<.10	36	6.5	.3	180	16	46	15	10	.3	2.1	160
79-08-23	.72	27	5.4	.2	230	29	64	16	6.9	.2	2.0	200
79-08-23	<.10	210	160	.8	600	140	170	42	100	1.8	15	460
79-08-23	.17	3.9	4.8	.1	100	0	12	18	8.0	.3	1.5	90
79-08-23	.35	24	1.6	.2	200	20	59	13	2.9	.1	.9	180
79-08-23	1.8	17	9.6	.2	270	7	72	23	8.0	.2	2.1	210
79-09-12	<.10	57	10	.6	240	35	70	16	12	.3	4.6	200
79-08-24	<.10	9.4	3.9	.2	280	1	87	15	7.9	.2	3.4	280
79-09-12	<.10	15	8.3	.4	220	0	63	16	11	.3	4.4	230
79-09-12	.63	16	8.1	.2	220	0	64	15	9.0	.3	1.1	250
79-09-12	.26	14	6.1	.4	190	0	54	13	48	1.5	2.5	320
79-08-31	<.10	6.9	5.5	.4	160	0	42	14	20	.7	2.7	240
79-08-31	<.10	23	11	.4	160	0	45	12	9.5	.3	1.4	170
79-08-31	<.10	90	4.9	.7	270	0	55	31	22	.6	1.2	290
79-08-30	<.10	12	7.8	.2	230	0	58	21	9.5	.3	1.8	270
79-10-03	--	--	--	--	--	--	--	--	--	--	--	270
79-08-30	<.10	4.9	6.6	.4	270	0	67	25	66	1.7	1.3	350
79-08-30	5.1	14	9.4	.2	270	0	72	22	31	.8	1.8	470
79-08-30	2.0	10	6.6	.2	220	0	63	14	13	.4	1.4	240
79-08-30	12	25	58	.3	380	0	79	44	41	.9	3.6	380
79-08-31	<.10	15	13	.3	200	0	50	18	54	1.7	2.1	370
79-08-29	.57	4.3	4.2	.2	100	0	34	3.6	5.2	.2	1.0	110
79-08-29	3.0	5.9	.9	.3	120	11	35	8.1	4.2	.2	.5	110
79-08-29	.26	15	79	.7	56	0	13	5.6	110	6.4	1.5	200
79-09-13	<.10	12	18	.2	350	0	110	19	17	.4	11	400
79-08-29	.44	8.6	2.0	.1	190	0	63	7.6	4.4	.1	.6	200
79-08-30	.30	4.3	1.8	.2	95	0	29	5.4	4.4	.2	.8	98
79-08-30	<.10	5.3	1.8	.2	80	0	22	6.1	4.8	.2	2.6	90
79-08-30	.59	10	6.3	.2	160	0	46	12	8.9	.3	1.9	160
79-08-29	.62	4.5	4.6	.2	120	0	30	11	7.7	.3	2.5	120
79-10-24	1.1	40	14	.4	210	13	61	15	14	.4	3.4	200

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	PHOS- PHORUS, TOTAL (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)
79-08-21	430	0	43	.010	--
79-08-20	330	0	13	.090	--
79-08-21	370	0	37	.030	--
79-08-21	360	0	7.3	1.400	--
79-08-21	410	0	52	.010	--
79-08-20	260	0	13	.010	--
79-08-22	340	0	22	.010	--
79-08-23	280	0	11	.030	--
79-08-21	230	0	7.3	.010	--
79-08-17	200	0	13	.010	--
79-08-23	240	0	9.6	.020	--
79-08-23	560	0	113	.020	--
79-08-23	110	0	1.1	.020	--
79-08-23	220	0	7.0	.020	--
79-08-23	260	0	20	.030	--
79-09-12	250	0	10	.150	--
79-08-24	340	0	17	.070	--
79-09-12	280	0	2.2	.020	--
79-09-12	310	0	16	.010	--
79-09-12	390	0	20	.030	--
79-08-31	290	0	12	.060	--
79-08-31	210	0	2.7	.010	--
79-08-31	350	0	7.0	.010	--
79-08-30	330	0	17	<.010	--
79-10-03	330	--	4.2	--	--
79-08-30	--	--	--	.040	--
79-08-30	570	0	23	.040	--
79-08-30	290	0	15	<.010	--
79-08-30	470	0	24	.010	--
79-08-31	450	0	7.2	<.010	--
79-08-29	130	0	13	.030	--
79-08-29	150	0	19	.030	--
79-08-29	240	0	2.4	.050	--
79-09-13	490	0	25	.260	--
79-08-29	230	0	9.2	.030	--
79-08-30	120	0	4.8	.030	<10
79-08-30	110	0	14	.050	1500
79-08-30	200	0	6.4	.020	<10
79-08-29	150	0	2.4	.010	<10
79-10-24	240	0	4.8	.010	<10

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

WELL IDENTIFICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPECIFIC CONDUCTANCE (MICROMHOS)	PH FIELD (UNITS)	TEMPERATURE, WATER (DEG C)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)
125.	10N 35E 08BBB1	110SKRV	79-08-31	360	503	7.6	10.0	21	303	--	--
126.	10N 36E 21CAC1	110SKRV	79-08-29	498	361	7.8	9.0	31	226	<1	<1
129.	08N 31E 14AAA1	110ALVM	79-10-24	540	477	7.8	11.0	44	316	--	--
139.	08N 33E 35DDD1	110SDMS	79-10-11	--	310	8.2	11.5	37	217	<1	<1
145.	08N 41E 33ABB1	110SKRV	79-11-08	E200	223	7.0	11.5	40	164	<1	--
147.	07N 33E 09BAA2	110SKRV	79-10-24	167	929	7.5	10.0	35	591	<1	<1
148.	07N 33E 12BBB1	110SKRV	79-10-24	395	318	8.2	10.5	45	228	--	--
151.	07N 34E 04DAD1	110SKRV	79-10-24	71	271	7.9	12.0	36	113	--	--
155.	07N 35E 01DBB1	110SKRV	79-09-20	203	229	7.9	12.0	34	165	K3	51
157.	07N 35E 25CDA1	110SKRV	79-09-21	E50	286	7.9	14.5	34	177	<1	--
158.	07N 35E 34DCC1	110SKRV	79-10-26	240	227	8.0	11.5	33	150	--	--
159.	07N 36E 05CAA1	110SKRV	79-09-20	239	267	7.9	13.5	34	179	<1	<1
160.	07N 36E 06ACD1	110SKRV	79-09-20	E50	272	7.9	--	35	179	<1	<1
161.	07N 36E 06DBA1	110SKRV	79-09-21	165	278	7.9	12.0	34	187	--	--
165.	07N 36E 14CBA1	110SKRV	79-09-20	E27	301	8.0	14.0	38	190	>120	>160
166.	07N 36E 22BAD1	110SKRV	79-10-11	--	264	8.1	13.5	35	184	K1	<1
169.	07N 39E 32CBA1	110ALVM	79-11-29	159	231	7.3	9.0	37	150	<1	<1
170.	07N 39E 32CCA1	110ALVM	79-11-29	55	332	7.8	9.5	41	202	<1	<1
174.	07N 40E 02BBB1	110SKRV	79-11-07	224	256	7.6	12.0	36	182	<1	<1
175.	07N 40E 03CBC1	110SKRV	79-11-28	87	211	7.9	11.5	42	152	<1	<1
176.	07N 40E 05ADB1	110SKRV	79-11-28	185	194	7.7	10.5	41	140	<1	<1
178.*	07N 40E 25BBB1	110SKRV	79-11-28	E90	221	7.4	10.5	33	140	<1	<1
181.	07N 40E 34BBC1	110ALVM	79-11-07	90	302	8.0	11.5	19	187	<1	<1
198.*	06N 34E 04AAA1	110SKRV	79-10-25	420	244	9.4	10.0	36	263	--	--
199.	06N 34E 04BAB1	110SKRV	79-10-25	370	345	7.9	10.5	43	222	<1	K210
200.	06N 34E 06DDD1	110SKRV	79-10-25	170	1300	7.7	12.0	31	728	--	--
201.	06N 34E 13AAA1	110SKRV	79-10-26	175	349	7.9	11.5	33	230	--	--
202.	06N 34E 17DDC1	110SKRV	79-10-11	330	272	8.6	13.0	25	177	K3	25
203.	06N 34E 22ABB1	110SKRV	79-09-21	267	832	7.6	12.5	34	511	<1	--
205.	06N 35E 14CCC1	110SKRV	79-10-26	250	612	8.0	10.5	25	371	--	--
209.	06N 36E 26DBC1	110SKRV	79-08-29	195	318	8.0	14.0	37	211	<1	<1
215.	06N 39E 24ACC1	110ALVM	79-11-07	97	341	7.8	10.0	20	187	<1	<1
217.	06N 39E 30ABB1	110SKRV	79-09-20	44	477	7.6	10.5	32	286	180	>160
220.	06N 40E 04DBD1	110SKRV	79-11-28	183	444	7.8	10.5	22	230	<1	<1
222.*	06N 40E 15AAA1	110ALVM	79-11-29	55	294	7.8	9.0	17	164	<1	<1
223.*	06N 40E 18AAD1	110ALVM	79-11-29	63	379	7.6	9.0	26	215	<1	<1
224.	06N 40E 29CCC1	120VLCC	79-12-05	305	389	8.1	14.0	37	237	--	--
229.	06N 40E 32CBC1	120VLCC	79-12-05	388	357	8.2	15.0	43	224	--	--
234.	06N 41E 20BCD1	120VLCC	79-11-29	650	313	7.7	8.5	46	200	<1	<1
236.	06N 42E 06BCB1	120VLCC	79-12-17	500	376	7.5	22.0	59	327	<1	<1

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLORIDE, DIS-SOLVED (MG/L AS CL)	FLUORIDE, DIS-SOLVED (MG/L AS F)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNESIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORPTION RATIO	POTASSIUM, DIS-SOLVED (MG/L AS K)	ALKALINITY (MG/L AS CACO3)
79-08-31	.87	43	6.9	.3	250	27	68	19	9.7	.3	2.7	220
79-08-29	.64	11	8.1	.2	170	0	45	14	12	.4	2.4	170
79-10-24	10	34	21	1.3	230	41	53	23	13	.4	2.5	190
79-10-11	.22	9.9	8.9	.8	92	0	21	9.6	29	1.3	4.2	160
79-11-08	.88	3.4	6.1	1.8	81	0	21	7.0	15	.7	2.9	110
79-10-24	3.0	71	65	.2	320	0	86	25	74	1.8	5.7	340
79-10-24	.24	18	8.9	.8	98	0	24	9.3	27	1.2	4.8	150
79-10-24	.73	7.8	8.2	.4	110	98	27	9.4	14	.6	2.3	12
79-09-20	.68	11	6.1	.5	100	0	27	8.5	9.1	.4	2.0	110
79-09-21	.82	11	7.7	.5	130	15	35	10	10	.4	2.3	110
79-10-26	.54	6.5	5.8	.5	91	0	24	7.5	11	.5	2.4	98
79-09-20	.89	6.6	16	.5	120	5	34	9.6	9.6	.4	2.3	110
79-09-20	.81	12	7.2	.5	110	0	30	8.0	11	.5	2.2	120
79-09-21	.84	12	7.2	.5	140	17	38	10	10	.4	2.3	120
79-09-20	2.5	12	12	.8	120	5	30	11	15	.6	2.7	110
79-10-11	1.1	6.0	7.6	.9	120	2	36	7.8	14	.6	3.1	120
79-11-29	2.1	10	4.4	1.4	74	0	19	6.5	12	.6	3.6	90
79-11-29	3.0	8.2	6.8	1.2	110	0	33	7.8	15	.6	8.2	130
79-11-07	1.4	10	5.4	1.4	110	0	30	8.1	15	.6	3.0	120
79-11-28	1.5	6.2	3.7	1.4	83	0	23	6.3	11	.5	3.0	90
79-11-28	1.3	5.5	5.3	1.0	65	0	18	4.9	12	.6	3.0	80
79-11-28	2.0	3.8	4.7	1.1	76	0	22	5.2	12	.6	2.4	90
79-11-07	<.10	8.3	3.1	.8	150	0	41	11	6.2	.2	1.6	160
79-10-25	.18	12	5.2	.5	4	0	1.0	.3	56	13	1.6	250
79-10-25	<.10	3.5	12	.7	130	0	35	11	18	.7	2.7	160
79-10-25	14	94	230	.2	560	360	140	50	45	.8	3.3	200
79-10-26	9.1	13	22	.4	140	1	33	13	19	.7	3.5	140
79-10-11	.10	6.2	7.1	.6	50	0	12	4.8	38	2.3	5.5	130
79-09-21	7.0	56	85	.3	320	33	73	34	42	1.0	5.9	290
79-10-26	2.0	25	22	.2	230	0	66	17	41	1.2	4.3	280
79-08-29	.54	13	9.9	1.0	130	0	36	10	17	.6	3.1	140
79-11-07	.12	10	3.9	.2	190	18	51	14	4.5	.1	1.6	170
79-09-20	3.4	35	23	1.7	150	0	38	14	40	1.4	3.3	160
79-11-28	2.3	11	3.2	.1	210	5	57	16	6.8	.2	2.0	200
79-11-29	.69	8.0	2.6	.1	130	0	37	10	3.9	.1	1.2	140
79-11-29	2.9	17	2.6	.2	180	16	50	14	4.1	.1	1.9	160
79-12-05	1.0	13	11	.9	170	6	44	14	17	.6	3.1	160
79-12-05	1.1	13	12	1.0	140	1	35	12	19	.7	3.5	140
79-11-29	.40	13	10	1.5	110	0	29	8.4	17	.7	3.1	120
79-12-17	.78	23	14	2.8	100	0	27	7.8	38	1.7	4.7	150

