UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

THE QUALITY OF GROUND WATER IN THE PRINCIPAL AQUIFERS OF NORTHEASTERN-NORTH CENTRAL WASHINGTON

By J. C. Ebbert

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WILLIAM P. CLARK, Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information write to:

District Chief
U.S. Geological Survey
1201 Pacific Avenue - Suite 600
Tacoma, Washington 98402-4384

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METRIC CONVERSION FACTORS

Multiply	By	To obtain
feet (ft)	0.3048	meters (m)
miles (mi)	1.609	kilometers (km)
acre-feet (acre-ft)	0.001233	cubic hectometers (hm^3)
micromho per centimeter at 25° Celsius (µmhos/cm at 25°C)	1.000	microsiemen per centimeter at 25° Celsius (µS/cm at 25°C)
degrees Fahrenheit, (°F)	0.5556, after subtracting 32 degrees	degrees Celsius (°C)

OTHER CONVERSION FACTORS

nitrate mg/L as NO_3	0.2258	nitrate mg/L as N

National Geodetic Vertical Datum of 1929 (NGVD 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. NGVD of 1929 is referred to as sea level in the text of this report and as NGVD in automatic-data-processed tables.

THE QUALITY OF GROUND WATER IN THE PRINCIPAL AQUIFERS OF NORTHEASTERN-NORTH CENTRAL WASHINGTON

By J. C. Ebbert

ABSTRACT

The quality of ground water in major aquifers in northeastern-north central Washington was assessed in terms of inorganic chemical, trace-metal, and fecal-coliform concentrations. For the Spokane Valley aquifer some organic chemical data were also included. Results of this assessment indicate that the ground water in the region is generally suitable for most uses.

With some exceptions, ground water in the region can be characterized as moderately hard to hard calcium-magnesium-bicarbonate-type water. Median nitrate concentrations ranged from 0.14 to 2.4 milligrams per liter. Constituent concentrations that exceeded limits recommended by U.S. Environmental Protection Agency secondary drinking water regulations were found in ground-water samples from 8 of the 11 aquifers sampled; however, the incidence of such samples was sporadic and did not reflect general ground-water-quality degradation. Iron concentrations in excess of 300 micrograms per liter or manganese concentrations in excess of 50 micrograms per liter constituted most exceedences of secondary regulations.

Except for two samples, concentrations of trace metals in the ground water of the region were below maximum contaminant levels specified by U.S. Environmental Protection Agency primary drinking water regulations. Nitrate concentrations in a few samples exceeded maximum contaminant levels, but these samples did not represent typical conditions.

INTRODUCTION

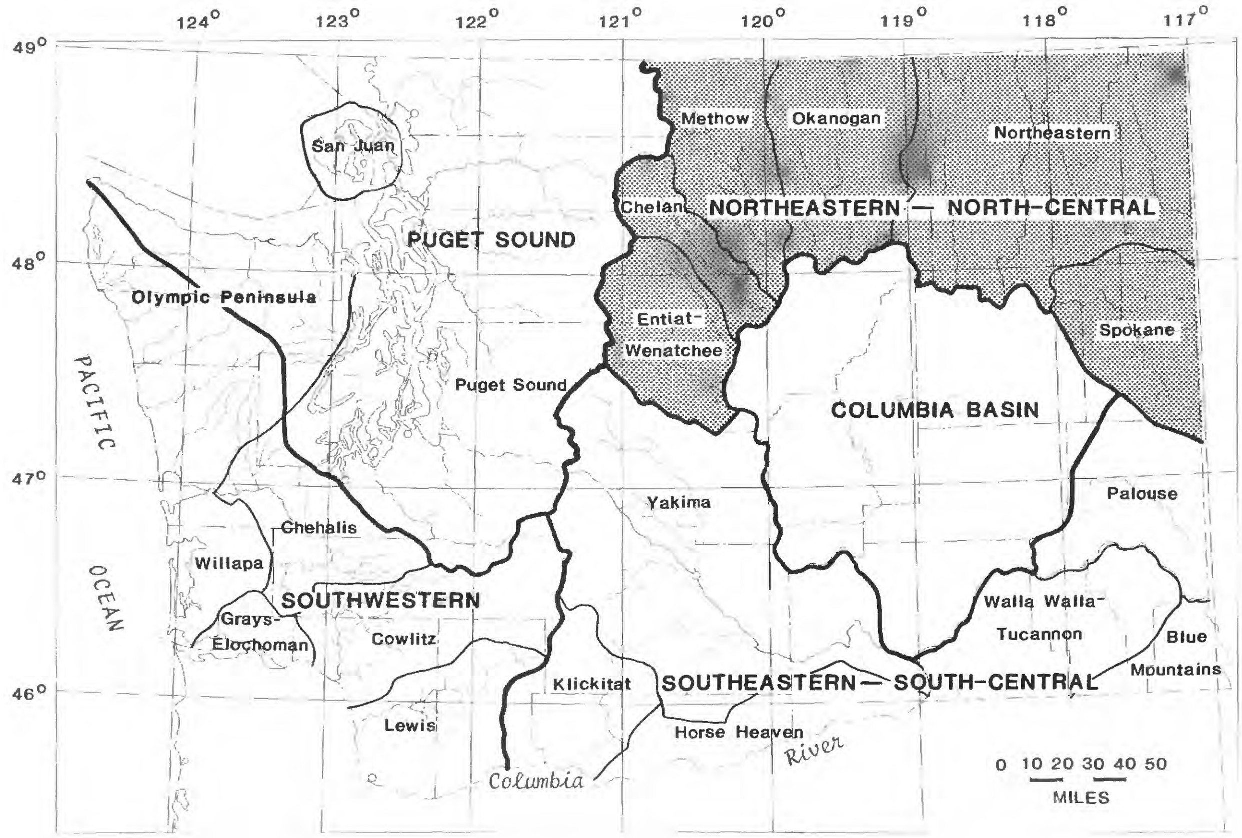
Purpose and Scope

The Washington State Department of Ecology requested the cooperative assistance of the U.S. Geological Survey in appraising the chemical quality of water in principal aquifers in the State. This resulted in a 5-year program, initiated in 1979, to obtain and analyze water samples for chemical quality from 500 wells and springs in principal aquifers throughout the State. To apportion the wells and springs uniformly across the State, it was divided into five major regions (fig. 1), and each major region was allocated 100 wells and springs. The selection of principal aquifers in each major region was based on the delineation of principal aquifers in Washington by Molenaar and others (1980).

The purpose of this report is to describe ground-water quality in the northeastern-north central region, a major region which includes the aquifer regions Spokane, Northeastern, Okanogan, Methow, Chelan, and Entiat-Wenatchee as identified by Molenaar (fig. 1). Ground-water-quality samples were collected in the northeastern-north central region during 1979, and data from those samples as well as historic ground-water-quality data are used in this report.

Criteria for Sampling-Site Selection

The number of ground-water-quality samples collected from a given aquifer was determined by a qualitative assessment of the availability, use, and economic importance of the water in that aquifer. Individual wells and springs were selected for sampling in order to provide a relatively uniform areal distribution of sites over an aquifer. Although some sites were located in areas of potential ground-water-quality degradation resulting from landfills, industrial sites, and other localized sources of pollution, the primary objective of sampling was to provide a general assessment of the overall ground-water quality in the major aquifers.



EXPLANATION

Boundary between major regions

Boundary between aquifer regions

Small type - aquifer region

BOLD TYPE - major region

Shaded area is topic of this report

FIGURE 1.--Washington State showing principal aquifer regions, as designated by Molenaar and others (1980), and five major regions, each containing approximately 100 sample sites.

Water-Quality Constituents and Characteristics

All samples that were collected during the summer of 1979 were analyzed for major anions and cations, nitrite-plus-nitrate, iron, and manganese. Hardness, sodium-absorption ratio, and dissolved-solids concentration were calculated from the results of the anion and cation determinations. Field measurements were made for temperature, specific conductance, and pH on all samples, and fecal-coliform-bacteria determinations were made on samples from domestic and public-supply wells. In addition, approximately 20 percent of the samples were analyzed for 11 trace elements: aluminum, arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc.

Historic ground-water-quality data generally included the major anions and cations, nitrate, iron, and manganese. Trace-element and organic-chemical determinations were sporadic. In comparing the historic data with the 1979 data, some difficulties arise due to the changing of sample types and analytical methods. Prior to 1979, iron and manganese determinations were often made on unfiltered samples, and concentrations were reported as total recoverable. Samples collected in 1979 were filtered, and the corresponding concentrations were reported as dissolved. In samples with high iron concentrations there is often a precipitate of iron hydroxide that collects on the filter during filtration. In a raw, unfiltered sample much of this iron would be dissolved when the sample was preserved by acidification. Therefore, the concentration of iron in a filtered portion of a ground-water sample will often be less than the concentration in an unfiltered portion of the same sample.

There has also been little uniformity in the reporting of the concentration of inorganic nitrogen in water samples. Depending on the analysis, inorganic nitrogen concentrations have been reported as nitrate or as nitrite-plus-nitrate. Concentrations in filtered samples were reported as dissolved, whereas in raw, unfiltered samples they were reported as total. Furthermore, some nitrate concentrations have been reported as NO_3 rather than as elemental nitrogen (NO_3-N). In the basic data tables of this report (tables 3, 10, 13, 16, 19, 22, 25, 28, 31, 32, and 35) these data are presented as originally reported; however, in the summary tables (tables 4, 11, 14, 17, 20, 23, 26, 29, 33, and 36) and on the figures, all nitrate and nitrite-plus-nitrate data are designated nitrate and expressed as mg/L (NO_3-N). This was done to facilitate comparison of data, and implies that for a given ground-water sample the various determinations will give similar results. For most ground-water samples this assumption is a satisfactory approximation. Determinations of nitrate and nitrite-plus-nitrate concentrations in a ground-water sample give approximately equivalent results because, in most ground water, little or no nitrite is present.

Comparison of nitrate concentrations in filtered and unfiltered portions of the same sample becomes more complex. Here, one must evaluate the potential for the nitrate concentration in a sample to change during the period from collection to analysis. Two processes that could alter the nitrate concentration in a ground-water sample are nitrification and denitrification reactions. These reactions proceed slowly, if at all, without biological mediation, and sample filtration, which is done through a 0.45-um filter, removes the microorganisms responsible for such mediation and effectively stabilizes a nitrate sample for the typical period between collection and analysis. This is not the case for an unfiltered sample, and unless it is treated with a biocide (until October 1980 this was not done), there is a potential for the nitrate concentration to change from the time of collection to analysis. Should this occur, nitrate determinations of the filtered and unfiltered components of the same sample would not give similar results; however, in many unfiltered ground-water samples little or no change in nitrate concentration will occur. Denitrification is unlikely because most samples contain oxygen either initially or after collection, and anaerobic conditions are the preferred environment for denitrifying bacteria. Furthermore, sufficient biodegradable carbon, a necessary energy source for denitrification, is usually not present in typical ground water (Viets and Hageman, 1971). Nitrification could occur, but in most ground water the concentration of reduced nitrogen compounds is low, minimizing the potential for nitrification reactions to significantly alter the initial nitrate concentration.

An additional complication in comparing recent and historic data is due to the changing of detection levels for trace-element determinations. For example, prior to 1979 many dissolved-lead determinations were done with a detection level of 100 ug/L. After 1979, they were done with a detection level of 1 ug/L.

Maximum Contaminant Levels Specified By U.S. Environmental Protection Agency Primary and Secondary Drinking Water Regulations

U.S. Environmental Protection Agency national interim primary drinking water regulations apply to the physical and chemical characteristics of water that affect the health of consumers. They are applicable to public water supplies and are enforceable by the U.S. Environmental Protection Agency or the States. Primary drinking water regulations for constituents included in this report are given in table 1.

National secondary drinking water regulations were also proposed by the U.S. Environmental Protection Agency. They apply to the esthetic qualities of drinking water and, unlike the primary regulations, are intended as guidelines and are not Federally enforceable. National secondary drinking water regulations for constituents and characteristics that are included in this report appear in table 1.

TABLE 1.--Maximum contaminant levels specified by U.S. Environmental Protection Agency primary and secondary drinking water regulations

[U.S. Environmental Protection Agency, 1976, 1977. Values in milligrams per liter unless otherwise noted]

Contaminant	Maximum contaminant level
Primary Regulations	
Arsenic	0.05
Barium	1
Cadmium	.010
Chromium	.05
Lead	.05
Mercury	.002
Nitrate (as N)	10
Selenium	.01
Silver	.05
Fluoride	[a]1.4 to 2.4
Secondary Regulations	
Chloride	250
Copper	1
Foaming agents	.5
Iron	.3
Manganese	.05
pH	6.5-8.5 units
Sulfate	250
Dissolved solids	500
Zinc	5

[a]Depends upon average daily air temperatures.

Significance of Selected Constituents and Characteristics of Water

The significance of selected water-quality constituents and characteristics not included in the U.S. Environmental Protection Agency primary and secondary drinking water regulations is discussed below. Although not included in the regulations, these constituents and characteristics are important in determining the suitability of water for domestic, industrial, or agricultural uses.

Alkalinity

Alkalinity is defined as the capacity of an aqueous solution to neutralize acid. Any ion that enters into a chemical reaction with strong acid can contribute to alkalinity; however, in most natural waters carbonate and bicarbonate ions are the principal components of alkalinity. The alkalinity of water used for domestic and municipal water supplies is important because it affects the amount of chemicals required for flocculation, softening, and control of corrosion in distribution systems. Generally, alkalinity resulting from naturally occurring materials is not a health hazard in drinking water, and alkalinities of natural waters rarely exceed 400 to 500 mg/L as $CaCO_3$. For industrial applications, high alkalinity can be a problem in water used for food processing, especially where acidity is necessary for flavor and stability, such as in carbonated beverages. In some cases, alkalinity is desirable because of the corrosive properties of water with low alkalinity. Maximum alkalinities in source waters used for selected industrial purposes appear in table 2.

TABLE 2.--Maximum alkalinity in waters used as a source of supply prior to treatment

[From U.S. Environmental Protection Agency, 1977b]

Industry	Alkalinity as $CaCO_3$, in milligrams per liter
Steam generation boiler makeup----------	350
Steam generation cooling----------------	500
Textile mill products-------------------	50-200
Paper and allied products---------------	75-150
Chemical and allied products------------	500
Petroleum refining----------------------	500
Primary metals industries---------------	200
Food canning industries-----------------	300
Bottled and canned soft drinks----------	85

Fecal-Coliform Bacteria

Fecal-coliform bacteria are nonpathogenic bacteria which normally inhabit the gut and feces of warmblooded animals. They are a subgroup of the total coliform group, which includes bacteria of nonfecal origin. The presence of fecal-coliform bacteria in water is an indicator of the contamination of the water supply by sewage or animal excrement. Since feces are known carriers of disease-producing bacteria, the contamination of a water supply as indicated by the presence of fecal-coliform bacteria can be a serious problem. Maximum contaminant levels for coliform bacteria in drinking water are specified by U.S. Environmental Protection Agency primary drinking water regulations in terms of total coliform bacteria, not fecal coliforms. Because the specification of these maximum contaminant levels is quite detailed, they are not included here. For the purpose of this report, it is sufficient to state that the presence of fecal-coliform bacteria in a water sample may indicate contamination of the source by sewage or animal excrement.