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
79-08-31	270	0	11	.010	<10
79-08-29	210	0	5.3	.020	10
79-10-24	230	0	5.8	.010	<10
79-10-11	190	0	1.9	.180	<10
79-11-08	130	0	21	.030	<10
79-10-24	410	0	21	.010	<10
79-10-24	180	0	1.8	.020	80
79-10-24	14	0	.3	.010	<10
79-09-20	130	0	2.6	.030	<10
79-09-21	140	0	2.8	.010	<10
79-10-26	120	0	1.9	.010	<10
79-09-20	140	0	2.8	--	<10
79-09-20	150	0	3.0	.030	<10
79-09-21	150	0	3.0	.040	<10
79-09-20	140	0	2.2	.020	<10
79-10-11	--	--	--	.010	20
79-11-29	110	0	8.8	.010	40
79-11-29	160	0	4.1	.090	<10
79-11-07	150	0	6.0	.030	<10
79-11-28	110	0	2.2	.030	<10
79-11-28	98	0	3.1	.030	<10
79-11-28	110	0	7.0	.020	90
79-11-07	190	0	3.0	.010	<10
79-10-25	250	29	.2	<.010	160
79-10-25	200	0	4.0	.060	20
79-10-25	240	0	7.7	.010	<10
79-10-26	170	0	3.4	.020	20
79-10-11	150	7	.7	.000	30
79-09-21	350	0	14	<.010	<10
79-10-26	--	--	--	.020	<10
79-08-29	170	0	2.7	.040	<10
79-11-07	210	0	5.3	.010	100
79-09-20	200	0	8.0	.110	<10
79-11-28	250	0	6.3	.010	<10
79-11-29	170	0	4.3	.010	<10
79-11-29	200	0	8.0	.020	<10
79-12-05	200	0	2.5	.010	<10
79-12-05	170	0	1.7	.010	<10
79-11-29	150	0	4.8	.010	<10
79-12-17	180	0	9.1	<.010	30

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

WELL IDENTI- FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML)
245.*	05N 37E 08CCC1	110SKRV	79-10-31	E196	381	8.0	9.0	43	255	--	--
246.	05N 37E 31CDB1	110SKRV	79-11-01	60	1850	7.6	8.5	46	1300	<1	<1
247.	05N 37E 32ACA1	110SKRV	79-10-31	140	--	8.0	--	39	303	<1	100
248.*	05N 37E 32DDB1	110ALVM	79-12-06	21	740	7.3	8.0	37	444	<1	<1
250.	05N 38E 04DBA1	110SDMS	79-12-06	70	453	9.3	15.0	17	274	--	--
252.	05N 38E 10ADD1	110SKRV	79-12-17	E165	1360	8.1	17.0	12	781	<1	<1
259.	05N 38E 32CBB1	110ALVM	79-10-31	--	475	--	14.0	14	280	<1	<1
260.	05N 38E 35ADA2	110SKRV	79-10-31	100	513	--	10.0	15	299	<1	<1
262.*	05N 39E 08ABC1	110ALVM	79-11-29	35	517	7.5	10.5	14	290	<1	<1
264.	05N 39E 24BDA1	110ALVM	79-12-17	60	550	7.5	9.0	17	336	<1	<1
267.	05N 40E 32CCB1	110ALVM	79-12-05	82	510	7.8	12.0	19	295	--	--
274.	04N 36E 30CBB1	110SKRV	79-11-02	--	521	7.9	10.0	25	329	<1	<1
277.	04N 37E 21DCD1	110SKRV	79-11-02	--	526	7.6	10.5	21	326	<1	<1
278.	04N 37E 22BAD1	110SKRV	79-11-09	806	443	7.3	9.5	25	273	--	--
282.	04N 38E 07DCC1	110SKRV	79-12-18	140	521	7.5	8.0	22	309	<1	<1
283.	04N 38E 25DAC1	110SDMS	79-11-07	120	482	7.5	9.0	9.7	283	<1	<1
284.	04N 38E 30DDD1	110SKRV	79-12-18	E184	466	7.5	11.5	15	274	<1	<1
285.	04N 39E 07AAA1	110ALVM	79-11-08	102	391	7.7	10.0	17	268	<1	<1
286.	04N 39E 18CDA1	110SDMS	79-12-06	175	451	7.7	11.0	14	281	<1	<1
287.	04N 39E 25DBB1	110ALVM	79-12-06	90	440	7.7	14.5	16	257	<1	<1
288.	04N 40E 05ADB1	120VLCC	79-12-17	96	567	7.3	9.0	19	338	<1	<1
289.	04N 40E 32DBD1	110SDMS	79-12-06	E120	550	7.5	10.5	14	324	<1	<1
300.*	03N 37E 02AAA1	110SKRV	79-11-09	165	453	7.5	12.0	16	274	--	--
303.	03N 37E 27BBB1	110SKRV	79-12-18	263	512	7.6	11.0	19	314	<1	<1
305.	03N 38E 22BAB1	110SKRV	79-12-07	155	531	7.2	10.5	22	304	<1	<1
306.	03N 38E 35CCB1	110SKRV	79-12-05	181	614	7.6	14.0	24	358	<1	<1
307.	03N 39E 18BDB1	110SKRV	79-11-28	200	518	7.9	9.5	19	307	<1	<1
311.	02N 36E 06CBB1	110SKRV	79-09-19	500	493	7.6	12.5	26	315	<1	K13
312.*	02N 36E 09ADA1	110SKRV	79-09-19	>400	487	7.6	13.0	25	312	<1	<1
316.	02N 37E 02BBD1	110SKRV	79-09-19	E200	553	7.4	14.5	23	344	<1	<1
317.	02N 37E 13CBB1	110SKRV	79-11-30	1910	308	7.7	10.0	20	283	--	--
318.*	02N 37E 14CCC1	110SKRV	79-09-20	168	587	7.7	11.0	26	314	--	--
319.	02N 37E 18DBA1	110SKRV	79-12-07	235	590	7.6	11.0	23	349	<1	<1
320.	02N 37E 21CDD1	110SKRV	79-09-19	165	539	7.7	14.0	22	349	<1	<1
321.*	02N 37E 24ADD1	110SKRV	79-11-30	378	581	7.6	10.0	23	344	--	--
323.	02N 37E 33AAA1	110SKRV	79-12-19	180	583	7.6	10.5	25	359	<1	<1
324.	02N 38E 01DAC1	110SKRV	79-12-07	165	599	7.7	12.0	25	348	<1	<1
325.	02N 38E 08CBB1	110SKRV	79-11-30	415	545	7.8	10.0	21	318	--	--
326.	02N 38E 16ADD1	110SKRV	79-12-07	225	590	7.5	8.0	25	342	<1	<1
327.	02N 38E 16BCC1	110SKRV	79-11-30	412	579	7.9	11.0	23	336	--	--

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY (MG/L AS CACO3)
79-10-31	<.10	32	12	1.2	150	0	42	11	18	.6	5.2	150
79-11-01	2.3	420	180	1.7	610	220	150	57	200	3.5	7.3	390
79-10-31	<.10	61	18	.6	190	34	51	16	17	.5	4.3	160
79-12-06	<.10	53	18	1.1	330	2	95	23	33	.8	4.0	330
79-12-06	.74	30	14	1.2	59	0	12	7.0	81	4.6	3.4	180
79-12-17	22	170	110	.8	460	120	84	61	110	2.2	6.7	340
79-10-31	.59	47	14	.4	230	47	66	15	12	.3	2.7	180
79-10-31	1.2	45	9.9	.4	240	26	60	21	17	.5	3.1	210
79-11-29	1.0	46	11	.3	230	25	68	15	12	.3	2.5	200
79-12-17	1.4	46	14	.4	260	14	75	17	12	.3	3.0	250
79-12-05	1.6	40	9.0	.4	240	27	69	17	10	.3	3.0	210
79-11-02	1.3	50	18	.5	190	0	66	18	15	.4	3.2	220
79-11-02	1.4	49	15	.4	240	10	67	17	14	.4	3.0	230
79-11-09	.54	48	13	.7	200	36	54	15	17	.5	3.4	160
79-12-18	1.2	49	15	.4	240	43	69	16	13	.4	3.2	200
79-11-07	.40	49	10	.5	190	0	53	14	12	.4	2.1	220
79-12-18	.84	42	9.3	.3	210	13	60	14	10	.3	2.5	200
79-11-08	3.3	45	11	.5	230	66	63	18	10	.3	3.8	160
79-12-06	1.1	42	9.8	.3	230	33	66	16	9.4	.3	2.6	200
79-12-06	1.2	38	7.9	.4	210	30	59	15	9.0	.3	2.6	180
79-12-17	3.1	46	15	.4	270	32	75	20	12	.3	3.5	240
79-12-06	.92	67	26	.3	240	60	68	17	19	.5	3.3	180
79-11-09	1.2	40	9.3	.4	220	32	64	15	11	.3	2.8	190
79-12-18	1.4	45	15	.4	230	9	61	19	17	.5	3.9	220
79-12-07	3.2	44	13	.2	240	43	67	17	12	.3	5.6	200
79-12-05	2.0	39	14	.2	280	17	79	21	19	.5	3.5	260
79-11-28	1.7	39	9.7	.2	240	10	68	18	9.9	.3	3.1	230
79-09-19	1.0	47	13	.5	210	30	52	20	18	.5	3.5	180
79-09-19	.91	56	19	.4	220	31	56	19	18	.5	3.4	190
79-09-19	2.3	45	10	.4	270	24	70	23	17	.5	3.6	250
79-11-30	1.3	44	16	.2	200	20	55	16	19	.6	3.9	180
79-09-20	2.6	42	13	.4	270	29	68	24	20	.5	3.8	240
79-12-07	1.8	54	24	.3	270	49	65	25	20	.5	3.7	220
79-09-19	1.8	46	11	.4	280	34	76	21	17	.4	3.3	250
79-11-30	2.1	42	14	.2	260	14	72	19	18	.5	3.3	250
79-12-19	2.1	41	19	.3	260	0	71	21	20	.5	3.8	260
79-12-07	1.5	40	27	.2	240	10	64	19	29	.8	4.5	230
79-11-30	1.9	43	10	.2	250	20	69	18	14	.4	3.1	230
79-12-07	2.0	42	21	.2	250	20	67	19	24	.7	4.1	230
79-11-30	2.0	42	16	.2	240	39	66	18	21	.6	3.7	240