Hardness

The hardness of water is an important consideration for domestic, municipal, and industrial uses. It is related almost entirely to the presence of calcium and magnesium ions in water; however, other constituents, such as iron, manganese, and strontium, also contribute to hardness. The fraction of hardness which is equivalent to the alkalinity is called carbonate hardness, and any excess is called noncarbonate hardness. A classification of water by hardness content (Sawyer, 1960, p. 235) is as follows:

Hardness as $CaCO_3$, in milligrams per liter	Description
0-75	Soft
75-150	Moderately hard
150-300	Hard
More than 300	Very hard

Phenols

Phenolic compounds arise from numerous industrial sources and from the decomposition of naturally occurring organic substances. Phenol and most of its derivatives are not included in U.S. Environmental Protection Agency primary and secondary drinking water regulations; however, some of them are included in U.S. Environmental Protection Agency water quality criteria (1980). The criteria are not rules and have no regulatory impact, but they can provide guidance on the environmental effect of pollutants, which can be useful in deriving regulatory requirements.

The analytical method used for phenol determinations was the condensation of phenol with 4-aminoantipyrine, followed by oxidation under alkaline conditions to produce a colored compound, the intensity of which is proportional to the phenol concentration. This analytical method is sensitive to pure phenol and to many of its derivatives, making it difficult to compare the results of the analytical determinations for phenol with the water-quality criteria, which specify individual compounds. For example, U.S. Environmental Protection Agency water quality criteria (1980) recommend an ambient concentration limit for phenol of 3.5 mg/L in drinking water for the protection of human health. The recommended concentration limits for 2, 4, 6-trichlorophenol, a potential carcinogen, are 12 ug/L, 1.2 ug/L, and 0.12 ug/L, respectively, for incremental increases of cancer risk over a lifetime estimated at 10^{-5}, 10^{-6} and 10^{-7}, respectively (U.S. Environmental Protection Agency, 1980). Because the analytical method is sensitive to both compounds, the identity of the specific phenolic compound, or compounds, is unknown and it is not possible to apply the water-quality criteria. Therefore, the phenol data included in this report serve only as an indicator for the presence of phenol and many of its derivatives.

Sodium-Adsorption Ratio

Excess sodium in irrigation water might become a problem because sodium enters into ion-exchange reactions with calcium or magnesium in the soil. This exchange process is undesirable because a build-up of sodium in the soil reduces its permeability and makes it difficult to cultivate. The adsorption of sodium from a given irrigation water is a function of the proportion of sodium to calcium and magnesium in the water. The sodium-adsorption ratio (SAR) is a measure of the degree to which sodium will be adsorbed by a soil from a given water when brought into equilibrium with it. It is defined as

$$SAR = \frac{(Na^{+})}{\sqrt{\dfrac{(Ca^{++}) + (Mg^{++})}{2}}}$$

where ion concentrations are expressed as milliequivalents per liter.

Specific Conductance

Specific conductance is a measure of the capacity of water to conduct an electrical current. It is commonly used as a measure of the mineral content of the water because it is the dissolved minerals that increase the water's current-carrying capacity.

Suitability of Water for Irrigation

The suitability of water for irrigation is in part determined by the degree of mineralization and the relative concentration of the minerals dissolved in water. The U.S. Department of Agriculture (1954) developed the diagram shown in figure 2, which uses specific conductance and sodium-adsorption ratio to determine the suitability of water for irrigation. Water is classified according to the sodium hazard and salinity hazard; C1-S1 water is low in both and, therefore, the best classification. The higher the numbers, the poorer the water for irrigation; C4-S4 is the poorest classification.

Explanation of Geologic Unit Codes

Most of the wells and springs sampled in the northeastern-north central region were completed in alluvial or glacial deposits, except in the Airway Heights subregion, where most wells were finished in basalt aquifers. Geologic unit codes appearing in the data tables are:

110ALVM - Quaternary alluvium
112GLCV - Pleistocene glaciofluviatile
122CBRV - Columbia River Basalt Group

A few wells which were completed in geologic units other than those mentioned above were sampled. These wells are referenced in the data tables by a footnote.

Data Presentation

Physical, biological, and major chemical-constituent data are summarized for most of the principal aquifers. These summaries include maximum, minimum, and median values. In calculating a median value it is important to consider the bias resulting when a site is sampled more than once. To eliminate this bias, a mean concentration was computed for each constituent at sites with multiple samples, and the resulting mean was used in the calculation of median concentration in ground water of an aquifer.

Nitrate and dissolved-solids concentrations shown on the figures represent mean values if there was more than one sample for a given sample site.

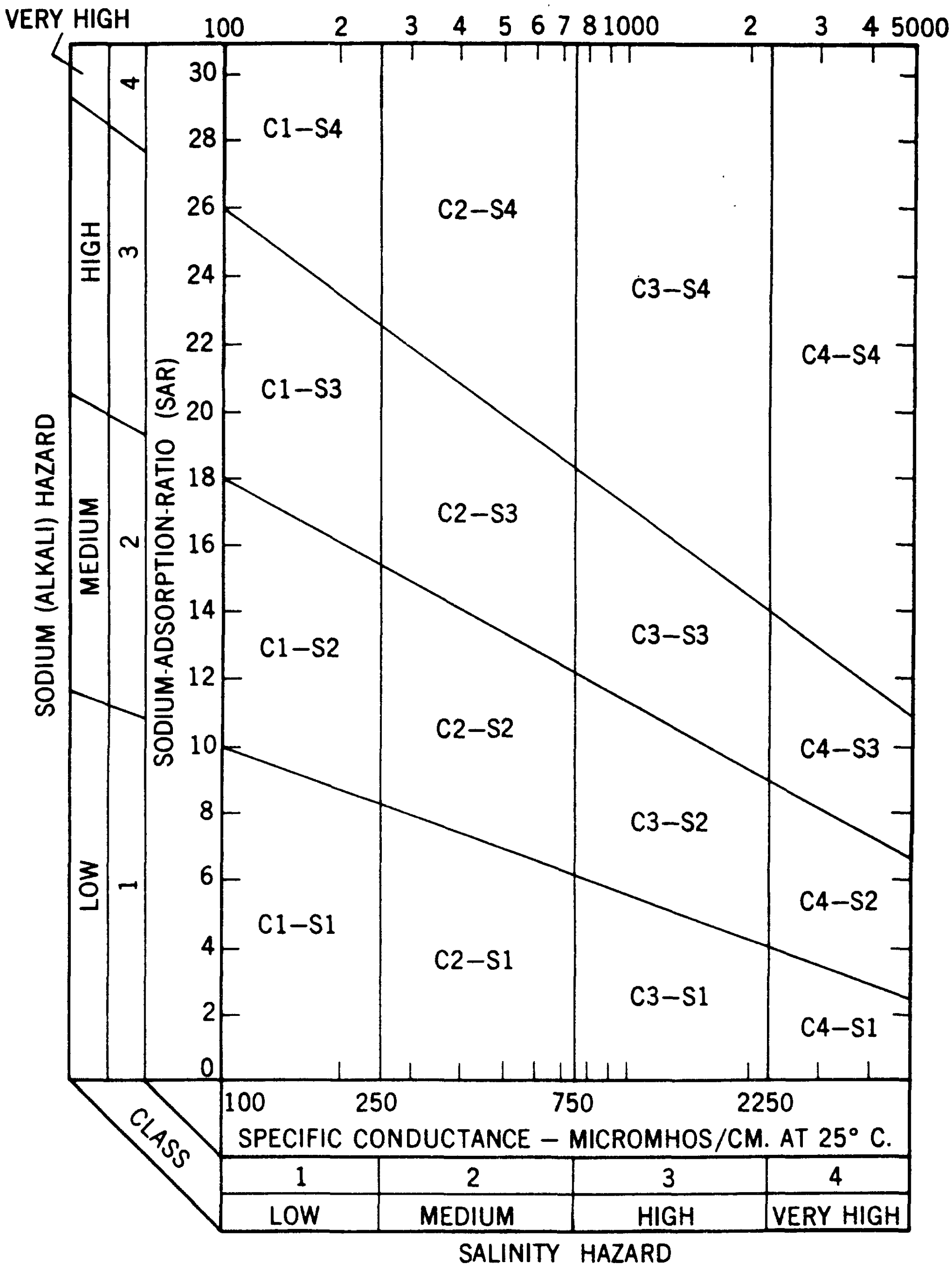
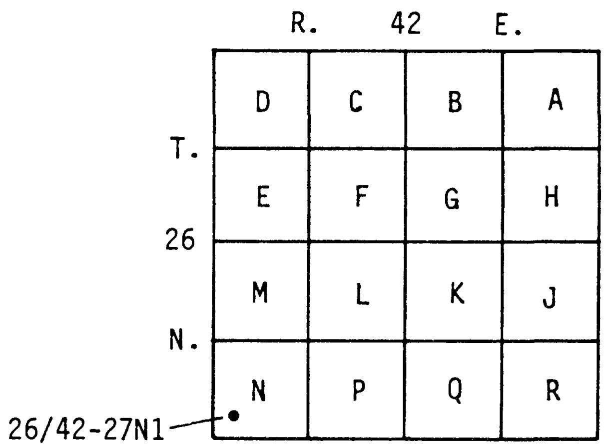


FIGURE 2.--Classification of irrigation waters (U.S. Department of Agriculture, 1954).

Well- and Spring-Location Numbering System

Wells in Washington are assigned numbers that identify their location in a township, range, and section. Well number 26/42-27N1 indicates, successively, the township (T.26 N.) and range (R.42 E.) north and east of the Williamette base line and meridian; the letters indicating north and east are omitted. The first number following the hyphen indicates the section (27) within the township, and the letter following the section gives the 40-acre subdivision of the section, as shown below. The number following the letter is the serial number of the well in the 40-acre subdivision. An "s" following the sequence number indicates that the site is a spring.



Section 27

SPOKANE REGION

The Spokane Region includes most of Spokane County and small sections of Stevens, Lincoln, and Whitman Counties (fig. 1). The three principal aquifers in the region where ground water was sampled were the Spokane Valley aquifer, the basalt aquifers in the vicinity of Airway Heights, and the aquifer along Chamokane Creek. The Spokane Valley aquifer is shown in figure 3; the Airway Heights and Chamokane Creek subregions are shown in figure 9.

Spokane Valley Aquifer

Description of the Data Base and Previous Investigations

There has been much interest in the Spokane Valley aquifer due to its importance as a source of water for the city of Spokane and much of the surrounding area. The aquifer has been the subject of numerous investigations, some of which have been concerned with the quality of ground water in the aquifer. Because of these studies, the ground-water-quality data base for the Spokane Valley aquifer is extensive, compared with most other major aquifers in the State. It was therefore possible to present a more complete description of the quality of ground water in the Spokane Valley aquifer than for the other principal aquifers.

In this report the ground-water-quality data for the Spokane Valley aquifer include those collected from 22 wells and springs sampled during the summer of 1979 and other data previously collected, which are stored in WATSTORE, the U.S. Geological Survey's computer storage and retrieval system. Most of the historic data resulted from investigations conducted by the U.S. Geological Survey for, or in cooperation with, other agencies. Where possible, these data are summarized to reduce the size of the data tables. Additional data may be found in reports by Drost and Seitz (1978), Bolke and Vaccaro (1979), and Vaccaro and Bolke (1983).

Drost and Seitz (1978) describe the hydrologic characteristics of the Spokane Valley-Rathdrum Prairie aquifer in Washington and Idaho, the population distribution overlying the aquifer, the soils overlying the aquifer, the use and disposal of water withdrawn from the aquifer, and the quality of water in the aquifer. Drost and Seitz accumulated ground-water-quality data for about 1,200 samples from 400 sites from the files of Federal, State, and local agencies, from previous studies, and from private laboratories. Some of the data were tabulated in their report, and all of the data were included when they determined locations where constituent concentrations exceeded drinking water standards. Some information from their report is included in the following discussion for enhancement and clarification.

Bolke and Vaccaro (1979) tabulated hydrologic data from 1977 and 1978 for the Spokane Valley aquifer. Included were nitrogen, phosphorus, chloride, and specific-conductance data for ground-water samples. Vaccaro and Bolke (1983) evaluated the water-quality characteristics of the Spokane Valley aquifer using a solute-transport model. This report contains detailed information on the relation between the hydrologic characteristics of the aquifer and the quality of ground water in the aquifer.

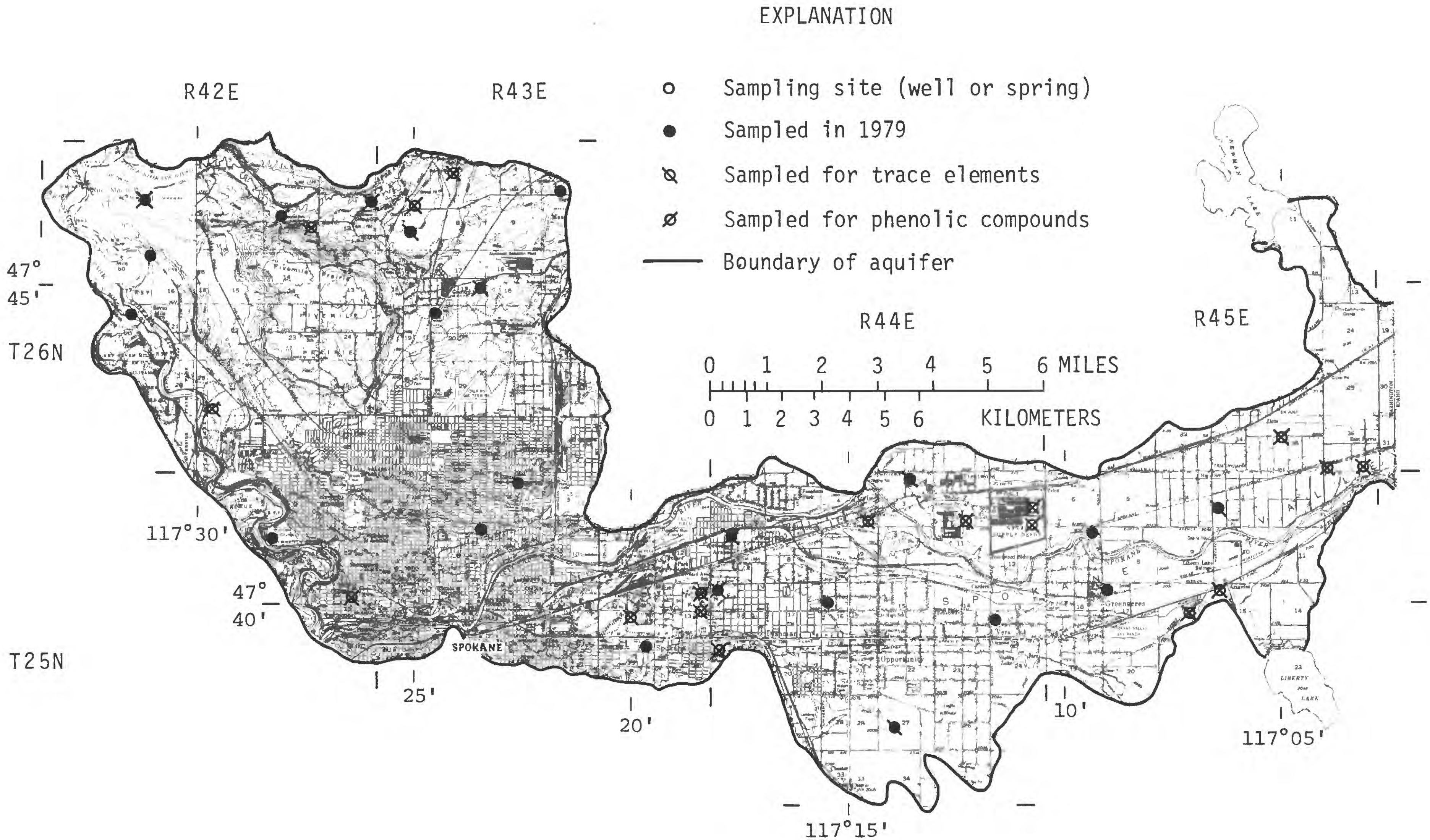


FIGURE 3.--Spokane Valley aquifer showing sample sites.

Description of the Aquifer

The boundaries of the Spokane Valley aquifer, as delineated by Drost and Seitz (1978), are shown in figure 3. Although the aquifer extends from Pend Oreille Lake, Idaho, to Long Lake, Wash., this report includes only the part of the aquifer that is in Washington. The aquifer is composed predominantly of Quaternary glaciofluvial deposits of unknown thickness, which lie above the consolidated Precambrian and Tertiary rocks that form the bottom and sides of the valley. Fivemile Prairie, a mesa northwest of the city of Spokane, consists of consolidated Tertiary deposits and separates the aquifer into the Hillyard Trough on the east and the lower Spokane River valley to the southwest.

Ground-Water Use

Water withdrawn from the Spokane Valley aquifer is used for municipal, domestic, irrigation, and industrial purposes. Most municipal use is for domestic and commercial purposes, and some water is used for irrigation and industry. In 1977, water used for municipal purposes was about 70 percent of the total withdrawn, or about 116,000 acre-feet, and water used for irrigation and industry was about 15 percent of the total, or about 24,000 acre-feet (Vaccaro and Bolke, 1983).

Water Quality

Physical and major inorganic-chemical characteristics

The physical and major inorganic-chemical data for samples from the 22 wells and springs sampled during the summer of 1979 appear in table 3 and are summarized in table 4. The percentage of major anions and cations in each of these samples is plotted on figure 4. Calcium and magnesium were the principal cations and bicarbonate was the principal anion in the samples. This is consistent with the findings of Drost and Seitz (1978) and Vaccaro and Bolke (1983).

The specific-conductance values of samples from 1979 and historic data for Spokane Valley aquifer wells and springs are summarized in table 5. Specific-conductance values ranged from 40 to 1,040 micromhos, with a median of 294 micromhos. The equation and graphical representation of the linear regression of dissolved-solids concentration on specific conductance are shown in figure 5. Using the regression equation, the recommended drinking-water standard of 500 mg/L of dissolved solids would correspond to a specific conductance of 916 micromhos. Well 25/45-16K1 is the only well in table 5 from which a sample had a specific conductance greater than 916 micromhos. Five water samples were collected from this well during the period 1973 to 1977. Dissolved-solids concentrations in these samples ranged from 445 to 594 mg/L, with a mean of 492 mg/L.

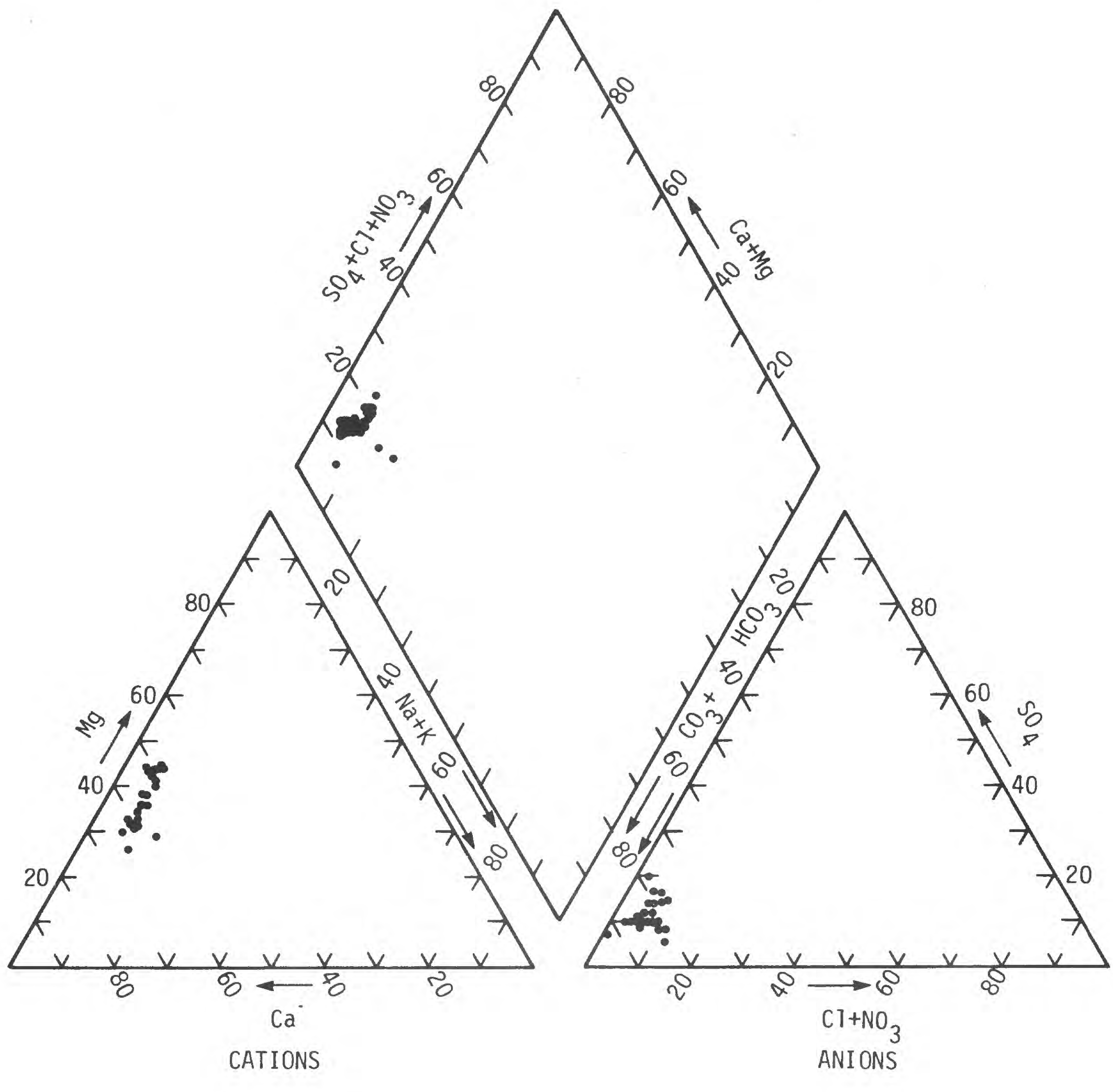


FIGURE 4.--Major ion percentages in water collected from Spokane Valley wells and springs, 1979.

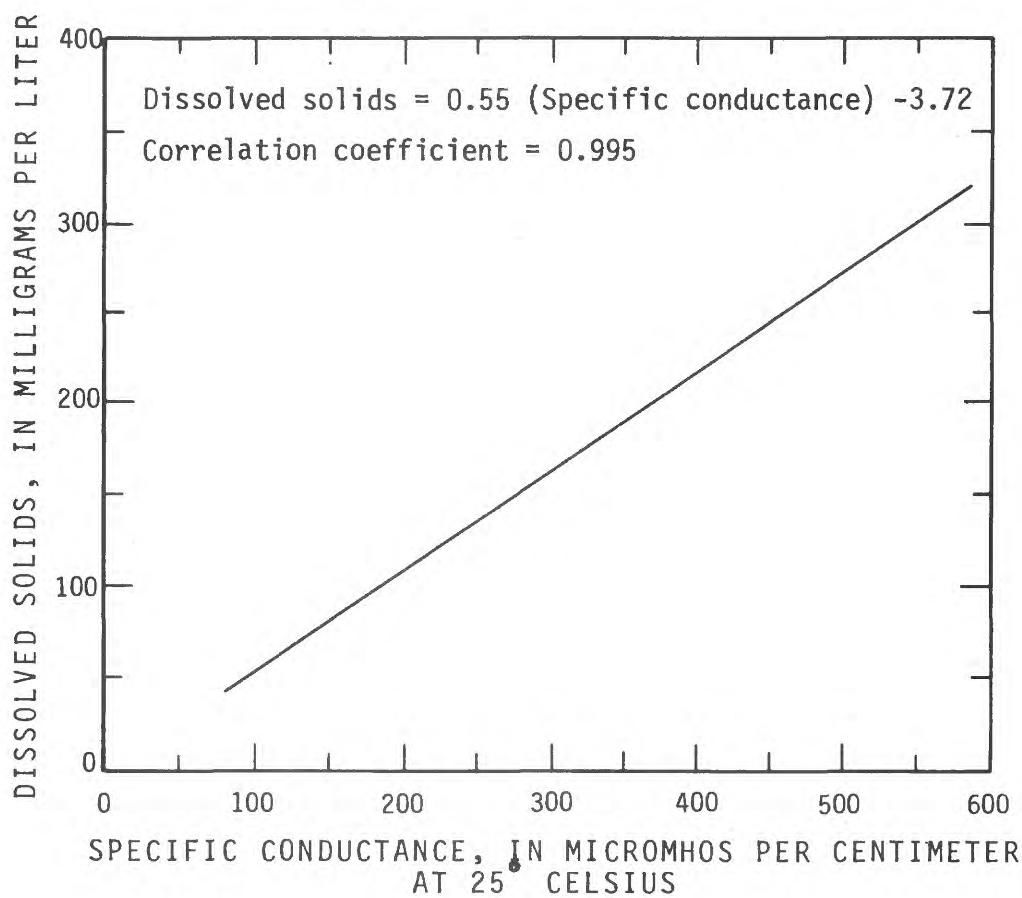


FIGURE 5.--Relation between dissolved-solids concentrations and specific-conductance values for Spokane Valley aquifer ground water.

The areal variation of specific conductance values in Spokane Valley aquifer ground water is shown in figure 6. The contours represent average values resulting from three samplings conducted during 1977 and 1978. Specific-conductance values for the samples collected during 1979 are consistent with the variations shown in figure 6. Generally, specific-conductance values are lowest in the southeastern part of the aquifer and highest in the area around Mead, in the northern part of the aquifer. Also, the specific conductance of ground water is usually greater at the valley perimeter than adjacent to the Spokane River. Local increases in the specific conductance of ground water have resulted from land-use activities (Drost and Seitz, 1978, and Vaccaro and Bolke, 1983). For example, the specific conductance values and chloride concentrations in water from well 25/44-2Q1 were thought to have been affected by wastes from the Kaiser-Trentwood aluminum plant (Drost and Seitz, 1978). The specific-conductance values for water from this well range from 310 to 775 micromhos (table 4).

Specific-conductance values for wells with long-term records are shown in figure 6. No general long-term trend is evident. Because short-term fluctuations exceed long-term variations in water from wells such as 25/42-13B1, it is difficult to evaluate trends. Water from well 25/42-11E1, which has the most complete long-term record, shows an apparent upward trend in specific-conductance values; however, these data must be interpreted with care. Instruments and methods of measurement have changed with time. Also, seasonal and climatic fluctuations in recharge to the aquifer, which influence ground-water quality, are not accounted for in the trend plots. Finally, the quality of water from wells such as 25/42-11E1, which are adjacent to the Spokane River, is influenced by recharge from the river. In such wells, changes in the quality of river water may affect the quality of water in the well more than land-use activities in the vicinity of the well.

Concentrations of NO_3-N in water sampled historically and in 1979 from Spokane Valley aquifer wells and springs ranged from 0.00 to 9.2 mg/L, with a median concentration of 1.3 mg/L. Nitrate data are summarized in table 6. A plot prepared by Vaccaro and Bolke (1983) of the areal variation in nitrate concentrations is shown in figure 7. The lowest nitrate concentrations occur in the east and central parts of the aquifer, and higher concentrations are found in the peripheral areas.

NO_3-N concentrations in water from wells and springs with relatively long-term records are shown in figure 7. As with specific- conductance values, it is difficult to determine trends. In many cases, seasonal or short-term variations exceed long-term variations.

Although none of the NO_3-N concentrations exceeded the recommended limit for drinking water of 10 mg/L, nitrate concentrations in water from several wells approached that limit. A NO_3-N concentration of 9.2 mg/L was found in a sample collected from well 25/43-23A1 in February 1972. The mean NO_3-N concentration in 20 samples collected from this well over a period from 1970 to 1979 was 2.8 mg/L. This well was sampled monthly from September 1971 to September 1972, and except for the NO_3-N concentration of 9.2 mg/L in the February sample, NO_3-N concentrations ranged from 1.4 to 3.2 mg/L.

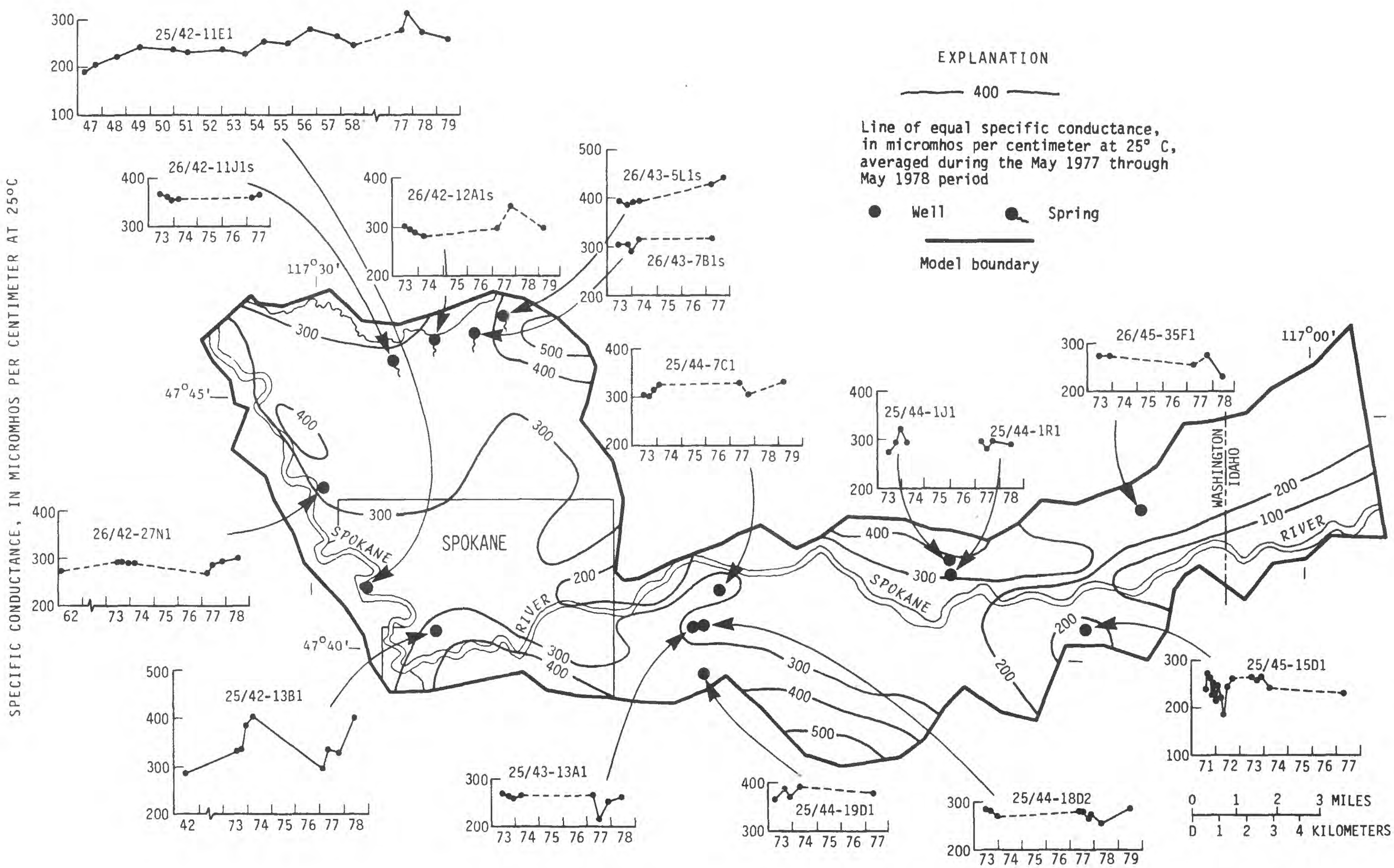


FIGURE 6.--Average specific-conductance values of Spokane Valley aquifer ground water observed during the period May 1977 to May 1978, and graphs showing the history of specific-conductance variation for selected wells and springs. (Modified from Vaccaro and Bolke, 1983.)