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
79-10-31	--	--	--	.050	340
79-11-01	480	0	19	.080	<10
79-10-31	190	0	3.0	.010	<10
79-12-06	400	0	32	.020	30
79-12-06	--	--	--	.150	30
79-12-17	420	0	5.3	.070	20
79-10-31	--	--	--	.010	<10
79-10-31	--	--	--	.060	<10
79-11-29	250	0	13	<.010	<10
79-12-17	300	0	15	<.010	<10
79-12-05	260	0	6.6	.010	<10
79-11-02	270	0	5.4	.010	<10
79-11-02	280	0	11	.010	<10
79-11-09	200	0	16	.010	<10
79-12-18	240	0	12	.010	20
79-11-07	270	0	14	.010	<10
79-12-18	240	0	12	--	<10
79-11-08	200	0	6.4	<.010	<10
79-12-06	240	0	7.7	.010	50
79-12-06	220	0	7.0	.010	60
79-12-17	290	0	23	.010	30
79-12-06	220	0	11	.010	<10
79-11-09	--	--	--	.020	<10
79-12-18	270	0	11	.010	<10
79-12-07	240	0	24	.030	<10
79-12-05	320	0	13	.010	20
79-11-28	280	0	5.6	.010	<10
79-09-19	220	0	8.8	.010	<10
79-09-19	230	0	9.2	.010	<10
79-09-19	300	0	19	.010	<10
79-11-30	220	0	7.0	.010	<10
79-09-20	--	--	--	.070	<10
79-12-07	270	0	11	.010	<10
79-09-19	300	0	9.6	.020	<10
79-11-30	300	0	12	.010	<10
79-12-19	320	0	13	.010	<10
79-12-07	280	0	8.9	.010	<10
79-11-30	280	0	7.1	.010	<10
79-12-07	280	0	14	.010	<10
79-11-30	290	0	5.8	.010	<10

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)
328.	02N 38E 16DDC1	110SKRV	79-11-30	387	579	8.0	13.0	24	342	--	--
332.	02N 38E 27ACB1	110SKRV	79-12-05	365	621	7.6	12.0	30	363	--	--
333.	02N 38E 29CCC1	110SKRV	79-12-19	225	572	7.6	11.0	25	360	<1	<1
334.	02N 39E 05CCC1	110SKRV	79-12-07	365	598	7.8	13.0	25	355	<1	<1
337.	01N 37E 01DCC1	110ALVM	79-12-07	--	611	7.5	12.0	28	362	<1	<1
338.*	01N 38E 09BCB1	110SKRV	79-08-24	183	621	7.5	17.0	28	367	--	--

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	NITROGEN, NO2+NO3 DISSOLVED (MG/L AS N)	SULFATE DISSOLVED (MG/L AS SO4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DISSOLVED (MG/L AS CA)	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	SODIUM ADSORPTION RATIO	POTASSIUM, DISSOLVED (MG/L AS K)	ALKALINITY (MG/L AS CACO3)
79-11-30	2.0	42	19	.2	240	2	65	19	23	.6	4.1	240
79-12-05	2.0	42	24	.2	260	22	69	21	26	.7	4.6	240
79-12-19	2.0	42	23	.3	260	6	70	20	24	.7	4.0	250
79-12-07	1.5	40	27	.2	240	2	64	19	30	.8	4.4	240
79-12-07	2.8	37	10	.2	270	0	72	23	17	.4	4.4	280
79-08-24	2.9	38	21	.3	300	41	82	22	18	.5	4.4	250

TABLE B.--CURRENT WATER-QUALITY DATA--Continued

DATE OF SAMPLE	BICARBONATE (MG/L AS HCO3)	CARBONATE (MG/L AS CO3)	CARBON DIOXIDE DISSOLVED (MG/L AS CO2)	PHOSPHORUS, TOTAL (MG/L AS P)	IRON, DISSOLVED (UG/L AS FE)
79-11-30	290	0	4.6	.010	<10
79-12-05	290	0	12	.010	30
79-12-19	310	0	12	.070	20
79-12-07	290	0	7.4	.010	<10
79-12-07	340	0	17	.010	<10
79-08-24	310	0	16	.020	<10

Headnotes for Table C.--Historic water-quality data

Notations:
- 0 - analyzed for but not detected
- -- not analyzed
- < - less than
- > - greater than
- E - estimated or reported
- B or K - less than ideal colony count (coliform bacteria)
- ND - less than 1 colony per 100 mL (coliform bacteria)

Units:
- MICROMHOS - micromhos per centimeter at 25°C
- DEG C - degrees Celsius
- COLS/100 ML - colonies per 100 mL (coliform bacteria)

Well identification number: See plate 1 and table A
* - wells with multiple analyses available

Aquifers: See table 1 for aquifer code, name, and rock unit

TABLE C.--HISTORIC WATER-QUALITY DATA

WELL IDENTIFICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPECIFIC CONDUCTANCE (UMHOS)	PH (UNITS)	TEMPERATURE (DEG C)	SILICA, DISSOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	COLIFORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLIFORM, FECAL, 0.45 UM-MF (COLS./100 ML)
					UPLANDS SUBAREAS						
1.	16N 43E 31CCB1	112MFLS	74-08-04	80	194	7.9	13.0	--	--	--	--
2.	16N 43E 32AAC1	111ALVM	74-06-23	240	1620	8.0	11.0	--	--	--	--
3.	16N 43E 32DAA1	111ALVM	74-06-24	80	171	8.1	11.5	--	--	--	--
4.*	15N 43E 13BCA1	112ALVM	74-07-11	155	--	--	--	--	--	--	--
		112ALVM	77-09-08	155	320	6.9	12.5	14	197	--	--
6.	15N 43E 24AAB1	112HKBR	75-07-08	202	240	8.3	11.0	6.8	136	--	155
7.	15N 43E 26CDD1	112OTSH	74-05-23	60	209	7.2	--	--	--	--	--
		112OTSH	74-06-27	60	--	--	12.0	--	--	--	ND
		112OTSH	74-07-20	60	208	7.2	10.0	--	--	--	ND
9.	14N 44E 30AAC1	112ALVM	74-06-27	62	134	7.4	9.0	--	--	--	ND
		112ALVM	74-07-16	62	135	--	9.0	--	--	--	--
10.	14N 44E 34BCD1	112PLTU	74-06-25	85	113	7.0	12.0	--	--	--	--
		112PLTU	74-07-16	85	108	--	--	--	--	--	--
11.	13N 41E 15AAD1	110SKRV	74-06-26	126	182	7.4	9.0	--	--	--	--
		110SKRV	74-07-18	126	178	--	--	--	--	--	--
12.	13N 42E 12ACB1	112ALVM	74-07-21	80	65	7.1	6.5	--	--	--	ND
13.*	13N 43E 15ADC1	112LVCK	74-07-10	--	82	7.4	7.5	--	--	--	--
		112LVCK	74-07-21	--	75	7.2	--	--	--	--	ND
		112LVCK	74-09-11	--	84	7.2	--	--	--	--	ND
		112LVCK	77-09-08	--	96	6.7	8.5	30	80	--	--
14.	13N 43E 23ABA1	112LVCK	74-09-13	75	106	7.1	11.5	--	--	--	--
15.	12N 42E 17BDA1	112LVCK	74-06-26	82	122	7.1	9.0	--	--	--	--
		112LVCK	74-07-17	82	114	--	--	--	--	--	--
16.	12N 42E 18CDB1	111ALVM	74-07-17	18	56	--	14.5	--	--	--	--
19.	12N 43E 17DBA2	112GRRT	74-07-22	74	145	--	--	--	--	--	ND
		112GRRT	74-09-12	74	151	7.3	--	--	--	--	ND
20.	12N 44E 08BAA1	112GRRT	75-09-11	50	52	6.6	4.5	.9	26	--	--
21.	12N 44E 20ADB1	112GRRT	75-07-24	105	104	6.9	7.5	37	87	--	--
		112GRRT	77-09-08	105	--	--	--	--	103	--	--
22.	11N 42E 11DAD1	112GRRT	74-07-22	80	124	--	--	--	--	--	ND
		112GRRT	77-09-08	80	130	7.2	12.5	30	105	--	--
23.*	11N 42E 23DAA1	112LVCK	74-07-11	128	--	--	--	--	--	--	--
24.	10N 44E 09BCB1	112GRRT	75-07-24	74	164	6.3	6.5	18	84	--	--
25.	09N 42E 12DCA1	112HKBR	75-09-14	300	269	7.3	--	39	156	--	--
26.	09N 42E 23DDA1	112FLRV	74-07-09	85	373	7.3	12.5	--	--	--	--
		112FLRV	74-07-24	85	375	7.4	12.5	--	--	--	ND
27.	09N 43E 19CDB1	112HKBR	75-08-08	127	385	6.3	--	42	228	--	--
29.	09N 43E 30CCA1	112HKBR	70-07-28	130	490	--	--	--	--	--	--
30.*	09N 43E 30CCC2	112FLRV	75-08-08	73	443	6.3	11.5	43	258	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
74-08-04	--	<.10	6.5	4.9	.2	84	0	21	7.6	12	.6	1.6
74-06-23	--	<.10	14	1.1	.1	75	0	16	8.6	5.3	.3	2.0
74-06-24	--	<.10	8.7	1.4	.1	80	0	29	1.9	4.5	.2	1.6
74-07-11	--	--	--	--	--	--	--	--	--	--	--	--
77-09-08	--	.74	4.4	1.6	.1	190	6	50	15	1.7	.1	1.0
75-07-08	--	.10	11	1.5	.1	120	0	28	13	2.2	.1	1.5
74-05-23	--	.53	3.6	1.7	.1	--	--	--	--	--	--	--
74-06-27	<1	--	--	--	--	--	--	--	--	--	--	--
74-07-20	81	.28	3.5	.9	.2	--	--	--	--	--	--	--
74-06-27	<1	.24	3.2	1.0	.5	--	--	--	--	--	--	--
74-07-16	--	.53	3.1	.9	.6	--	--	--	--	--	--	--
74-06-25	--	<.10	3.7	3.6	4.6	19	0	6.6	.5	1.4	.1	2.5
74-07-16	--	<.10	3.7	3.4	3.5	--	--	--	--	--	--	--
74-06-26	--	<.10	3.2	1.5	<.1	--	--	--	--	--	--	--
74-07-18	--	.23	3.8	.8	.1	--	--	--	--	--	--	--
74-07-21	<1	<.10	1.1	.3	.1	--	--	--	--	--	--	--
74-07-10	--	.23	2.9	.8	.3	--	--	--	--	--	--	--
74-07-21	E3	.21	2.9	.7	.3	--	--	--	--	--	--	--
74-09-11	ND	--	--	--	--	--	--	--	--	--	--	--
77-09-08	--	.21	3.0	1.0	.5	39	0	11	2.7	4.3	.3	1.6
74-09-13	--	<.10	3.5	1.6	1.6	25	0	7.4	1.5	9.8	.9	2.7
74-06-26	--	.13	4.6	1.8	.2	44	0	15	1.6	5.7	.4	1.4
74-07-17	--	.23	5.8	1.4	.2	--	--	--	--	--	--	--
74-07-17	--	<.10	4.0	.8	.1	--	--	--	--	--	--	--
74-07-22	24	<.10	3.4	1.8	1.5	--	--	--	--	--	--	--
74-09-12	<1	--	--	--	--	--	--	--	--	--	--	--
75-09-11	--	<.10	.8	.8	1.4	9	0	3.5	.1	4.6	.7	2.5
75-07-24	--	<.10	5.9	.7	1.4	40	2	7.4	5.2	4.8	.3	1.2
77-09-08	--	--	--	--	--	--	--	--	--	--	--	--
74-07-22	ND	<.10	5.4	1.7	.1	--	--	--	--	--	--	--
77-09-08	--	.38	5.7	2.2	.2	72	14	22	4.1	4.7	.2	1.2
74-07-11	--	--	--	--	--	--	--	--	--	--	--	--
75-07-24	--	9.1	4.2	5.6	.1	58	27	16	4.5	4.9	.3	3.3
75-09-14	--	6.0	5.7	4.8	.9	95	7	26	7.4	10	.4	2.1
74-07-09	--	3.8	13	10	.9	--	--	--	--	--	--	--
74-07-24	<1	3.8	13	9.0	.9	180	0	50	14	24	.8	2.1
75-08-08	--	5.2	6.6	5.2	.7	160	1	42	14	15	.5	1.6
70-07-28	--	--	--	8.7	--	--	--	--	--	--	--	--
75-08-08	--	4.0	9.5	10	1.0	180	0	46	15	19	.6	2.7