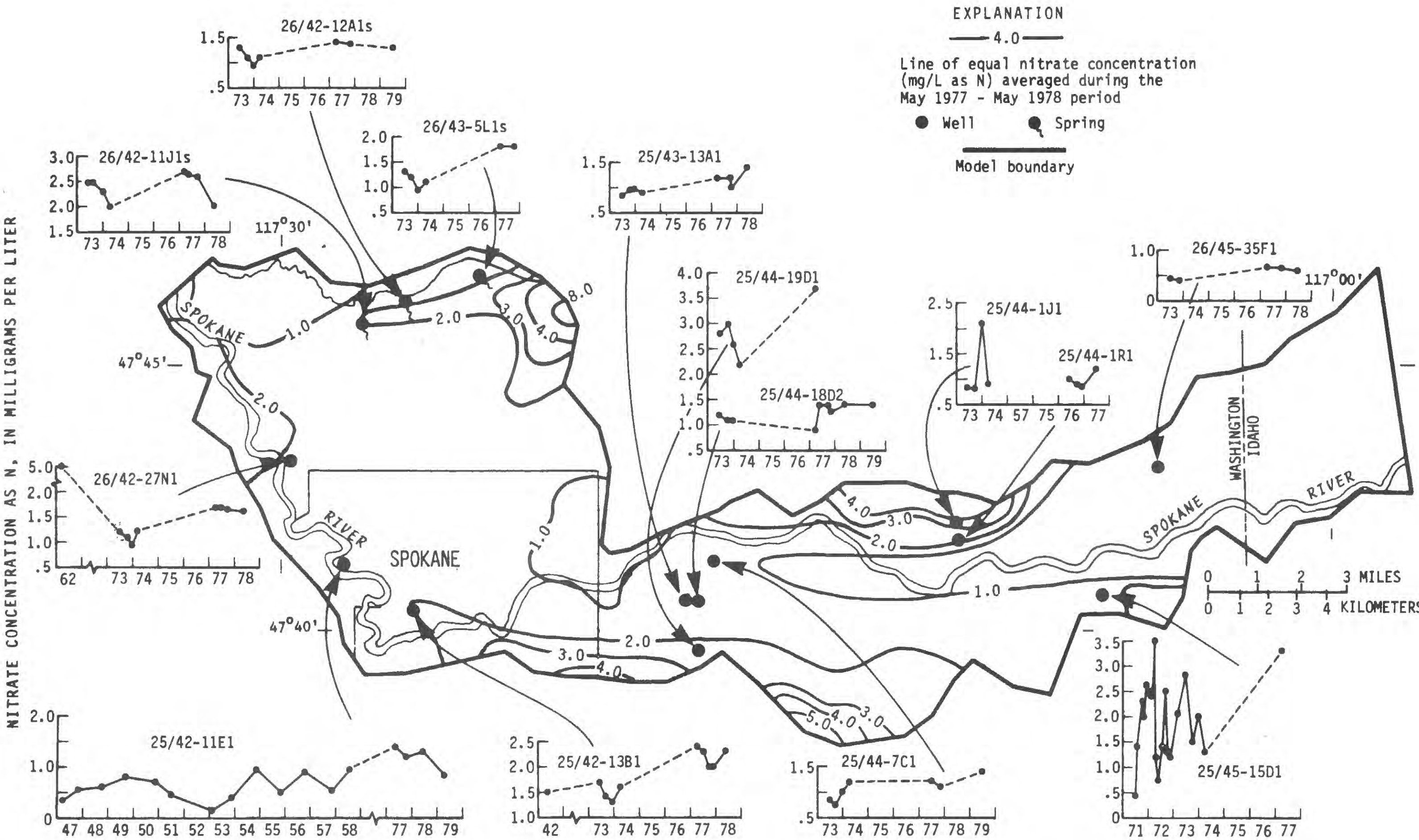


FIGURE 7.--Average nitrate concentrations in Spokane Valley aquifer ground water observed during the period May 1977 to May 1978, and graphs showing the history of nitrate concentration variation for selected wells and springs. (Modified from Vaccaro and Bolke, 1983.)

Water samples from wells 26/43-3N1, 26/43-3P1, 26/43-8B4, and 26/43-10K1 in the Mead area had NO_3-N concentrations exceeding 8 mg/L. The locations and corresponding graphs of nitrate and chloride concentrations of these and several other wells in the vicinity of Mead are shown in figure 8. In their analysis of the flow and solute transport in the Spokane Valley aquifer, Vaccaro and Bolke (1983) attributed these high nitrate concentrations to high nitrate concentrations in the ground-water inflow from Peone Prairie mixing with ground water in the Spokane Valley aquifer. The source of the nitrate was not identified.

Support for their hypothesis lies in their analysis of ground-water flow in the Spokane Valley aquifer, ground-water inflow from Peone Prairie, and the correlation between chloride and nitrate concentrations in four Mead area wells (fig. 8). Examining their data collected during 1977 and 1978, Vaccaro and Bolke noted the correlation of high chloride and nitrate concentrations in water from wells 26/43-3N1, 26/43-3P1, 26/43-8B4, and 26/43-10K1. This correlation is atypical of most water in the Spokane Valley aquifer, where the correlation coefficient between nitrate and chloride concentrations was 0.442 (Vaccaro and Bolke, 1983). The fluctuations in, and correlations between, nitrate and chloride concentrations in water from the four wells were thought to be caused by variations in the mixing between ground water in the Spokane Valley aquifer and ground-water inflow from Peone Prairie, where there was a common source of nitrate and chloride. Although well 26/43-8G2 is in proximity to well 26/43-8B4, it is in an area where the northward-flowing Spokane Valley aquifer water is just beginning to mix with the inflow from Peone Prairie, and NO_3-N concentrations higher than 4 mg/L were not observed in water from this well.

High chloride concentrations that did not correlate with high nitrate concentrations were found in samples from wells 26/43-8G2, 26/43-16D2, and in the 1964 sample from well 26/43-8B4. Land-use activities that affected chloride, but not nitrate, concentrations were a possible cause.

Of the 22 samples collected during 1979, iron exceeded the recommended maximum concentration for drinking water of 300 ug/L in one sample, and manganese exceeded the recommended maximum concentration of 50 ug/L in two samples. Drost and Seitz (1978) found that iron concentrations exceeded the recommended concentration at 19 percent of the sites tested, and that manganese exceeded the recommended concentration at 6 percent of the sites tested.

Trace elements

Trace-element concentrations in ground-water samples from Spokane Valley aquifer wells and springs appear in table 7 and are summarized in table 8. On two occasions trace-element concentrations in Spokane Valley aquifer ground-water samples exceeded the maximum contaminant levels specified by U.S. Environmental Protection Agency primary drinking water regulations.

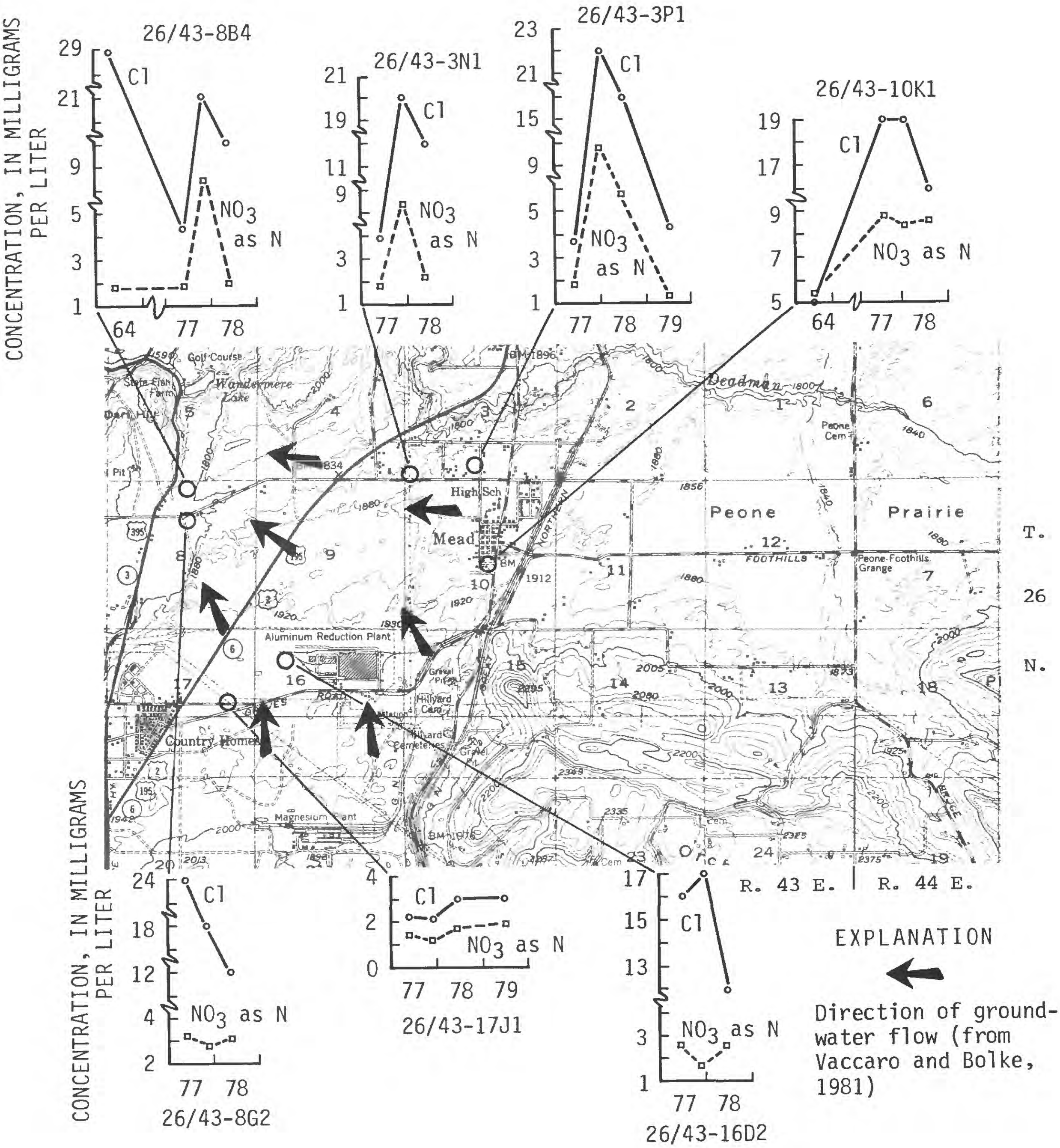


FIGURE 8.--Locations of Mead area wells, graphs of nitrate and chloride concentrations, and the direction of ground-water flow.

A lead concentration of 61 ug/L in a sample collected in March 1977 from well 25/43-13A1 exceeded the maximum contaminant level of 50 ug/L. The median lead concentration in six samples collected from this well was 3.5 ug/L. The concentration of copper in the March 1977 sample from the same well was 280 ug/L, or 5.6 times the median concentration of 50 ug/L in samples from this well. A nearby well, 25/44-18D2, was sampled in April 1977, and no extraordinary lead or copper concentrations were observed.

An arsenic concentration of 64 ug/L in a sample collected on September 26, 1973, from the spring 26/43-7B1s exceeded the maximum contaminant level of 50 ug/L. This may be an isolated occurrence, as four other samples from this spring had concentrations ranging from 2 to 4 ug/L (table 7).

Organic chemicals

The use of phenolic compounds in some of the industries in the Spokane Valley prompted the Environmental Protection Agency to include phenol as one of the analytical determinations for ground-water samples collected from 1973 to 1977. These data, along with methylene-blue-active-substance (detergents) data, are given in table 9.

Primary and secondary drinking water regulations do not include phenol; however, the Environmental Protection Agency (1980) has issued water-quality criteria that include phenol and several phenolic compounds. Based on these criteria, the recommended limit for phenol in drinking water supplies is 3.5 mg/L. There are difficulties in applying these criteria to the data because the analytical method that was used to measure the concentration of phenol in these samples was sensitive to pure phenol and to certain other phenolic compounds. The identity and concentration of individual phenolic compounds was not determined. The analysis for phenol is, however, useful as an indicator of phenolic contamination in ground water. This is especially true in light of the contamination by phenol of water from well 25/44-1J1 (Drost and Seitz, 1978) where, in late 1975, a phenol concentration of 15 mg/L was detected. In samples taken from the well during 1973 and 1974, phenol was not detected (table 9). Phenol concentrations in samples from the Spokane Valley aquifer wells and springs listed in table 9 ranged from 0 to 12 ug/L, with a median of 1.0 ug/L.

The recommended limit for foaming agents (detergents) is 0.5 mg/L in drinking water. For samples from the wells listed in table 9, the concentrations ranged from 0.00 to 0.10 mg/L, with a median of 0.01 mg/L.

Coliform bacteria

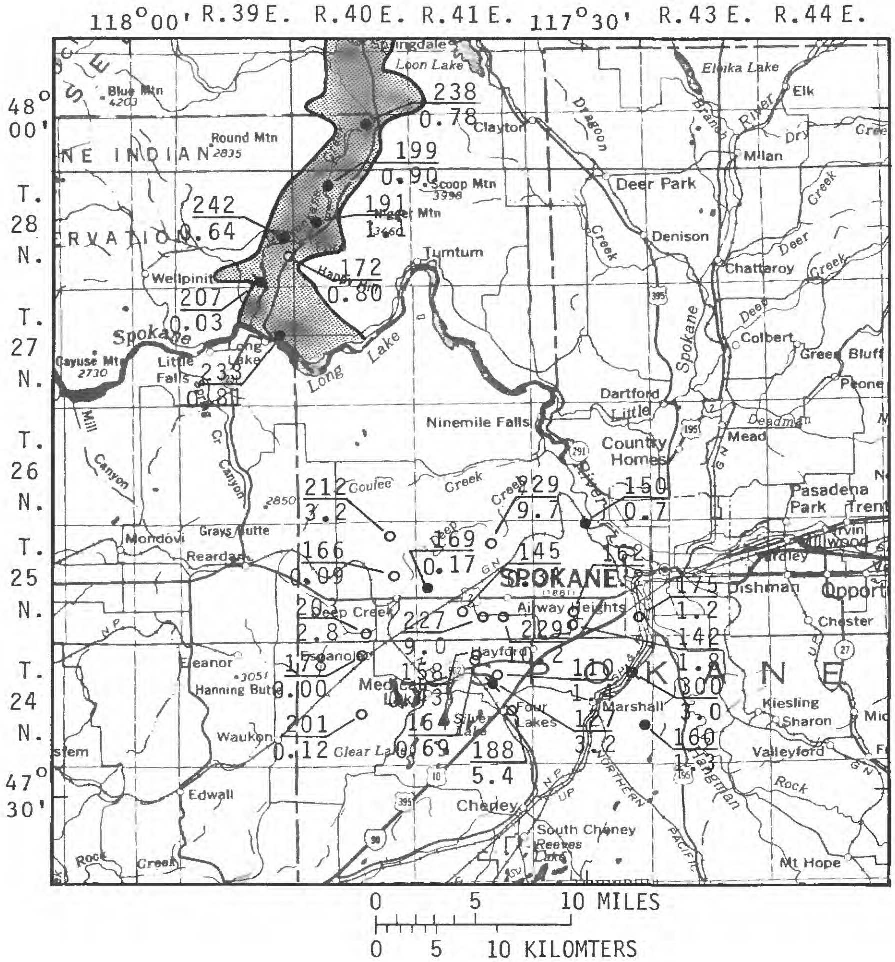
No fecal-coliform bacteria were detected in the samples collected from wells during the 1979 sampling. Fecal-coliform bacteria were present in the sample collected from spring 26/42-12A1s (table 3), but the probability of sample contamination from a surficial source is high. Drost and Seitz (1978) summarized the potential for the contamination of Spokane Valley aquifer ground water by coliform bacteria. They concluded that, in most cases, positive tests for coliform bacteria in ground-water samples were the result of local contamination.

Airway Heights Subregion

The Airway Heights subregion located west of Spokane includes the vicinity of Airway Heights, Four Lakes, and Medical Lake (fig. 9). The principal ground-water reservoir of the subregion occurs in the lava flows, which constitute the Miocene Columbia River Basalt Group. In much of the area the basalt is only a few hundred feet thick or less, and is underlain by, or interlayered with, the Miocene Latah Formation, which is composed of fine silt and clay of low permeability. The Latah Formation was formed by the accumulation of fine-grained sediment that was deposited as the basalt flows dammed streams and formed lakes. The lowermost beds of the Latah Formation were deposited upon pre-Tertiary plutonic and metamorphic rocks that form the basement complex underlying the area. Generally, this formation is of low permeability and does not produce large quantities of ground water. Where the rocks are weathered or where fractures occur in unweathered rocks, permeability increases, and wells completed in such zones commonly have yields of about 10 gal/min. Glacier-related deposits and extensive glacial flood sediments are found on the plains area north of Four Lakes. These deposits are relatively thin (less than 25 ft), and although these sediments would seem to be good potential aquifers, yields to wells are generally less than 25 gal/min due to low recharge.

Excluding wells for which records were not available, all wells sampled in the Airway Heights subregion were completed in basalt aquifers except for well 24/41E-23K1, which was terminated in the pre-Tertiary rock of the basement complex.

Ground-water quality in the Airway Heights subregion is generally adequate for most uses; however, NO_3-N concentrations in samples from wells 25/41-10G1, 25/41-34C1, and 25/41-35C1 have exceeded the maximum contaminant level of 10 mg/L specified in the U.S. Environmental Protection Agency primary drinking water regulations. Nitrate concentrations were consistently high in samples from these wells (see table 10). NO_3-N concentrations in samples from well 24/41-3N1 were erratic, ranging from 0.00 to 2.1 mg/L. For the subregion in general, there was considerable areal variation of nitrate concentrations in ground water (fig. 9).



EXPLANATION

Area underlain by unconsolidated alluvial and glacial deposits in the vicinity of the sample sites. Source: Huntting, M.T., and others, 1961, Geologic Map of Washington.

● Well sampled in 1979

○ Well sampled prior to 1979

Well sampled for trace metals

201 dissolved solids, in mg/L

0.12 nitrate as N, in mg/L

FIGURE 9.--The Airway Heights and Chamokane Creek subregions showing sample sites and average nitrate and dissolved-solids concentrations.

Percentages of anions and cations in ground-water samples from the Airway Heights subregion are plotted in figure 10. Some variations in anionic composition were due to variations in nitrate concentrations. Samples in which magnesium was the principal cation were approximately equal in number to those where calcium was the principal cation.

Physical and major chemical-constituent ground-water-quality data are summarized in table 11. Iron concentrations exceeded the recommended drinking-water limit of 300 ug/L at 4 of the 21 sample sites, and manganese concentrations exceeded the recommended limit of 50 ug/L in 2 of 15 samples. No other constituents, with the exception of nitrate, exceeded limits set by U.S. Environmental Protection Agency primary or secondary drinking water regulations.

Trace-element data for ground water in the subregion are sparse (table 12). A mercury concentration of 1.9 ug/L in a sample from well 24/41E-15A2 approaches the maximum contaminant level of 2.0 ug/L for drinking water. Additional trace-element data are needed to evaluate the ground-water quality of the subregion.

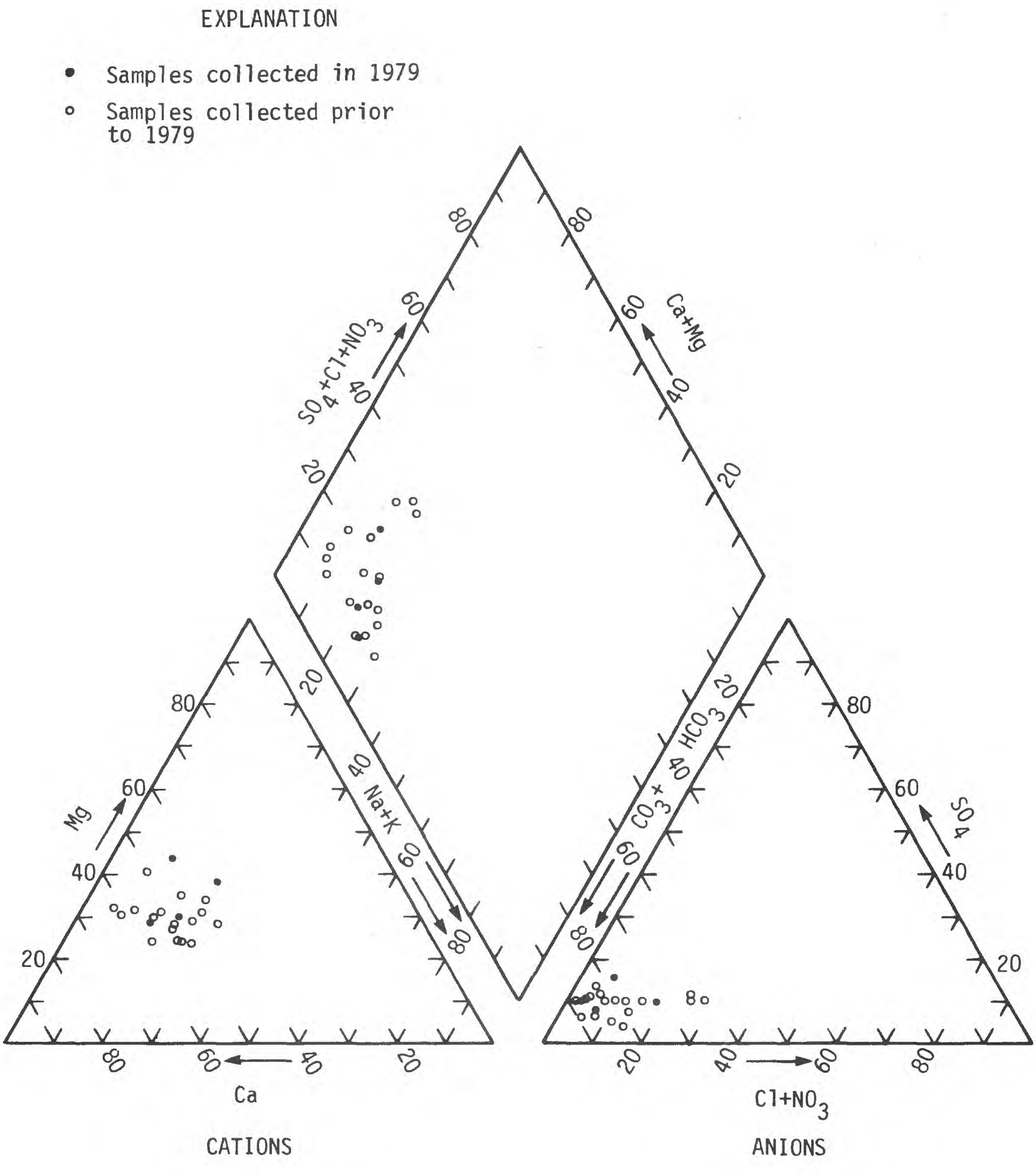


FIGURE 10.--Major ion percentages in water from the Airway Heights subregion wells.

Chamokane Creek Subregion

Chamokane Creek originates in the Selkirk Mountains and flows into the Spokane River below Long Lake Dam. Alluvial and glacial deposits along the lower reach of Chamokane Creek constitute the third principal aquifer where ground water was sampled in the Spokane Region (fig. 9). The Chamokane Creek subregion is sparsely populated, and most wells are used to supply domestic and irrigation water.

The quality of the ground water sampled in the Chamokane Creek aquifer is such that the water is suitable for most uses (tables 13-15). NO_3-N concentrations in ground-water samples ranged from 0.00 to 1.1 mg/L, with a median concentration of 0.78 mg/L. The major ions in the Chamokane Creek aquifer ground water were calcium, magnesium, and bicarbonate (fig. 11). The median dissolved-solids concentration was 207 mg/L.

Iron concentrations in two of seven samples exceeded the recommended limit of 300 ug/L for drinking water. The median dissolved iron concentration in samples from the subregion was 220 ug/L, indicating that iron concentrations are somewhat elevated compared with ground water from many of the other major aquifers. In general, manganese concentrations in the ground water sampled were low (median of 2 ug/L); however, a manganese concentration of 90 ug/L in the sample from well 28/39-35L1 exceeded the recommended limit of 50 ug/L for drinking water.

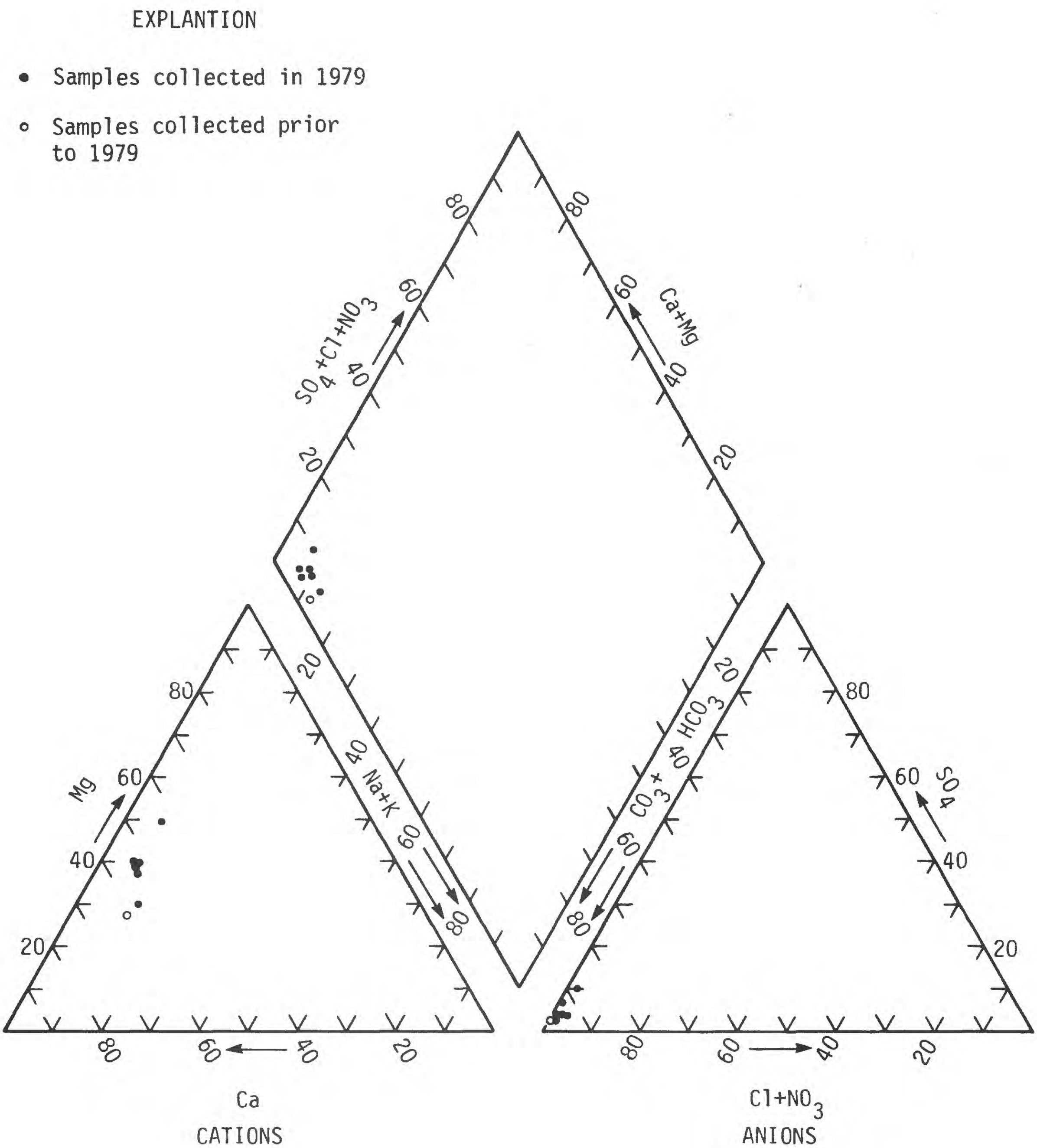


FIGURE 11.--Major ion percentages in water from the Chamokane Creek subregion wells.

NORTHEASTERN REGION

The boundaries of the Northeastern Region are shown in figure 1. The region includes part of Okanogan County, all of Ferry County, and most of Stevens and Pend Oreille Counties. Ground-water sampling in the region was done in three areas where alluvial and glacial deposits form aquifer units—the Curlew-Sanpoil subregion, the Colville-Kettle subregion, and the Pend Oreille subregion (figs. 12 and 14).