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA-LINITY FIELD (MG/L AS CACO3)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
74-08-04	110	140	--	4.6	.010	--
74-06-23	140	170	--	2.7	.050	--
74-06-24	98	120	--	2.5	.020	--
74-07-11	200	240	--	--	--	--
77-09-08	180	220	0	44	<.010	--
75-07-08	120	150	0	1.2	.010	--
74-05-23	140	170	--	29	.040	--
74-06-27	--	--	--	--	--	--
74-07-20	120	150	--	26	.030	--
74-06-27	77	94	--	10	.080	--
74-07-16	--	--	--	--	--	--
74-06-25	78	95	--	15	.020	--
74-07-16	--	--	--	--	--	--
74-06-26	46	56	--	15	.020	--
74-07-18	--	--	--	--	--	--
74-07-21	44	54	--	12	--	--
74-07-10	34	42	--	4.5	.020	--
74-07-21	40	49	--	8.4	.030	--
74-09-11	--	--	--	--	--	--
77-09-08	43	53	0	17	.020	--
74-09-13	<1	0	--	13	.070	--
74-06-26	68	83	--	18	.080	--
74-07-17	--	--	--	--	--	--
74-07-17	--	--	--	--	--	--
74-07-22	--	--	--	--	--	--
74-09-12	--	--	--	--	--	--
75-09-11	19	23	0	9.2	<.010	--
75-07-24	38	46	0	9.3	.630	--
77-09-08	--	--	--	--	--	--
74-07-22	--	--	--	--	--	--
77-09-08	57	70	0	7.1	.040	--
74-07-11	58	71	--	--	--	--
75-07-24	31	38	0	30	.160	--
75-09-14	90	110	0	8.7	.290	--
74-07-09	370	450	--	36	.040	--
74-07-24	210	260	--	27	.050	--
75-08-08	160	200	0	158	.040	--
70-07-28	--	--	--	--	--	--
75-08-08	180	220	0	180	.050	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)
32.	09N 44E 08CDA1	112HKBR	75-09-14	410	391	7.5	--	30	228	--	--
33.	09N 44E 27CBC1	112FLRV	75-08-08	385	278	6.6	--	43	175	--	--
34.	09N 44E 30DAA1	112FLRV	75-09-16	260	830	7.5	13.0	35	396	--	--
36.	08N 43E 01DDB1	112HKBR	75-10-23	266	409	7.7	8.0	34	245	--	--
37.	06N 44E 09CCA1	110VLCC	58-11-04	443	245	7.4	8.5	--	--	--	--
39.	06N 44E 26BAA1	110VLCC	50-10-09	114	384	--	11.5	12	--	--	--
40.	06N 44E 28BCB1	110VLCC	58-11-04	405	111	7.1	9.0	--	--	--	--
42.	06N 45E 06DDA1	110VLCC	58-11-04	134	261	7.4	8.5	--	--	--	--
44.	06N 45E 34BDA1	110ALVM	50-10-09	28	372	--	9.0	14	--	--	--
45.	06N 45E 34CDC1	112ALVM	76-10-20	93	314	7.8	8.0	12	176	--	--
50.	05N 44E 36AAD1	110ALVM	50-10-09	--	601	--	8.5	18	--	--	--
52.	05N 45E 23ABC1	110ALVM	50-10-09	80	290	--	8.5	11	--	--	--
54.	05N 45E 26DAA1	112ALVM	57-07-24	225	296	7.9	7.0	8.6	167	--	--
58.	04N 45E 11ABA1	110ALVM	50-10-09	52	409	--	8.0	12	--	--	--
59.	04N 45E 13AAD1	110QRNR	58-11-18	321	277	7.9	5.5	--	--	--	--
60.*	04N 45E 27DAA1	110ALVM	50-10-09	60	373	--	9.5	9.6	--	--	--

PLAINS SUBAREA

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)
111.	13N 40E 30CAC2	110SKRV	74-07-18	--	159	--	8.0	--	--	--	--
112.	12N 39E 01DBA1	110SKRV	75-06-12	196	132	7.4	10.0	33	99	--	70
115.	12N 40E 17ABC1	110SKRV	75-07-10	230	123	7.8	6.5	38	103	--	73
116.	12N 40E 23ACD1	110SKRV	74-07-18	15	185	--	11.0	--	--	--	--
117.	12N 40E 25CCB1	110SKRV	74-07-18	17	116	--	12.0	--	--	--	--
118.	12N 41E 07BAD1	110SKRV	75-07-11	190	149	7.8	7.0	35	109	--	83
120.	11N 36E 34AAC1	110SKRV	57-05-24	765	336	7.9	10.5	26	206	--	--
		110SKRV	66-09-14	765	333	8.0	11.5	21	205	--	--
122.	11N 41E 07CBA1	110SKRV	57-07-25	8	85	6.5	8.5	26	76	--	--
		110SKRV	74-07-18	--	54	--	12.5	--	--	--	--
123.	10N 30E 32BBC1	110SDMS	78-11-02	102	400	7.3	10.5	11	221	<1	--
127.	10N 36E 21CAD2	110SKRV	57-05-24	610	343	7.9	10.5	35	214	--	--
		110SKRV	66-09-14	--	320	7.7	14.5	--	--	--	--
128.	09N 35E 24AAA1	110SKRV	57-07-26	207	259	7.9	15.0	39	174	--	--
130.	08N 33E 09DAB1	110SKRV	57-05-27	590	305	8.0	14.0	36	201	--	--
131.	08N 33E 09DAC1	110SKRV	70-07-24	185	439	--	13.5	--	--	--	--
		110SKRV	70-09-09	185	435	--	13.0	--	--	--	--
		110SKRV	70-09-10	185	447	7.8	13.0	31	258	--	--
132.	08N 33E 15CAD1	110SKRV	70-07-24	200	1560	--	11.5	--	--	--	--
133.	08N 33E 16ACB1	110SKRV	70-07-24	--	478	--	14.0	--	--	--	--
		110SKRV	70-09-09	--	496	--	13.5	--	--	--	--
		110SKRV	70-09-10	--	488	7.8	14.0	33	271	--	--
134.	08N 33E 19DAC1	110SKRV	70-09-10	--	447	--	--	--	--	--	--
135.	08N 33E 20CBC1	110SKRV	70-07-26	350	474	--	12.0	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
75-09-14	--	.42	1.1	2.8	.6	190	0	50	15	6.0	.2	2.3
75-08-08	--	3.1	4.9	7.0	1.1	91	0	22	8.7	18	.8	1.6
75-09-16	--	<.10	16	36	.5	400	130	95	39	10	.2	2.6
75-10-23	--	3.8	5.3	3.0	.8	190	0	50	17	9.0	.3	2.2
58-11-04	--	--	5.3	11	--	110	3	28	9.5	6.9	.3	.0
50-10-09	--	--	6.8	3.0	.2	200	3	52	16	--	--	--
58-11-04	--	--	1.4	3.2	--	43	0	12	3.2	4.1	.3	.0
58-11-04	--	--	7.2	3.9	--	120	0	35	8.8	4.1	.2	.0
50-10-09	--	--	3.1	2.0	.2	200	3	58	13	--	--	--
76-10-20	--	--	4.2	1.0	.1	160	1	49	10	2.9	.1	1.1
50-10-09	--	310	17	6.0	.2	320	8	85	27	--	--	--
50-10-09	--	--	3.3	1.0	.2	150	0	44	9.8	--	--	--
57-07-24	--	--	4.6	.5	.1	160	4	44	12	.8	.0	.4
50-10-09	--	--	5.1	2.0	.2	220	16	54	21	--	--	--
58-11-18	--	--	1.4	1.4	--	140	0	38	12	.0	.0	.0
50-10-09	--	--	4.1	.0	.2	200	6	--	--	--	--	--
74-07-18	--	.13	5.2	.7	.1	--	--	--	--	--	--	--
75-06-12	--	1.3	4.3	2.6	.1	52	0	11	5.9	4.3	.3	2.0
75-07-10	--	.58	4.6	1.1	.2	53	0	9.7	7.0	3.9	.2	1.7
74-07-18	--	2.4	9.8	11	.1	--	--	--	--	--	--	--
74-07-18	--	1.5	8.7	2.2	<.1	--	--	--	--	--	--	--
75-07-11	--	1.7	4.2	2.6	.2	58	0	13	6.1	3.8	.2	1.8
57-05-24	--	--	9.4	7.0	.2	160	0	45	12	8.3	.3	2.0
66-09-14	--	--	7.0	6.0	.2	170	0	47	12	8.4	.3	1.6
57-07-25	--	--	9.5	.8	.2	38	2	8.0	4.4	3.5	.3	1.8
74-07-18	--	.46	4.3	.8	.2	--	--	--	--	--	--	--
78-11-02	<1	.57	24	6.0	.2	200	30	53	17	6.2	.2	1.2
57-05-24	--	--	7.9	8.0	.2	160	0	40	14	11	.4	2.3
66-09-14	--	--	--	7.5	--	140	0	36	12	12	.4	2.3
57-07-26	--	--	5.5	6.0	.3	110	0	24	10	11	.5	2.2
57-05-27	--	--	12	9.0	.3	130	0	34	12	11	.4	3.0
70-07-24	--	--	--	21	--	--	--	--	--	--	--	--
70-09-09	--	--	--	20	--	--	--	--	--	--	--	--
70-09-10	--	--	26	20	.3	180	16	48	16	17	.6	4.0
70-07-24	--	--	--	320	--	--	--	--	--	--	--	--
70-07-24	--	--	--	48	--	--	--	--	--	--	--	--
70-09-09	--	--	--	52	--	--	--	--	--	--	--	--
70-09-10	--	--	24	47	.4	200	69	55	15	14	.4	5.0
70-09-10	--	--	--	20	--	180	--	--	--	--	--	--
70-07-26	--	--	--	39	--	--	--	--	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA-LINITY FIELD (MG/L AS CACO3)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
75-09-14	200	240	0	12	.020	--
75-08-08	110	130	0	52	.110	--
75-09-16	270	330	0	16	.080	--
75-10-23	200	240	0	7.6	.050	--
58-11-04	110	130	0	8.5	--	--
50-10-09	200	240	0	--	--	--
58-11-04	54	66	0	8.4	--	--
58-11-04	120	150	0	9.5	--	--
50-10-09	200	240	0	--	--	--
76-10-20	160	200	0	5.0	--	--
50-10-09	312	380	0	--	--	--
50-10-09	150	180	0	--	--	--
57-07-24	160	190	0	3.8	--	30
50-10-09	200	250	0	--	--	--
58-11-18	150	180	0	3.6	--	--
50-10-09	200	240	0	--	--	--
74-07-18	--	--	--	--	--	--
75-06-12	57	70	0	4.5	.100	--
75-07-10	60	73	0	1.9	.140	--
74-07-18	--	--	--	--	--	--
74-07-18	--	--	--	--	--	--
75-07-11	68	83	0	2.1	.120	--
57-05-24	160	200	0	4.0	--	30
66-09-14	170	210	0	3.3	--	--
57-07-25	36	44	0	22	--	1400
74-07-18	--	--	--	--	--	--
78-11-02	170	210	0	17	<.010	<10
57-05-24	160	200	0	4.0	--	10
66-09-14	160	190	0	5.9	--	160
57-07-26	120	150	0	3.0	--	80
57-05-27	140	170	0	2.7	--	60
70-07-24	--	--	--	--	--	--
70-09-09	--	--	--	--	--	--
70-09-10	160	200	--	5.0	--	--
70-07-24	--	--	--	--	--	--
70-07-24	--	--	--	--	--	--
70-09-09	--	--	--	--	--	--
70-09-10	130	160	--	4.1	--	--
70-09-10	--	--	--	--	--	--
70-07-26	--	--	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)
136.	08N 33E 21CAB1	110SKRV	70-07-24	--	317	--	13.5	--	--	--	--
137.	08N 33E 28DBD1	110SKRV	70-07-22	232	1140	--	--	--	--	--	--
		110SKRV	70-09-15	232	1120	7.9	10.5	3.6	593	--	--
138.	08N 33E 33DDD1	110SKRV	57-08-08	145	1240	7.7	11.5	39	708	--	--
140.	08N 34E 20CDA2	110SKRV	57-08-28	55	924	7.8	10.0	41	549	--	--
141.	08N 34E 22AAA1	110SKRV	56-07-25	81	276	8.1	13.0	34	173	--	--
142.	08N 34E 33BAD1	110SKRV	57-05-23	40	267	8.0	10.5	38	171	--	--
143.	08N 36E 27DAC1	110SKRV	70-07-27	150	285	--	13.0	--	--	--	--
144.	08N 37E 29CAC1	110SKRV	57-07-26	200	249	7.9	15.0	44	155	--	--
		110SKRV	70-07-27	--	260	--	15.0	--	--	--	--
146.	07N 33E 09BAA1	110SKRV	57-07-22	268	1140	7.7	--	40	663	--	--
149.	07N 33E 13DAC1	110SKRV	70-07-22	285	290	--	--	--	--	--	--
150.	07N 33E 15CDC1	110SKRV	70-07-22	600	338	--	14.0	--	--	--	--
152.	07N 34E 09ABD1	110SKRV	70-07-26	--	330	--	12.0	--	--	--	--
		110SKRV	70-09-15	--	311	--	11.0	--	--	--	--
153.	07N 34E 10CDD1	110SKRV	70-07-26	75	605	--	12.5	--	--	--	--
		110SKRV	70-09-09	75	510	--	11.5	--	--	--	--
		110SKRV	70-09-10	75	523	7.7	11.5	31	295	--	--
154.	07N 34E 23BAB1	110SKRV	57-05-23	26	270	8.0	10.5	36	178	--	--
156.	07N 35E 25CAD1	--	56-07-25	--	251	7.9	12.0	32	164	--	--
162.	07N 36E 08BBC1	110SKRV	57-05-24	200	258	8.0	14.0	34	154	--	--
163.	07N 36E 10AAB1	110SKRV	70-07-27	163	279	--	12.5	--	--	--	--
164.	07N 36E 13AAA1	110SKRV	70-07-26	153	287	--	13.5	--	--	--	--
		110SKRV	70-09-10	153	353	7.9	13.0	33	208	--	--
167.	07N 37E 18CBC1	110SKRV	70-07-26	--	283	--	13.5	--	--	--	--
		110SKRV	70-09-10	--	299	--	13.0	--	--	--	--
168.	07N 38E 23DBA3	110SKRV	60-07-26	202	--	--	12.0	--	--	--	--
171.	07N 39E 35CDD1	112ALVM	76-06-24	24	120	9.0	14.5	.4	56	--	<1
172.	07N 40E 01ADA1	110SKRV	50-08-07	238	--	6.8	11.0	--	--	--	--
		110SKRV	50-08-27	238	--	--	--	--	--	--	--
		110SKRV	57-08-27	238	194	7.4	12.0	40	145	--	--
173.	07N 40E 01ADA2	110SKRV	50-08-07	80	--	--	--	--	--	--	--
177.	07N 40E 05DBC1	110ALVM	76-06-25	39	155	9.6	15.5	.2	79	--	86
178.*	07N 40E 25BBB1	110SKRV	76-06-26	--	219	7.5	14.5	34	138	--	<1
		110SKRV	76-07-22	--	198	7.2	13.5	33	141	--	<1
179.	07N 40E 27CCC1	110SKRV	76-06-26	75	338	7.6	11.0	22	196	--	<1
		110SKRV	76-07-22	75	331	7.6	10.5	20	196	--	<1
180.	07N 40E 33BAA1	110ALVM	76-06-25	--	574	7.4	11.5	28	342	--	813
		110ALVM	76-07-22	--	575	7.5	10.5	26	349	--	<1
182.	07N 40E 34DCD1	110ALVM	76-06-24	78	373	7.8	12.0	22	219	--	<1

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
70-07-24	--	--	--	14	--	--	--	--	--	--	--	--
70-07-22	--	--	--	180	--	--	--	--	--	--	--	--
70-09-15	--	--	110	160	.2	440	260	120	35	45	.9	5.0
57-08-08	--	--	130	210	.1	530	360	140	41	40	.8	6.2
57-08-28	--	--	92	110	.4	270	69	72	23	86	2.3	5.0
56-07-25	--	--	6.3	8.0	.4	110	0	29	9.3	12	.5	1.8
57-05-23	--	--	6.3	8.0	.4	110	0	27	9.7	13	.5	2.5
70-07-27	--	--	--	--	--	--	--	--	--	--	--	--
57-07-26	--	--	4.9	8.0	.9	100	0	26	.8	12	.6	2.6
70-07-27	--	--	--	6.5	--	--	--	--	--	--	--	--
57-07-22	--	--	120	170	.3	440	250	120	35	57	1.2	6.2
70-07-22	--	--	--	8.0	--	--	--	--	--	--	--	--
70-07-22	--	--	--	14	--	--	--	--	--	--	--	--
70-07-26	--	--	--	17	--	--	--	--	--	--	--	--
70-09-15	--	--	--	14	--	--	--	--	--	--	--	--
70-07-26	--	--	--	60	--	--	--	--	--	--	--	--
70-09-09	--	--	--	43	--	--	--	--	--	--	--	--
70-09-10	--	--	26	43	.4	180	24	47	15	32	1.0	4.0
57-05-23	--	--	7.6	8.0	.3	110	0	26	10	15	.6	2.6
56-07-25	--	--	8.9	6.5	.4	110	3	30	7.7	10	.4	2.0
57-05-24	--	--	7.2	6.0	.4	110	0	30	8.8	8.9	.4	2.3
70-07-27	--	--	--	12	--	--	--	--	--	--	--	--
70-07-26	--	--	--	10	--	--	--	--	--	--	--	--
70-09-10	--	--	13	21	1.0	130	4	34	10	20	.8	4.0
70-07-26	--	--	--	8.3	--	--	--	--	--	--	--	--
70-09-10	--	--	--	11	--	--	--	--	--	--	--	--
60-07-26	--	--	--	--	--	--	--	--	--	--	--	--
76-06-24	>80	--	3.2	3.3	.5	36	0	8.8	3.3	10	.7	2.5
50-08-07	--	--	3.1	6.0	1.3	69	0	--	--	--	--	--
50-08-27	--	--	--	--	--	--	--	--	--	--	--	--
57-08-27	--	--	4.9	7.5	2.0	69	0	18	5.8	15	.8	2.4
50-08-07	--	--	3.3	6.0	1.2	73	0	19	6.2	--	--	--
76-06-25	820	--	2.4	8.9	1.1	5	0	2.0	.1	26	4.9	5.4
76-06-26	<1	--	1.7	4.4	1.1	81	0	23	5.8	12	.6	2.3
76-07-22	<1	.97	5.2	6.1	1.2	73	0	21	5.1	12	.6	2.4
76-06-26	<1	--	4.5	3.3	.8	160	0	46	12	9.5	.3	1.7
76-07-22	<1	.75	8.1	5.7	.6	160	3	44	12	7.2	.2	1.7
76-06-25	24	--	6.1	8.2	.7	280	0	73	23	20	.5	3.1
76-07-22	<1	1.4	7.1	14	1.1	270	0	75	20	20	.5	3.1
76-06-24	<1	--	4.9	3.4	.2	190	4	53	14	5.5	.2	1.6