Curlew-Sanpoil Subregion

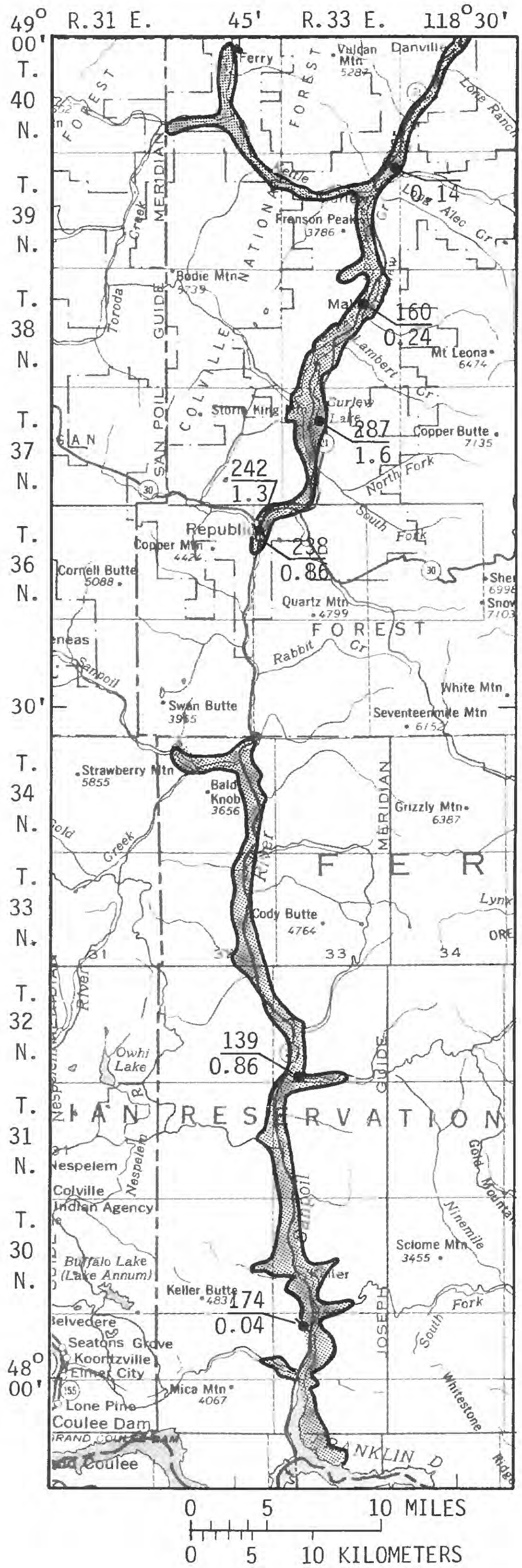
The principal aquifers of the Curlew-Sanpoil subregion are glacial and alluvial deposits along the Sanpoil River and Curlew Creek and along the arc of the Kettle River from where it enters the United States near Ferry to where it flows back into Canada near Danville (fig. 12). The subregion is sparsely populated, and ground water is used mainly for domestic, municipal, and irrigation purposes.

Ground-water-quality data for the subregion appear in tables 16 and 18 and are summarized in table 17. On the basis of these data, the quality of ground water in the subregion is such that the water is suitable for most uses. All constituents were within drinking-water-regulation guidelines, except a total iron concentration of 570 ug/L in water from well 29/33E-4M1. As shown in figure 13, the principal cations in the samples were calcium and magnesium, and bicarbonate was the principal anion. Water from City of Republic wells 36/33E-7F1 and 36/33E-7F2 had a high percentage composition of sulfate compared with other samples from the subregion.

Colville-Kettle Subregion

Alluvial and glacial deposits along the Colville River and the lower reach of the Kettle River are the principal aquifers of the Colville-Kettle subregion. In 1979, five wells adjacent to the Colville River extending from Addy north to Colville were sampled, and two wells were sampled near Boyds adjacent to the Kettle River. Historical ground-water-quality data were collected near Chewela, near Colville, and adjacent to the Columbia River near the mouth of the Colville River (fig. 14).

The ground-water-quality data for the subregion appear in tables 19 and 21 and are summarized in table 20. Except for dissolved-manganese concentrations of 90 ug/L in water from well 33/39E-13C1 and 290 ug/L in water from well 35/39E-10A1, constituent concentrations in ground water sampled in the subregion were below maximum contaminant levels specified by U.S. Environmental Protection Agency primary and secondary drinking water regulations. Hardness values ranged from moderately hard to hard. The median NO_3-N concentration was 0.41 mg/L. City of Colville well 35/39E-10A1 was sampled in 1960 and in 1979, and on both occasions no nitrate was detected. Calcium and magnesium were the major cations and bicarbonate was the major anion in the ground-water sampled (fig. 15). For irrigation purposes, the ground water sampled had a low sodium hazard and a low to medium salinity hazard.



EXPLANATION

Area underlain by unconsolidated alluvial and glacial deposits. Source: Huntting, M.T., and others, 1961, Geologic Map of Washington, and Molenaar, Dee, and others, 1980, Principal Aquifers and Well Yields in Washington.

- ● Well sampled in 1979
- ○ Well sampled prior to 1979
- Well sampled for trace metals

242 dissolved solids, in mg/L
1.3 nitrate as N, in mg/L

FIGURE 12.--Curlew-Sanpoil subregion showing sample sites and average nitrate and dissolved-solids concentrations.

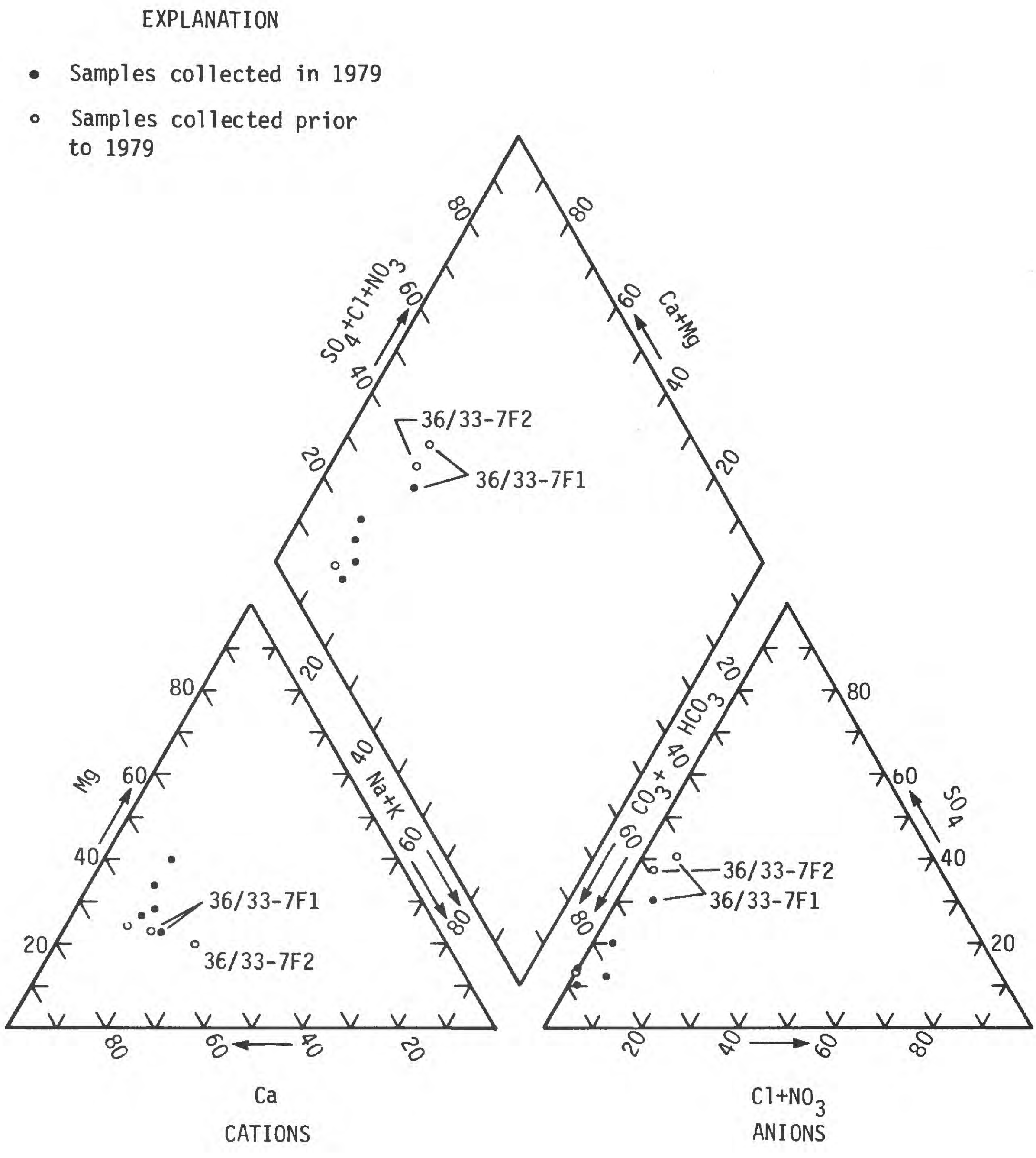
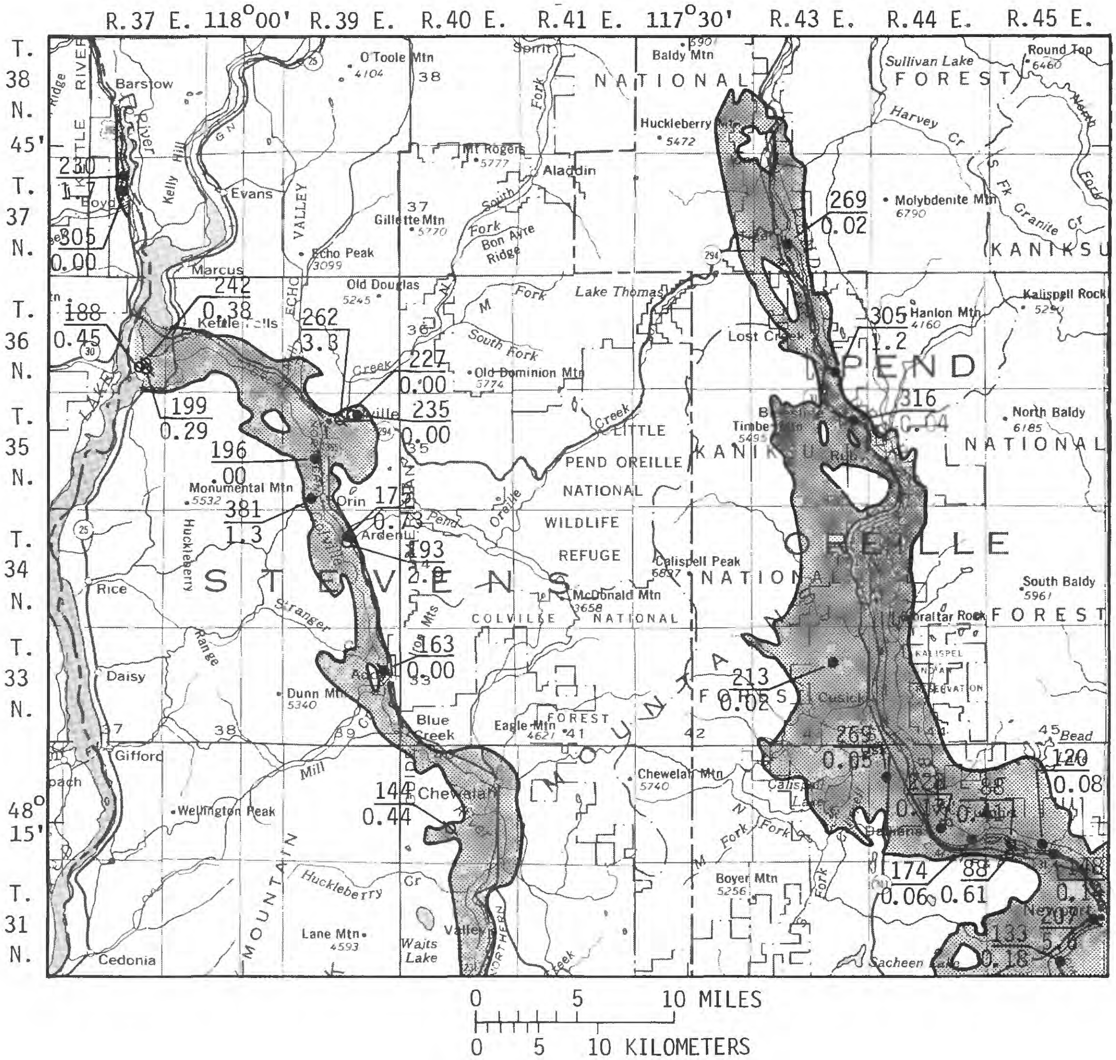


FIGURE 13.--Major ion percentages in water from the Curlew-Sanpoil subregion wells.



EXPLANATION

Area underlain by unconsolidated alluvial and glacial deposits in the vicinity of the sample sites. Source: Huntting, M.T., and others, 1961, Geologic Map of Washington.

● Well sampled in 1979

o Well sampled prior to 1979

Well sampled for trace metals

144 dissolved solids, in mg/L

0.44 nitrate as N, in mg/L

FIGURE 14.--The Colville-Kettle and Pend Oreille subregions showing sample sites and average nitrate and dissolved-solids concentrations.

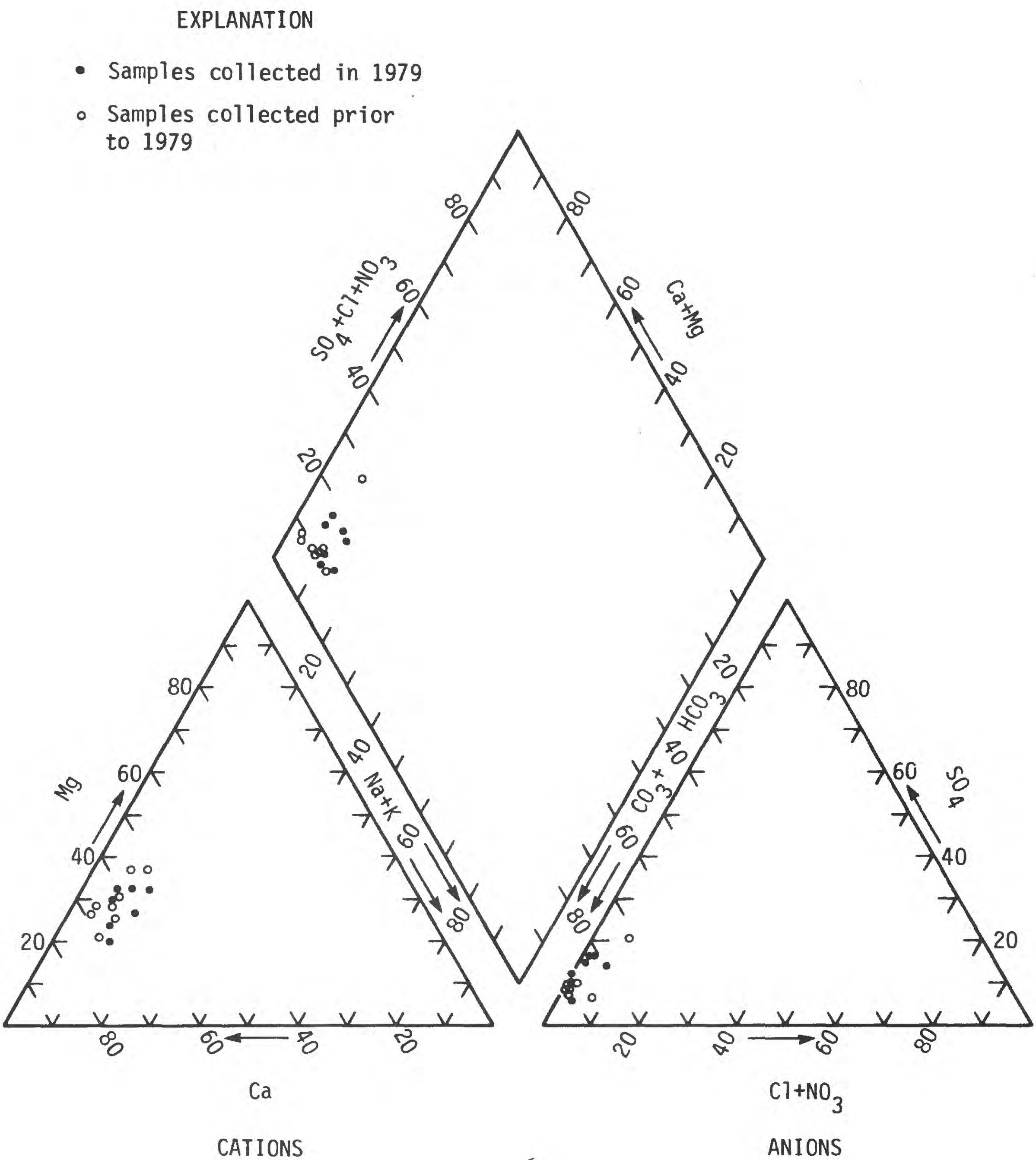


FIGURE 15.--Major ion percentages in water from the Colville-Kettle subregion wells.