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA-LINITY FIELD (MG/L AS CACO3)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
70-07-24	--	--	--	--	--	--
70-07-22	--	--	--	--	--	--
70-09-15	190	230	--	4.6	--	--
57-08-08	170	210	0	6.7	--	80
57-08-28	200	251	0	6.4	--	40
56-07-25	120	150	0	1.9	--	<10
57-05-23	110	140	0	2.3	--	30
70-07-27	--	--	--	--	--	--
57-07-26	110	140	0	2.7	--	>10
70-07-27	--	--	--	--	--	--
57-07-22	190	230	0	7.3	--	30
70-07-22	--	--	--	--	--	--
70-07-22	--	--	--	--	--	--
70-07-26	--	--	--	--	--	--
70-09-15	--	--	--	--	--	--
70-07-26	--	--	--	--	--	--
70-09-09	--	--	--	--	--	--
70-09-10	160	190	--	6.2	--	--
57-05-23	120	150	0	2.4	--	<10
56-07-25	110	130	--	2.7	--	0
57-05-24	110	140	0	2.2	--	0
70-07-27	--	--	--	--	--	--
70-07-26	--	--	--	--	--	--
70-09-10	120	150	--	3.0	--	--
70-07-26	--	--	--	--	--	--
70-09-10	--	--	--	--	--	--
60-07-26	--	--	--	--	--	--
76-06-24	57	0	34	.1	.020	--
50-08-07	71	86	0	22	--	100
50-08-27	82	10	--	--	--	--
57-08-27	82	100	0	6.5	--	30
50-08-07	79	96	0	--	--	100
76-06-25	54	66	0	.0	.070	--
76-06-26	90	110	0	5.8	.050	--
76-07-22	90	110	0	11	.040	--
76-06-25	160	200	0	8.2	.030	--
76-07-22	160	190	0	7.6	.020	--
76-06-25	300	360	0	23	.020	--
76-07-22	300	370	0	19	.030	--
76-06-24	150	230	0	5.8	.030	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./ 100 ML)
	(cont'd)										
	07N 40E 34DCD1	110ALVM	76-07-20	78	394	7.3	11.0	20	200	--	<1
183.	07N 41E 25CBD1	112HKBR	76-07-20	--	524	7.3	32.0	76	350	--	<1
		112HKBR	77-07-23	--	520	7.6	35.0	--	--	--	--
184.	07N 41E 34ADD1	110SKRV	77-06-16	275	450	7.6	33.0	64	321	--	--
185.	07N 41E 35CDD1	120VLCC	72-08-09	350	529	7.9	36.0	75	357	--	--
		120VLCC	77-06-16	350	535	7.5	32.5	--	--	--	--
186.	07N 41E 35DCD1	120VLCC	77-09-06	400	564	6.5	32.0	71	376	--	--
187.	07N 41E 36DDA2	120VLCC	76-06-24	525	375	7.5	32.0	68	275	--	81
		120VLCC	76-07-20	525	483	7.9	31.0	59	251	--	<1
188.	07N 42E 08CAA1	120VLCC	76-06-22	802	388	7.6	31.5	65	265	--	14
		120VLCC	76-07-19	802	403	7.7	29.0	61	257	--	<1
		120VLCC	77-07-22	802	390	7.5	33.5	--	--	--	--
189.	07N 42E 19BBB1	120VLCC	77-07-23	764	500	7.7	43.5	--	--	--	--
190.	07N 42E 19CCA1	120VLCC	76-06-22	635	394	7.9	24.5	35	236	--	<1
		120VLCC	76-07-19	635	383	7.9	26.0	33	218	--	<1
191.	06N 32E 11ABA1	110SKRV	52-10-31	267	366	7.7	15.5	33	237	--	--
		110SKRV	77-09-07	267	357	8.0	16.0	34	238	--	--
192.	06N 32E 22CAC1	110SKRV	56-07-20	309	366	--	11.0	27	224	--	--
		110SKRV	57-06-21	309	354	8.1	10.0	21	215	--	--
		110SKRV	77-09-05	309	410	8.0	12.0	27	214	--	--
193.	06N 32E 26CAB1	110SKRV	77-09-07	681	179	8.7	16.0	1.0	98	--	--
194.	06N 32E 26CDB1	110SKRV	56-07-18	322	359	8.2	14.5	32	227	--	--
		110SKRV	59-07-22	322	356	7.6	--	31	212	--	--
		110SKRV	59-07-24	322	338	7.4	--	22	202	--	--
		110SKRV	77-09-07	322	353	8.2	14.5	31	231	--	--
195.	06N 32E 36ADD1	110SKRV	52-10-09	310	385	7.3	13.0	28	237	--	--
		110SKRV	52-10-11	310	390	--	12.0	--	--	--	--
		110SKRV	77-09-07	310	337	8.0	12.5	25	211	--	--
196.	06N 33E 02BAB1	110SKRV	57-05-23	245	925	7.8	10.0	36	539	--	--
197.	06N 33E 26DDB1	110SKRV	52-12-18	312	362	7.5	15.5	35	228	--	--
		110SKRV	66-10-10	312	351	7.6	15.5	34	221	--	--
		110SKRV	77-09-07	312	430	7.9	15.5	38	265	--	--
198.*	06N 34E 04AAA1	110SKRV	57-05-27	420	238	9.1	12.0	42	174	--	--
204.	06N 34E 24HBB1	110SKRV	57-05-23	267	459	7.9	10.5	33	264	--	--
206.	06N 35E 26BAC1	110SKRV	57-07-26	327	330	7.9	12.0	39	214	--	--
207.	06N 35E 32CDD1	110SKRV	70-07-28	387	474	--	12.0	--	--	--	--
		110SKRV	70-09-09	387	443	--	12.0	--	--	--	--
208.	06N 35E 33CDA1	110SKRV	70-07-22	400	318	--	13.0	--	--	--	--
		110SKRV	70-09-09	400	328	--	12.0	--	--	--	--
		110SKRV	70-09-10	400	333	7.7	12.5	32	200	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
76-07-20	<1	1.1	8.7	4.9	.3	200	46	52	16	5.4	.2	1.9
76-07-20	<1	.84	26	25	6.2	71	0	23	3.3	88	4.5	12
77-07-23	--	--	--	--	--	--	--	--	--	--	--	--
77-06-16	--	.83	26	22	5.7	87	0	25	5.9	69	3.2	6.9
72-08-09	--	.79	33	24	5.4	96	0	28	6.3	78	3.5	8.6
77-06-16	--	--	--	--	--	--	--	--	--	--	--	--
77-09-06	--	2.0	31	27	5.3	110	0	34	6.9	76	3.1	8.5
76-06-24	81	--	16	12	3.0	90	0	24	7.3	44	2.0	4.9
76-07-20	<1	.71	17	14	2.9	95	0	25	8.0	47	2.1	5.2
76-06-22	>160	--	8.8	14	2.0	150	0	38	14	22	.8	4.8
76-07-19	<1	1.5	10	18	2.1	150	17	40	13	22	.8	5.7
77-07-22	--	--	--	--	--	--	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--	--	--	--	--	--	--
76-06-22	81	--	24	21	2.1	160	25	34	19	15	.5	2.1
76-07-19	<1	1.3	22	24	2.2	160	39	35	17	15	.5	2.2
52-10-31	--	--	30	11	.5	160	12	39	15	15	.5	3.5
77-09-07	--	--	29	13	.5	160	8	39	14	15	.5	3.6
56-07-20	--	--	29	7.2	.2	180	32	46	15	7.0	.2	2.9
57-06-21	--	--	29	6.5	.3	170	22	43	15	7.1	.2	3.1
77-09-05	--	--	34	21	.2	190	33	49	16	12	.4	3.8
77-09-07	--	--	<1.0	8.6	.4	63	0	5.4	12	14	.8	3.5
56-07-18	--	--	30	11	.4	150	11	37	15	14	.5	3.1
59-07-22	--	--	28	9.5	.4	150	19	34	15	13	.5	3.2
59-07-24	--	--	28	9.5	.4	140	7	33	14	13	.5	3.8
77-09-07	--	--	29	16	.5	150	15	37	15	15	.5	3.5
52-10-09	--	--	19	7.0	.1	170	0	34	21	11	.4	15
52-10-11	--	--	--	--	--	--	--	--	--	--	--	--
77-09-07	--	--	26	7.9	.2	140	3	29	17	13	.5	9.1
57-05-23	--	--	70	82	.2	370	91	90	36	50	--	6.4
52-12-18	--	--	25	13	.8	140	0	36	.1	24	1.1	4.3
66-10-10	--	--	26	19	.8	120	0	31	11	22	--	4.9
77-09-07	--	--	29	43	.8	160	32	39	14	25	.9	5.4
57-05-27	--	--	9.5	6.0	.5	2	0	.8	.1	53	15	1.8
57-05-23	--	--	12	18	.3	190	0	50	17	20	.6	4.6
57-07-26	--	--	14	17	.5	130	1	37	9.7	16	.6	2.6
70-07-28	--	--	--	37	--	--	--	--	--	--	--	--
70-09-09	--	--	--	32	--	--	--	--	--	--	--	--
70-07-22	--	--	--	12	--	--	--	--	--	--	--	--
70-09-09	--	--	--	13	--	--	--	--	--	--	--	--
70-09-10	--	--	9.0	13	.7	130	0	36	10	16	.6	4.0

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA-LINITY FIELD (MG/L AS CACO3)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
76-07-20	148	180	0	15	.020	--
76-07-20	150	180	0	4.6	.010	--
77-07-23	--	--	--	--	--	--
77-06-16	160	200	0	8.0	.020	--
72-08-09	200	240	0	4.8	.020	--
77-06-16	--	--	--	--	--	--
77-09-06	190	230	0	104	.020	<10
76-06-24	160	190	0	9.5	.050	--
76-07-20	120	150	0	3.0	.010	--
76-06-22	160	200	0	8.2	.020	--
76-07-19	140	170	0	5.3	.010	--
77-07-22	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--
76-06-22	140	170	0	3.4	.020	--
76-07-19	110	140	0	2.9	.020	--
52-10-31	150	180	--	5.7	--	60
77-09-07	150	180	0	2.9	--	<10
56-07-20	150	180	--	--	--	20
57-06-21	150	180	0	2.3	--	0
77-09-05	150	190	0	3.0	--	<10
77-09-07	86	95	5	.3	--	<10
56-07-18	140	170	--	1.7	--	0
59-07-22	130	160	E0	6.6	--	--
59-07-24	130	160	E0	10	--	80
77-09-07	140	170	0	1.7	--	30
52-10-09	170	210	0	17	--	40
52-10-11	160	200	--	--	--	--
77-09-07	140	170	0	2.7	--	20
57-05-23	280	340	0	--	--	--
52-12-18	150	180	0	9.1	--	20
66-10-10	120	150	0	--	--	--
77-09-07	120	150	0	3.0	--	60
57-05-27	100	91	17	.2	--	10
57-05-23	200	250	0	5.1	--	60
57-07-26	130	160	--	3.2	--	20
70-07-28	--	--	--	--	--	--
70-09-09	--	--	--	--	--	--
70-07-22	--	--	--	--	--	--
70-09-09	--	--	--	--	--	--
70-09-10	130	160	--	5.2	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)
210.	06N 36E 27BAA1	110SKRV	60-07-26	228	--	--	15.5	--	--	--	--
211.	06N 38E 34BDB1	110SKRV	57-07-21	E55	404	8.0	10.5	32	252	--	--
212.	06N 39E 12BBA1	110ALVM	76-07-20	27	359	7.2	11.0	28	191	--	<1
213.	06N 39E 12BBA2	--	76-06-25	--	375	7.2	12.5	31	218	--	<1
214.	06N 39E 16DAA1	111ALVM	76-06-23	26	180	7.3	14.5	1.7	101	--	86
216.	06N 39E 28BBB1	110ALVM	76-06-23	26	162	8.8	11.0	.3	83	--	84
218.	06N 39E 35CBB2	111ALVM	76-06-23	27	482	7.3	11.5	16	273	--	--
219.	06N 40E 04CCD1	110SKRV	78-06-28	195	443	7.8	10.0	21	248	--	--
221.	06N 40E 13ADA1	--	77-07-15	--	340	7.1	9.5	28	231	--	--
222.*	06N 40E 15AAA1	110ALVM	76-06-24	55	330	7.5	10.5	18	180	--	<1
		110ALVM	76-07-20	55	333	7.3	11.0	17	173	--	<1
223.*	06N 40E 18AAD1	110ALVM	76-06-25	63	370	7.6	12.0	28	220	--	<1
225.	06N 40E 29CCD1	110SKRV	70-07-28	363	347	--	15.0	--	--	--	--
		110SKRV	70-09-15	363	346	--	14.5	--	--	--	--
226.	06N 40E 30BDA1	110SKRV	57-08-27	172	394	7.8	12.0	26	237	--	--
227.	06N 40E 31BDB1	110SKRV	70-07-28	136	345	--	15.5	--	--	--	--
228.	06N 40E 31DAA1	110SKRV	77-07-23	317	350	7.8	16.5	--	--	--	--
230.	06N 40E 35BDD1	--	77-06-16	--	415	7.7	13.0	33	254	--	--
231.	06N 41E 10DBB1	--	77-06-16	--	470	7.6	26.5	80	352	--	--
232.	06N 41E 11CDB1	110VLCC	77-06-17	489	435	7.7	21.5	--	--	--	--
233.	06N 41E 14CAD1	--	77-07-23	--	420	7.6	19.0	--	--	--	--
235.	06N 41E 31AAC1	--	77-07-23	--	320	7.6	14.5	--	--	--	--
237.	05N 32E 36ADD1	110SKRV	52-06-02	405	340	--	13.5	--	--	--	--
		110SKRV	52-06-03	405	315	7.7	13.0	20	188	--	--
		110SKRV	52-06-12	405	244	--	12.0	--	--	--	--
		110SKRV	52-09-18	405	182	--	15.5	--	--	--	--
		110SKRV	52-10-11	405	287	--	13.0	--	--	--	--
		110SKRV	52-10-19	405	317	--	13.0	--	--	--	--
		110SKRV	61-07-28	405	--	--	12.0	--	--	--	--
		110SKRV	66-10-10	405	231	8.4	12.0	1.0	103	--	--
		110SKRV	77-09-13	405	--	--	--	--	--	--	--
238.	05N 33E 10CDC1	110SKRV	53-07-11	429	344	7.9	15.5	37	222	--	--
		110SKRV	77-09-13	--	--	--	--	--	--	--	--
239.	05N 33E 13BDC1	110SKRV	53-04-22	405	312	8.4	14.5	39	--	--	--
		110SKRV	53-04-27	405	358	7.9	14.0	35	232	--	--
		110SKRV	61-07-27	405	--	--	14.5	--	--	--	--
240.	05N 33E 17ADD1	110SKRV	53-02-21	334	331	7.8	14.5	35	--	--	--
		110SKRV	77-09-13	--	--	--	--	--	--	--	--
241.	05N 33E 23DDA1	110SKRV	70-07-26	374	435	--	11.0	--	--	--	--
		110SKRV	77-09-13	374	--	--	--	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLIFORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLORIDE, DIS-SOLVED (MG/L AS CL)	FLUORIDE, DIS-SOLVED (MG/L AS F)	HARDNESS (MG/L AS CACO3)	HARDNESS, NONCARBONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNESIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORPTION RATIO	POTASSIUM, DIS-SOLVED (MG/L AS K)
60-07-26	--	--	--	--	--	--	--	--	--	--	--	--
57-07-21	--	--	17	11	1.1	140	0	35	13	31	1.1	4.0
76-07-20	<1	1.8	10	6.8	1.1	170	40	45	13	9.0	.3	4.1
76-06-25	81	--	9.3	6.2	1.2	160	0	47	11	11	.4	5.7
76-06-23	>80	--	2.3	4.0	.7	66	0	22	7.8	6.2	.3	2.3
76-06-23	820	--	2.9	3.9	.2	40	0	4.3	7.1	13	.9	6.6
76-06-23	--	3.3	9.8	6.1	.3	220	0	50	23	9.4	.3	4.8
78-06-28	--	2.1	10	3.4	.1	220	16	59	18	6.6	.2	2.1
77-07-15	--	--	6.7	12	.2	180	0	50	13	11	.4	2.5
76-06-24	<1	--	9.3	2.7	.2	160	0	42	14	4.4	.2	1.4
76-07-20	<1	.92	6.4	3.1	.3	170	36	46	13	4.5	.2	1.4
76-06-25	<1	--	12	2.5	.2	180	1	47	16	4.5	.1	2.0
70-07-28	--	--	--	8.8	--	--	--	--	--	--	--	--
70-09-15	--	--	--	9.5	--	--	--	--	--	--	--	--
57-08-27	--	--	10	6.5	.3	200	11	53	16	8.3	.3	2.4
70-07-28	--	--	--	10	--	--	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--	--	--	--	--	--	--
77-06-16	--	3.2	13	21	.4	200	28	47	19	13	.4	2.6
77-06-16	--	1.1	26	25	4.5	110	0	31	7.6	70	2.9	8.5
77-06-17	--	--	--	--	--	--	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--	--	--	--	--	--	--
52-06-02	--	--	24	14	--	130	7	38	9.6	--	--	--
52-06-03	--	--	25	14	.3	130	13	33	11	15	.6	3.6
52-06-12	--	--	--	13	--	80	0	17	9.1	--	--	--
52-09-18	--	--	24	14	--	44	0	7.7	6.0	--	--	--
52-10-11	--	--	--	--	--	110	12	29	8.5	--	--	--
52-10-19	--	--	--	--	--	130	15	34	10	--	--	--
61-07-28	--	--	--	--	--	--	--	--	--	--	--	--
66-10-10	--	--	.2	16	.2	50	0	11	5.4	15	.9	5.0
77-09-13	--	--	1.3	12	<.1	60	0	13	6.2	14	.8	4.4
53-07-11	--	--	24	10	.6	140	1	36	13	14	.5	3.3
77-09-13	--	--	23	14	.4	130	0	34	11	16	.6	3.5
53-04-22	--	--	28	14	.7	120	5	26	13	17	.7	3.6
53-04-27	--	--	27	14	.6	140	1	36	13	18	.7	4.1
61-07-27	--	--	--	--	--	--	--	--	--	--	--	--
53-02-21	--	--	25	9.0	.5	140	6	33	14	15	.6	3.6
77-09-13	--	--	21	11	.5	140	0	34	12	14	.6	3.6
70-07-26	--	--	--	27	--	--	--	--	--	--	--	--
77-09-13	--	--	30	37	.4	170	38	43	14	19	.7	4.2