Pend Oreille Subregion

Alluvial and glacial deposits along the Pend Oreille River form the principal aquifers in the Pend Oreille subregion. The wells sampled in the subregion extend from the vicinity of Newport north to Tiger (fig. 14). Ground water in the subregion is used primarily for domestic, municipal, and irrigation purposes.

Ground-water-quality data for the subregion appear in tables 22 and 24 and are summarized in table 23. In 5 of the 12 samples for which a manganese determination was done, concentrations exceeded the recommended limit of 50 ug/L. Iron concentrations exceeded the recommended limit of 300 ug/L in 3 of 13 samples. No other constituents exceeded maximum contaminant levels specified by U.S. Environmental Protection Agency primary or secondary drinking water regulations.

Nitrate concentrations were generally low. The median NO_3-N concentration was 0.14 mg/L. The sample from well 31/45-24B1 had a nitrate concentration of 5.6 mg/L. The source of nitrate is unknown, but on the basis of other data it appears to be local. As shown in figure 16, the major ions in the ground water sampled were calcium, magnesium, and bicarbonate. Hardness values ranged from soft to hard.

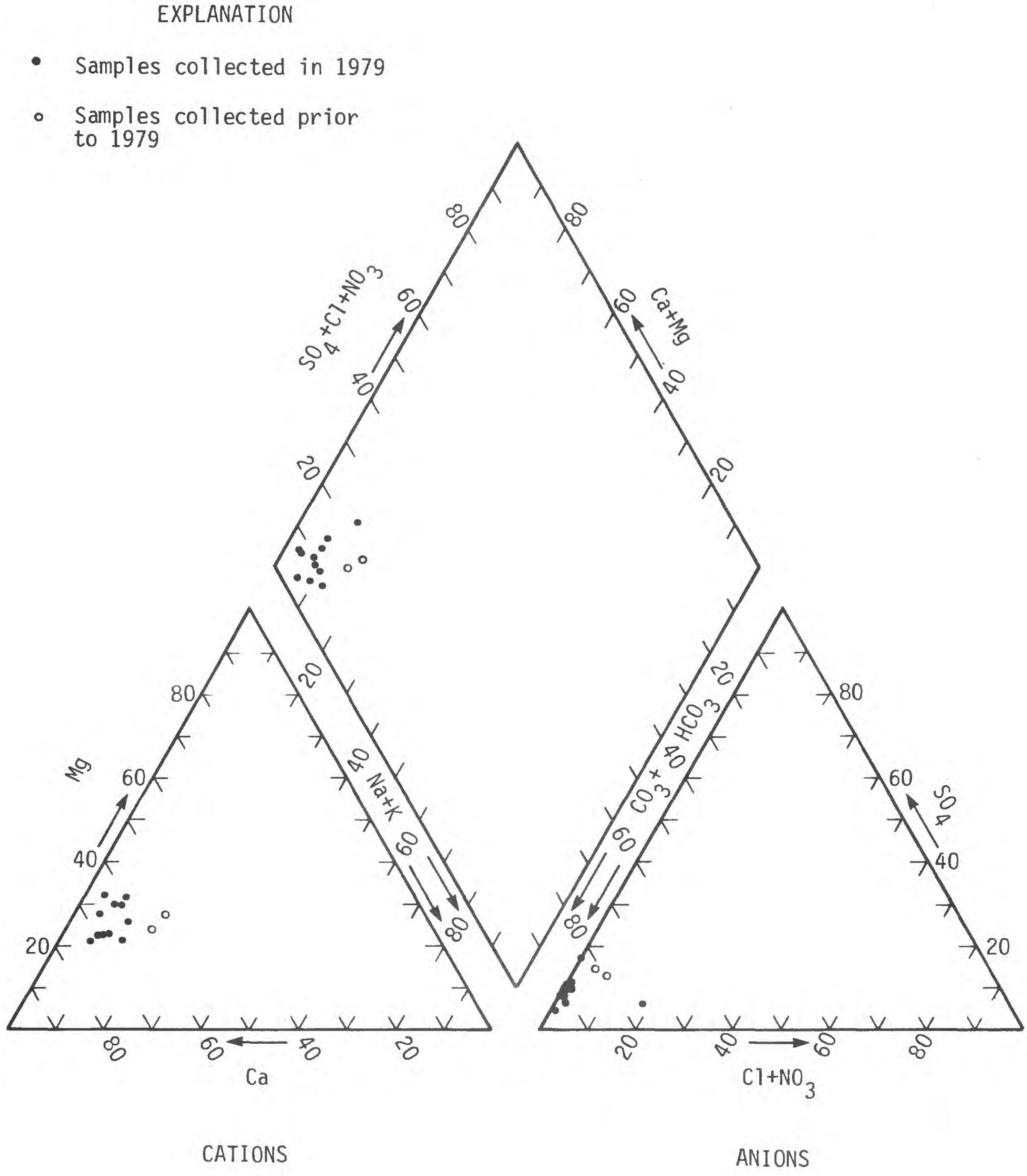


FIGURE 16.--Major ion percentages in water from the Pend Oreille subregion wells.

OKANOGAN REGION

The Okanogan Region is located in north-central Washington, and its boundaries enclose the part of the Okanogan River basin that lies within the United States (fig. 1). Alluvial and glacial deposits, which occur primarily in and adjacent to the major valleys, contain the main volume of ground water in the region (fig. 17). Ground water withdrawn from the aquifer is used for agricultural, industrial, municipal, and domestic purposes.

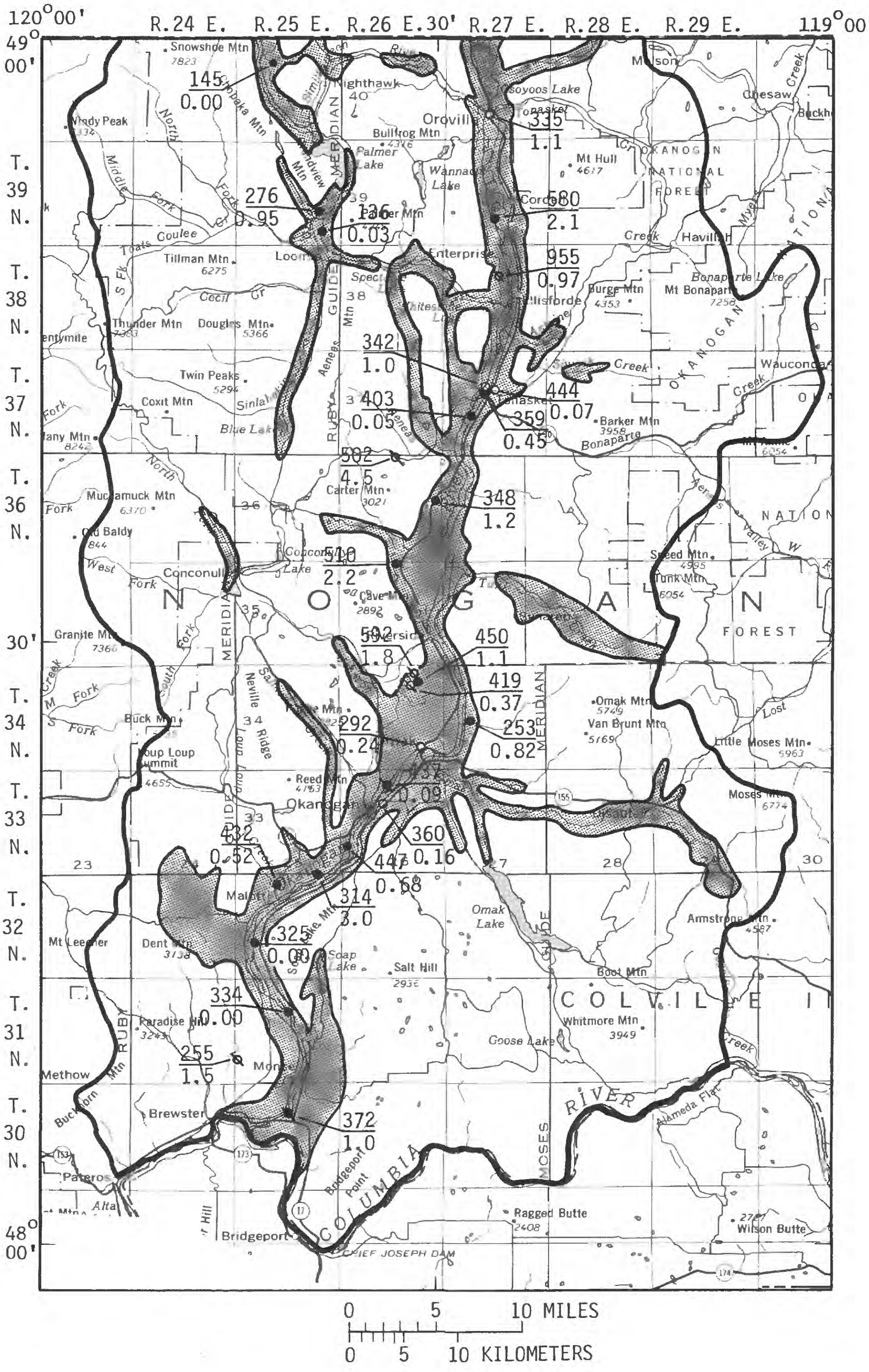
Physical, chemical, and biological water-quality data for wells sampled in the Okanogan Region are shown in table 25 and are summarized in table 26. Additional trace-element data appear in table 27.

The median values for dissolved-solids concentrations were 359 mg/L for analytical determinations (residue or evaporation at 180°C) and 340 mg/L based on the sum of dissolved constituents. The recommended limit for the dissolved-solids concentration in drinking water of 500 mg/L was exceeded in 5 of 28 samples. For irrigation purposes the salinity hazard of ground-water samples ranged from low to high, and the sodium hazard was low in all samples except from well 38/27E-10N1, where it was high.

Figure 18 illustrates the variation in the chemical composition of ground water sampled in the region. There is a distinct variability in anionic composition where, in many samples, percentages of carbonate and bicarbonate are low compared with ground water from other northeastern-north central aquifer regions. There was less dispersion in the plot of cation percentages than anion percentages; however, the high percentage of sodium in water from well 38/27E-10N1 is unique compared with other samples.

In addition to dissolved solids, other constituent concentrations found to exceed maximum contaminant levels specified by U.S. Environmental Protection Agency primary and secondary drinking water regulations were iron, manganese, sulfate, and selenium. Iron concentrations in excess of the recommended limit of 300 ug/L were found in samples from four wells; however, excessive iron in ground water does not appear to be a pervasive problem in the region. Median concentrations for dissolved and total-recoverable iron were 10 and 50 ug/L, respectively. Manganese concentrations in samples from 5 of 17 wells exceeded the recommended limit of 50 ug/L. The five wells were scattered throughout the region, indicating local influences rather than extensive areas where the ground water had high manganese concentrations. Two samples contained dissolved sulfate in excess of the recommended limit of 250 mg/L. Although a graph showing the percentage composition of anions indicates some shift toward sulfate and chloride (fig. 18), the median sulfate concentration of 73.5 mg/L is well below the recommended limit.

The only constituent to exceed maximum contaminant limits set by the U.S. Environmental Protection Agency primary drinking water regulations was selenium, at a concentration of 12 ug/L in water from irrigation well 30/25E-10N1.



EXPLANATION

Area underlain by unconsolidated alluvial or glacial deposits of sufficient thickness to provide yields of water to wells. Source: Walters (1974).

- ● Well sampled in 1979
- ○ Well sampled prior to 1979
- Well sampled for trace metals
- 447 dissolved solids, in mg/L
- 0.68 nitrate as N, in mg/L
- ── Boundary of aquifer region

FIGURE 17.--The Okanogan Region showing sample sites and average nitrate and dissolved-solids concentrations.