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA-LINITY FIELD (MG/L AS CACO3)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
60-07-26	--	--	--	--	--	--
57-07-21	180	220	0	3.5	--	10
76-07-20	120	150	0	16	.090	--
76-06-25	160	200	0	21	.200	--
76-06-23	98	120	0	9.4	.020	--
76-06-23	74	66	12	.2	.020	--
76-06-23	250	300	0	24	1.70	--
78-06-28	210	250	0	6.3	.020	--
77-07-15	180	220	0	25	.070	--
76-06-24	160	200	0	10	.020	--
76-07-20	130	160	0	13	.020	--
75-06-25	180	220	0	8.9	.040	--
70-07-28	--	--	--	--	--	--
70-09-15	--	--	--	--	--	--
57-08-27	190	230	0	6.0	--	40
70-07-28	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--
77-06-16	170	210	0	6.7	.020	--
77-06-16	180	220	0	6.8	.010	--
77-06-17	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--
77-07-23	--	--	--	--	--	--
52-06-02	120	150	E0	--	--	--
52-06-03	110	140	0	4.5	--	--
52-06-12	80	90	4	--	--	--
52-09-18	48	58	E0	--	--	--
52-10-11	98	120	--	--	--	--
52-10-19	110	140	--	--	--	--
61-07-28	110	140	--	--	--	--
66-10-10	82	100	4	.7	--	--
77-09-13	79	95	0	--	--	--
53-07-11	140	170	0	3.4	--	50
77-09-13	130	160	0	--	--	--
53-04-22	--	--	--	--	--	20
53-04-27	140	170	0	3.5	--	30
61-07-27	--	--	--	--	--	--
53-02-21	--	0	0	.0	--	--
77-09-13	140	170	0	--	--	--
70-07-26	--	--	--	--	--	--
77-09-13	130	160	0	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)
242.	05N 33E 35DAA1	110SKRV	53-08-03	516	567	7.8	13.0	34	322	--	--
243.	05N 34E 09BDA1	110SKRV	50-02-03	--	1000	7.8	12.0	31	541	--	--
		110SKRV	52-11-07	--	966	7.6	11.0	--	--	--	--
		110SKRV	52-11-08	322	963	7.7	11.0	29	511	--	--
		110SKRV	52-12-17	--	953	7.5	11.0	--	--	--	--
		110SKRV	77-09-13	--	--	--	--	--	--	--	--
244.	05N 34E 29DAA1	110SKRV	53-04-25	423	310	8.4	11.0	39	--	--	--
		110SKRV	77-09-13	423	--	--	--	--	--	--	--
245.*	05N 37E 08CCC1	110SKRV	57-07-22	196	390	8.1	9.0	48	266	--	--
248.*	05N 37E 32DDB1	110ALVM	76-06-26	21	585	7.3	9.5	36	371	--	<1
		110ALVM	76-07-21	21	576	7.3	11.5	33	324	--	<1
249.	05N 37E 33BDC1	110SDMS	76-06-26	105	660	7.5	9.5	44	378	--	B1
		110SDMS	76-07-21	105	646	7.5	10.5	42	398	--	<1
251.	05N 38E 09DDC1	110SKRV	70-07-22	--	516	--	--	--	--	--	--
253.	05N 38E 15CCC1	110SKRV	57-05-22	90	507	7.7	10.0	25	697	--	--
254.	05N 38E 16ADA1	110SKRV	70-07-22	40	590	--	--	--	--	--	--
255.	05N 38E 22CBB2	110ALVM	76-06-27	30	605	7.4	11.0	16	350	--	<1
		110ALVM	76-07-22	30	529	7.3	11.5	14	323	--	<1
256.	05N 38E 24BCC1	110ALVM	76-07-23	21	429	8.2	11.5	11	274	--	--
257.	05N 38E 31BBB1	110ALVM	76-06-26	--	513	7.6	9.5	29	309	--	<1
		110ALVM	76-07-21	--	502	7.4	11.0	26	282	--	<1
258.	05N 38E 31BBC1	--	76-06-26	--	473	7.4	9.5	15	260	--	85
261.	05N 39E 05BBA1	110ALVM	76-07-23	12	493	7.3	11.5	25	315	--	--
262.*	05N 39E 08ABC1	110ALVM	76-06-23	35	499	7.4	9.5	14	291	--	B2
		110ALVM	76-07-20	35	524	7.6	10.5	13	274	--	B1
263.	05N 39E 08DAD1	111ALVM	76-06-23	27	515	7.6	10.5	9.0	369	--	<1
265.	05N 40E 08BCC1	110SKRV	77-06-15	372	344	7.6	26.0	50	228	--	--
266.	05N 40E 12CAA1	--	77-07-23	--	300	7.5	20.5	--	--	--	--
268.	04N 35E 14DBC1	110SKRV	70-07-20	505	428	--	11.5	--	--	--	--
269.	04N 35E 15DBA1	110SKRV	70-07-22	495	274	--	--	--	--	--	--
		110SKRV	70-09-09	495	276	7.9	13.0	34	174	--	--
270.	04N 36E 01DAC1	110SKRV	57-06-11	942	454	8.0	10.5	36	293	--	--
271.	04N 36E 14ACA1	110SKRV	70-07-23	386	529	--	11.5	--	--	--	--
272.	04N 36E 25DAB1	110SKRV	70-07-21	430	486	--	11.5	--	--	--	--
273.	04N 36E 27CAB1	110SKRV	70-07-23	--	507	--	11.0	--	--	--	--
275.	04N 36E 32CDA1	110SKRV	70-07-23	412	507	--	11.0	--	--	--	--
276.	04N 36E 34DAC1	110SKRV	70-07-23	580	517	--	10.5	--	--	--	--
279.	04N 37E 31BBD1	110SKRV	70-07-21	454	494	--	--	--	--	--	--
280.	04N 37E 32BDC1	110SKRV	57-08-28	380	500	7.7	10.5	24	299	--	--
281.	04N 37E 35CBD1	110SKRV	70-07-21	220	480	--	--	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI- FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM AD- SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)
53-08-03	--	--	32	69	.6	200	69	51	19	33	1.0	5.1
50-02-03	--	--	59	174	.3	400	250	100	36	42	.9	8.8
52-11-07	--	--	--	--	--	--	--	--	--	--	--	--
52-11-08	--	--	57	160	.3	370	210	93	33	42	1.0	6.8
52-12-17	--	--	--	--	--	--	--	--	--	--	--	--
77-09-13	--	--	39	68	.2	250	37	64	22	44	1.2	5.9
53-04-25	--	--	19	32	.5	120	26	26	13	15	.6	3.3
77-09-13	--	--	21	34	.4	170	30	45	13	19	.7	3.6
57-07-22	--	--	29	12	1.1	160	4	45	11	18	.6	5.8
76-06-26	<1	--	28	7.3	1.2	230	0	62	18	41	1.2	3.4
76-07-21	<1	.14	30	9.8	1.1	230	9	64	16	40	1.2	3.5
76-06-26	82	--	90	25	.8	300	62	82	23	26	.7	5.4
76-07-21	20	<.10	86	27	.8	290	110	81	21	26	.7	5.7
70-07-22	--	--	--	21	--	--	--	--	--	--	--	--
57-05-22	--	--	50	13	.4	240	43	68	16	14	.4	2.8
70-07-22	--	--	--	39	--	--	--	--	--	--	--	--
76-06-27	<1	--	64	17	.5	310	82	84	24	14	.3	2.3
76-07-22	<1	1.4	48	12	.5	250	15	70	19	12	.3	2.2
76-07-23	--	.59	38	10	.4	210	0	62	14	10	.3	2.2
76-06-26	<1	--	42	9.7	.5	240	30	68	13	13	.4	3.2
76-07-21	<1	.81	45	12	.5	240	75	67	18	13	.4	3.4
76-06-26	>80	--	39	8.8	.4	230	54	65	17	10	.3	2.3
76-07-23	--	.71	34	8.8	.6	260	18	69	21	9.9	.3	2.3
76-06-23	83	--	49	10	.4	240	36	65	18	12	.3	2.4
76-07-20	<1	1.5	51	12	.4	240	86	69	17	12	.3	2.4
76-06-23	<1	--	47	11	.4	230	0	55	22	23	.7	3.5
77-06-15	--	.81	12	12	1.7	130	0	33	11	20	.8	3.9
77-07-23	--	--	--	--	--	--	--	--	--	--	--	--
70-07-20	--	--	--	9.4	--	--	--	--	--	--	--	--
70-07-22	--	--	--	6.8	--	--	--	--	--	--	--	--
70-09-09	--	--	7.0	6.4	1.0	110	0	30	8.0	13	.6	4.0
57-06-11	--	--	62	17	.4	190	46	53	15	15	.5	4.4
70-07-23	--	--	--	12	--	--	--	--	--	--	--	--
70-07-21	--	--	--	12	--	--	--	--	--	--	--	--
70-07-23	--	--	--	14	--	--	--	--	--	--	--	--
70-07-23	--	--	--	14	--	--	--	--	--	--	--	--
70-07-23	--	--	--	14	--	--	--	--	--	--	--	--
70-07-21	--	--	--	12	--	--	--	--	--	--	--	--
57-08-28	--	--	43	12	.3	230	30	66	16	15	.4	3.0
70-07-21	--	--	--	11	--	--	--	--	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA-LINITY FIELD (MG/L AS CACO3)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOS-PHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
53-08-03	130	160	0	4.2	--	110
50-02-03	150	180	0	4.7	--	240
52-11-07	150	190	--	7.5	--	--
52-11-08	150	190	--	5.9	--	120
52-12-17	--	--	--	--	--	--
77-09-13	210	260	0	--	--	--
53-04-25	--	--	--	--	--	30
77-09-13	140	170	0	--	--	--
57-07-22	160	190	0	2.4	--	90
76-06-26	290	360	0	29	.030	--
76-07-21	210	260	0	21	.040	--
76-06-26	240	290	0	12	.040	--
76-07-21	180	220	0	11	.060	--
70-07-22	--	--	--	--	--	--
57-05-22	200	240	0	7.6	--	<10
70-07-22	--	--	--	--	--	--
76-06-27	230	280	0	18	.010	--
76-07-22	240	290	0	23	.010	--
76-07-23	210	260	0	2.6	.020	--
76-06-26	210	260	0	10	.030	--
76-07-21	160	200	0	13	.020	--
76-06-26	170	210	0	14	.010	--
76-07-23	240	290	0	23	.010	--
76-06-23	200	240	0	16	.010	--
76-07-20	160	190	0	7.6	<.010	--
76-06-23	330	400	0	16	4.50	--
77-06-15	140	170	0	6.8	.010	--
77-07-23	--	--	--	--	--	--
70-07-20	--	--	--	--	--	--
70-07-22	120	150	--	--	--	--
70-09-09	120	150	--	2.9	--	<10
57-06-11	150	180	0	2.9	--	10
70-07-23	--	--	--	--	--	--
70-07-21	--	--	--	--	--	--
70-07-23	--	--	--	--	--	--
70-07-23	--	--	--	--	--	--
70-07-23	--	--	--	--	--	--
70-07-21	--	--	--	--	--	--
57-08-28	200	240	0	7.8	--	40
70-07-21	--	--	--	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI- FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE- CIFIC CON- DUCT- ANCE (UMHOS)	PH (UNITS)	TEMPER- ATURE (DEG C)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	COLI- FORM, FECAL, 0.45 UM-MF (COLS./ 100 ML)
290.	03N 34E 32BBC1	110SKRV	50-11-04	786	269	7.3	12.0	40	186	--	--
		110SKRV	52-10-16	786	275	7.8	12.0	32	182	--	--
		110SKRV	77-09-14	786	--	--	--	--		--	--
291.	03N 35E 02BCB1	110SKRV	70-07-17	690	518	--	10.5	--	--	--	--
292.	03N 35E 14DDC1	110SKRV	70-07-20	--	517	--	10.5	--	--	--	--
293.	03N 36E 08BAD1	110SKRV	70-07-16	470	504	--	10.5	--	--	--	--
294.	03N 36E 14ACA1	110SKRV	70-07-16	--	505	--	10.0	--	--	--	--
		110SKRV	70-09-10	--	512	7.8	10.0	20	294	--	--
295.	03N 36E 17ACD1	110SKRV	70-07-14	493	500	--	10.5	--	--	--	--
296.	03N 36E 18BAB1	110SKRV	70-07-14	500	518	--	11.0	--	--	--	--
		110SKRV	70-09-23	500	515	--	10.0	--	--	--	--
297.	03N 36E 19ADA1	110SKRV	70-07-17	556	505	--	--	--	--	--	--
		110SKRV	70-09-10	556	516	7.8	10.5	20	295	--	--
298.	03N 36E 20CDB1	110SKRV	70-07-14	--	501	--	10.5	--	--	--	--
		110SKRV	70-09-23	--	453	--	10.0	--	--	--	--
299.	03N 36E 32DDC1	110SKRV	57-06-11	438	507	7.9	10.5	29	311	--	--
300.*	03N 37E 02AAA1	110SKRV	76-06-27	165	465	7.5	11.5	18	282	--	<1
		110SKRV	76-07-21	165	475	7.7	13.5	16	254	--	<1
301.	03N 37E 05CDA1	110SKRV	57-06-11	470	502	7.9	10.5	23	304	--	--
302.	03N 37E 18BBA1	110SKRV	70-07-16	--	500	--	11.0	--	--	--	--
304.	03N 37E 31DBC1	110SKRV	70-07-16	360	539	--	10.5	--	--	--	--
		110SKRV	70-09-10	360	556	7.7	10.5	20	318	--	--
308.	03N 40E 02CCC1	112ALVM	57-07-22	202	550	7.6	10.0	19	323	--	--
309.	03N 40E 05CAD1	110SKRV	57-08-29	142	526	7.8	10.5	24	319	--	--
310.	02N 35E 02BBC1	110SKRV	52-05-28	682	531	7.7	10.5	22	316	--	--
		110SKRV	52-05-30	682	535	7.8	10.0	22	322	--	--
		110SKRV	52-05-31	682	530	7.8	10.0	21	319	--	--
313.	02N 36E 18CDA1	110SKRV	70-07-14	476	509	--	10.0	--	--	--	--
314.	02N 36E 23DAA1	110SKRV	70-07-14	--	54	--	11.0	--	--	--	--
		110SKRV	70-09-11	--	563	7.8	10.5	20	327	--	--
315.	02N 36E 24BDA1	110SKRV	70-07-13	335	539	--	11.0	--	--	--	--
		110SKRV	70-09-16	335	534	--	10.0	--	--	--	--
318.*	02N 37E 14CCC1	110SKRV	72-08-17	168	581	7.5	11.5	25	450	--	--
		110SKRV	73-03-14	168	605	7.6	12.0	24	342	--	--
		110SKRV	77-08-16	168	580	7.3	13.0	25	347	--	--
321.*	02N 37E 24ADD1	110SKRV	51-04-06	378	--	7.8	10.0	25	--	--	--
322.	02N 37E 28AAA1	110SKRV	77-08-16	152	559	7.6	15.0	20	333	--	--
329.	02N 38E 17CCB1	110SKRV	61-04-06	1630	--	--	--	22	--	--	--
330.	02N 38E 18CBC1	110SKRV	51-04-06	394	--	8.3	10.0	27	--	--	--
331.	02N 38E 19DBB1	110SKRV	61-04-06	400	--	7.8	10.5	27	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
50-11-04	--	--	11	8.2	1.0	110	0	28	9.5	15	.6	1.6
52-10-16	--	--	13	8.2	.9	100	0	26	9.3	18	.8	2.3
77-09-14	--	--	55	7.7	.9	100	0	26	8.4	16	.7	2.6
70-07-17	--	--	--	21	--	--	--	--	--	--	--	--
70-07-20	--	--	--	14	--	--	--	--	--	--	--	--
70-07-16	--	--	--	14	--	--	--	--	--	--	--	--
70-07-16	--	--	--	14	--	--	--	--	--	--	--	--
70-09-10	--	--	47	13	.4	230	41	62	17	17	.5	4.0
70-07-14	--	--	--	15	--	--	--	--	--	--	--	--
70-07-14	--	--	--	16	--	--	--	--	--	--	--	--
70-09-23	--	--	--	14	--	--	--	--	--	--	--	--
70-07-17	--	--	--	15	--	--	--	--	--	--	--	--
70-09-10	--	--	48	13	--	220	31	62	17	17	.5	4.0
70-07-14	--	--	--	14	--	--	--	--	--	--	--	--
70-09-23	--	--	--	14	--	--	--	--	--	--	--	--
57-06-11	--	--	54	21	.5	220	42	57	19	19	.6	3.7
76-06-27	<1	--	37	8.5	.4	240	36	67	17	12	.3	2.5
76-07-21	<1	1.4	37	11	.4	220	65	63	16	11	.3	2.6
57-06-11	--	--	48	13	.4	230	33	64	18	15	.4	2.8
70-07-16	--	--	--	13	--	--	--	--	--	--	--	--
70-07-16	--	--	--	16	--	--	--	--	--	--	--	--
70-09-10	--	--	49	15	--	240	27	62	21	21	.6	4.0
57-07-22	--	--	47	14	.3	260	39	75	13	14	.4	3.6
57-08-29	--	--	49	18	.4	230	33	67	15	22	.6	3.8
52-05-28	--	--	53	16	.2	230	30	63	19	19	.5	3.6
52-05-30	--	--	54	17	.2	240	43	67	18	20	--	3.6
52-05-31	--	--	54	16	.3	240	35	67	18	19	.5	3.6
70-07-14	--	--	--	18	--	--	--	--	--	--	--	--
70-07-14	--	--	--	15	--	--	--	--	--	--	--	--
70-09-11	--	--	44	13	.4	249	23	67	20	20	.6	4.0
70-07-13	--	--	--	16	--	--	--	--	--	--	--	--
70-09-16	--	--	--	12	--	--	--	--	--	--	--	--
72-08-17	--	1.9	45	11	.5	270	21	71	22	19	.5	3.6
73-03-14	--	1.9	40	11	.4	270	21	71	22	18	.5	3.5
77-08-16	--	2.4	42	11	.4	270	23	73	21	19	.5	3.5
51-04-06	--	--	40	18	<.1	260	63	67	22	--	--	--
77-08-16	--	1.9	41	11	.3	260	27	73	20	18	.5	3.6
61-04-06	--	--	44	22	.1	190	38	50	15	--	--	--
51-04-06	--	--	43	17	.1	240	76	61	21	--	--	--
61-04-06	--	--	47	20	<.1	260	61	65	22	--	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKALINITY FIELD (MG/L AS CACO3)	BICARBONATE FET-FLD (MG/L AS HCO3)	CARBONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2)	PHOSPHORUS, TOTAL (MG/L AS P)	IRON, DIS-SOLVED (UG/L AS FE)
50-11-04	120	150	0	12	--	140
52-10-16	120	140	--	3.7	--	80
77-09-14	110	140	0	--	--	--
70-07-17	--	--	--	--	--	--
70-07-20	--	--	--	--	--	--
70-07-16	--	--	--	--	--	--
70-07-16	--	--	--	--	--	--
70-09-10	190	230	--	6.0	--	--
70-07-14	--	--	--	--	--	--
70-07-14	--	--	--	--	--	--
70-09-23	--	--	--	--	--	--
70-07-17	--	--	--	--	--	--
70-09-10	190	230	--	5.9	--	--
70-07-14	--	--	--	--	--	--
70-09-23	--	--	--	--	--	--
57-06-11	180	220	0	4.4	--	0
76-06-27	200	250	0	12	.020	--
76-07-21	160	190	0	6.2	.010	--
57-06-11	200	240	0	4.8	--	<10
70-07-16	--	--	--	--	--	--
70-07-16	--	--	--	--	--	--
70-09-10	210	260	--	8.3	--	--
57-07-22	220	270	0	11	--	10
57-08-29	200	240	0	6.1	--	10
52-05-28	200	250	0	8.0	--	160
52-05-30	200	240	0	--	--	--
52-05-31	200	250	E0	6.3	--	--
70-07-14	--	--	--	--	--	--
70-07-14	--	--	--	--	--	--
70-09-11	230	280	--	7.0	--	--
70-07-13	--	--	--	--	--	--
70-09-16	--	--	--	--	--	--
72-08-17	250	300	0	15	.030	--
73-03-14	250	300	0	12	.030	--
77-08-16	250	300	0	24	.050	<10
51-04-06	200	240	E0	6.0	--	50
77-08-16	240	290	0	12	.360	<10
61-04-06	160	150	20	--	--	180
51-04-06	190	200	16	1.8	--	150
61-04-06	200	240	0	6.1	--	>50

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

WELL IDENTI-FICATION NUMBER	WELL LOCATION	AQUIFER	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (UNITS)	TEMPER-ATURE (DEG C)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	COLI-FORM, FECAL, 0.45 UM-MF (COLS./100 ML)
335.	02N 39E 30ADA1	110SKRV	70-07-16	--	586	--	20.0	--	--	--	--
336.	01N 36E 12DCD1	110SKRV	77-08-18	150	631	7.3	15.0	28	475	--	--
338.*	01N 38E 09BCB1	110SKRV	77-08-17	183	618	7.5	18.0	30	372	--	--

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	COLI-FORM, TOTAL, IMMED. (COLS. PER 100 ML)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG)	SODIUM, DIS-SOLVED (MG/L AS NA)	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)
70-07-16	--	--	--	57	--	--	--	--	--	--	--	--
77-08-18	--	13	72	49	.4	340	82	87	29	42	1.0	4.9
77-08-17	--	2.7	38	15	.3	280	13	74	24	21	.5	4.9

TABLE C.--HISTORIC WATER-QUALITY DATA--Continued

DATE OF SAMPLE	ALKA- LINITY FIELD (MG/L AS CACO3)	BICAR- BONATE FET-FLD (MG/L AS HCO3)	CAR- BONATE FET-FLD (MG/L AS CO3)	CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2)	PHOS- PHORUS, TOTAL (MG/L AS P)	IRON, DIS- SOLVED (UG/L AS FE)
70-07-16	--	--	--	--	--	--
77-08-18	250	310	0	25	.040	<10
77-08-17	270	330	0	17	.030	40