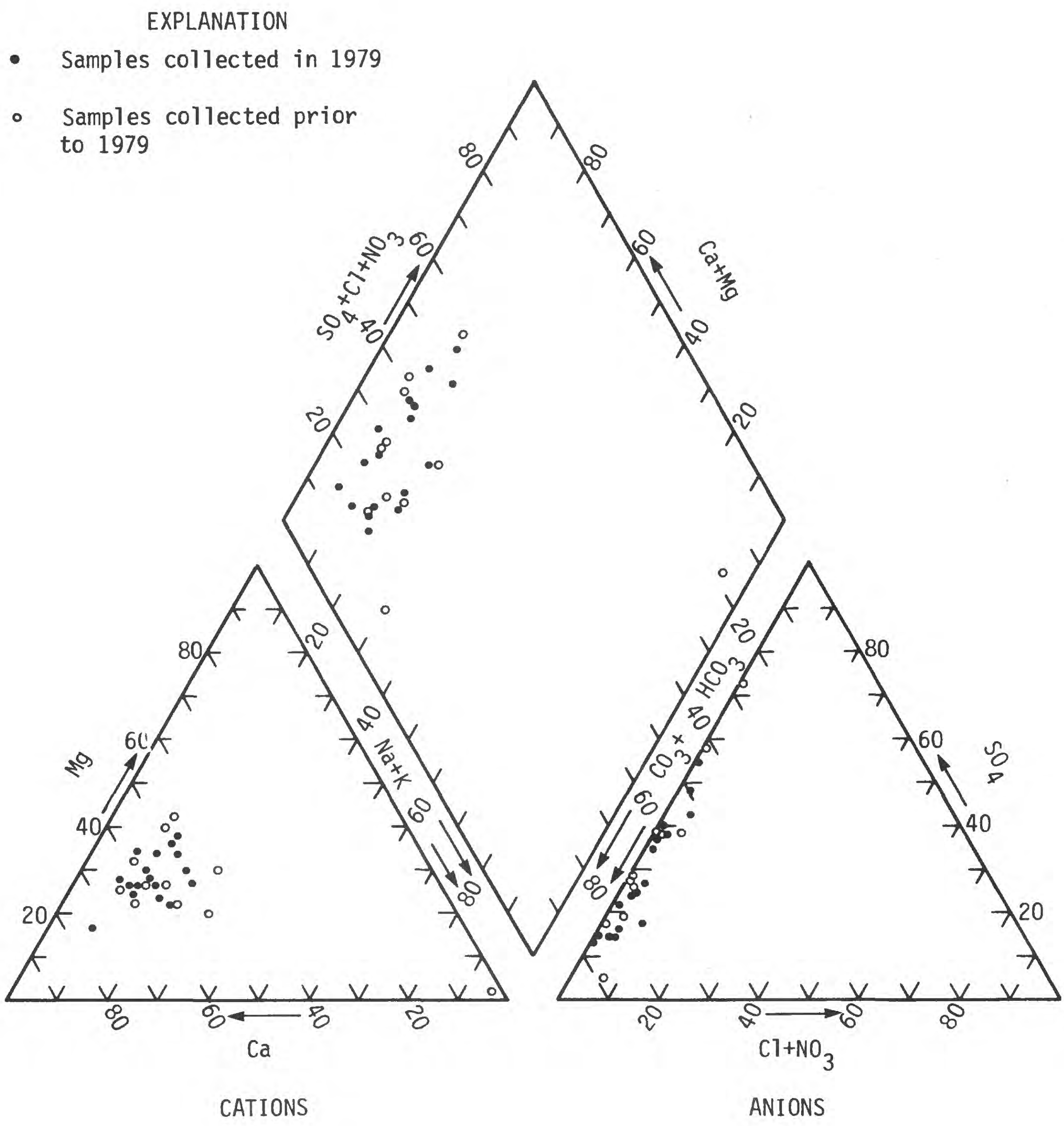


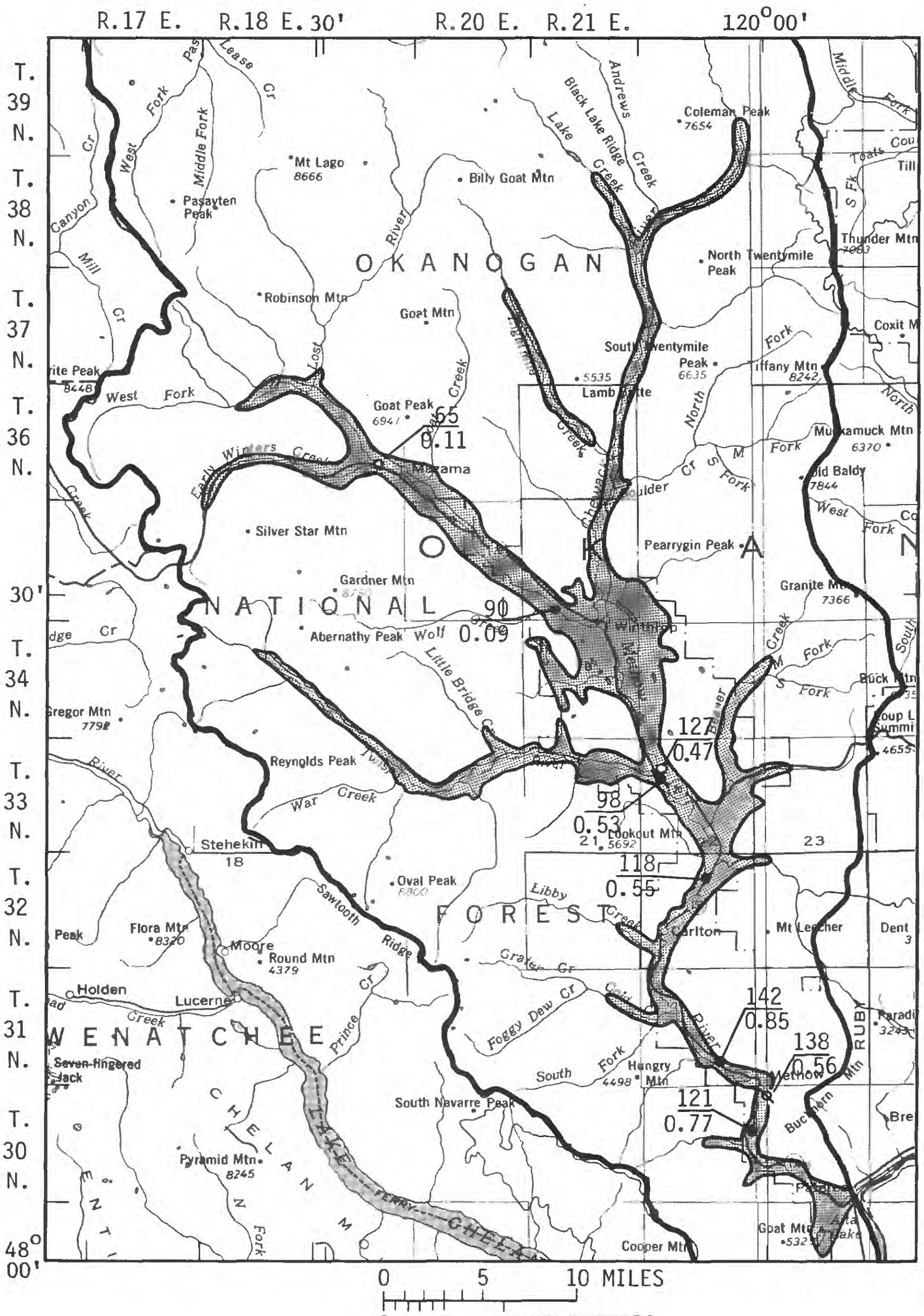
FIGURE 18.--Major ion percentages in water from the Okanogan Region wells.

METHOW REGION

The Methow Region is located in the western one-third of Okanogan County, between the crest of the Cascade Range and the Okanogan River basin (fig. 1). Population in the region is sparse and is concentrated along the Methow River valley between Mazama and Pateros.

Alluvial and glacial deposits along the Methow River and its tributaries constitute the major ground-water reservoir in the region (fig. 19). Ground water is used for agricultural, industrial, municipal, and domestic purposes.

Wells sampled in the Methow aquifer region are shown in figure 19. Physical, chemical, and biological water-quality data for water from these wells appear in tables 28 and 30 and are summarized in table 29. These data indicate that the ground water in the region is of adequate quality for most uses. None of the maximum contaminant levels specified by U.S. Environmental Protection Agency primary and secondary drinking water regulations was exceeded. The hardness of the ground water ranged from soft to moderately hard, making the water acceptable for most uses. Calcium and magnesium were the major cations and bicarbonate was the principal anion in the samples (fig. 20). The ground water had a low sodium-adsorption ratio, indicating its suitability for irrigation.



EXPLANATION

Area underlain by unconsolidated alluvial or glacial deposits of sufficient thickness to provide substantial yields of water to wells. Source: Walters and Nassar (1974).

- ● Well sampled in 1979
- ○ Well sampled prior to 1979
- Well sampled for trace metals
- 90 dissolved solids, in mg/L; 0.09 nitrate as N, in mg/L
- ▬ Boundary of aquifer region

FIGURE 19.--The Methow Region showing sample sites and average nitrate and dissolved-solids concentrations.

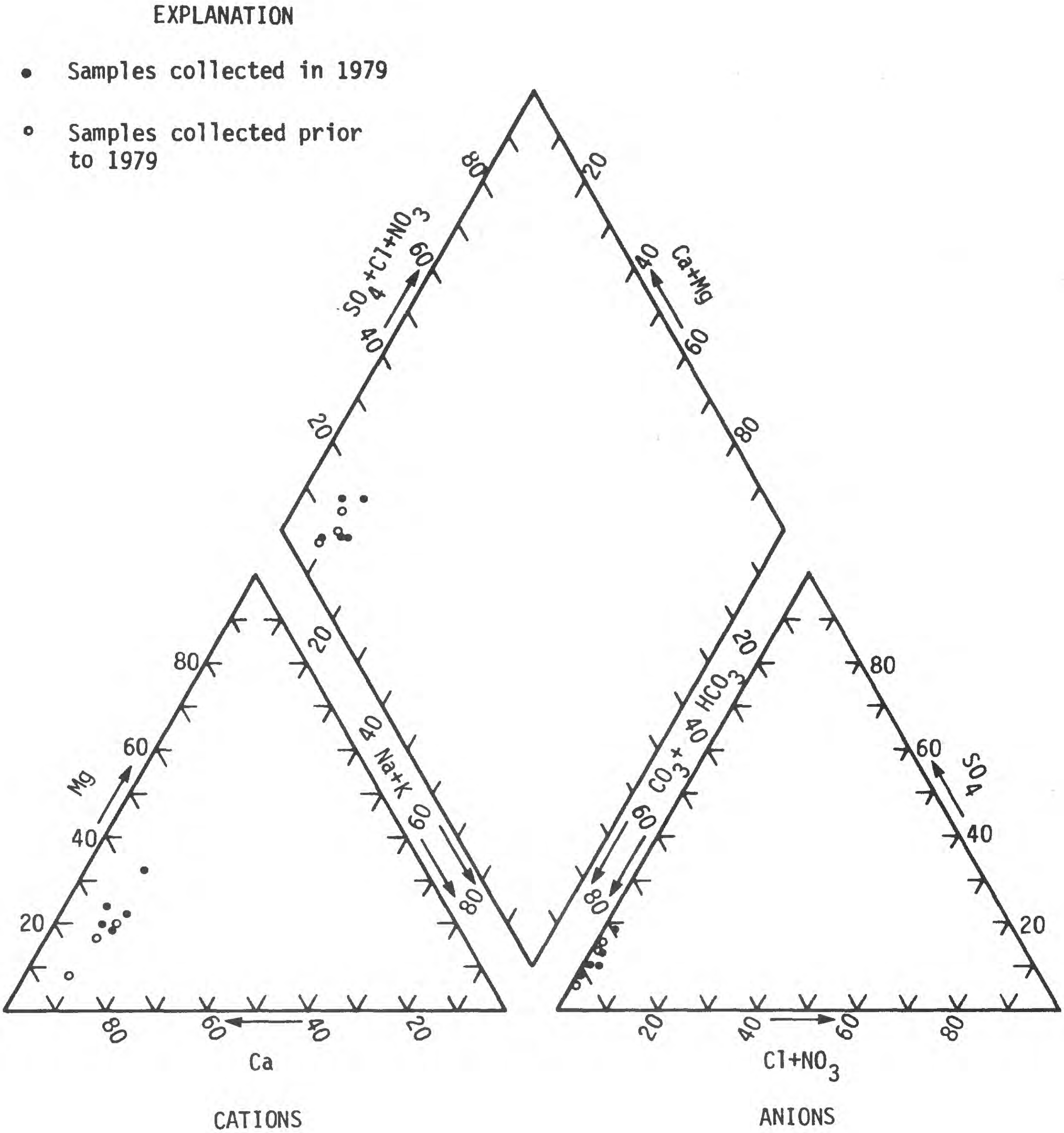


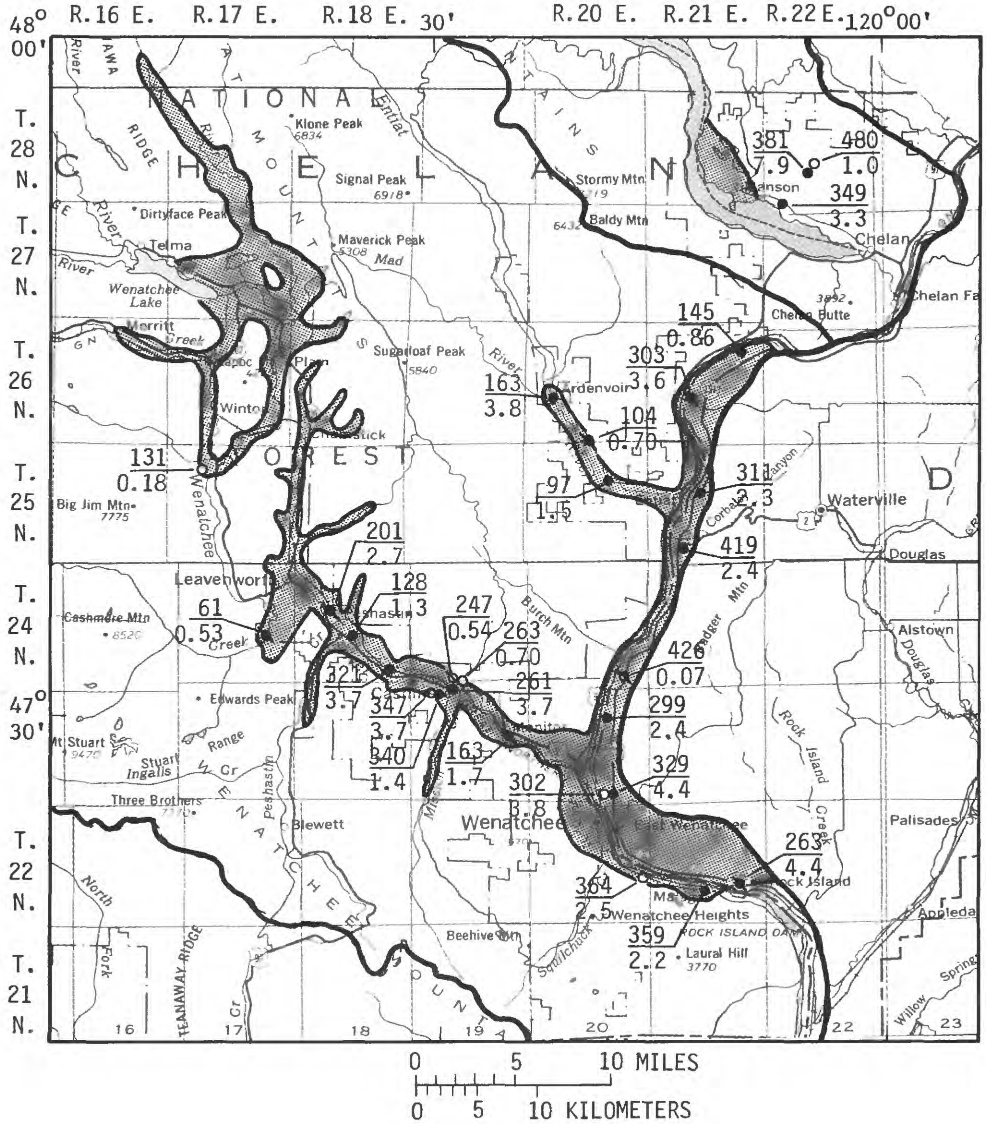
FIGURE 20.--Major ion percentages in water from the Methow Region wells.

CHELAN REGION

The Chelan Region lies between the Entiat-Wenatchee Region and the Methow Region, extending from the crest of the Cascade Range to the Columbia River (fig. 1). The principal aquifers in the region are the glacial and alluvial deposits along the Stehekin River, a tributary to Lake Chelan, and the glacial terrace deposits along the lower portion of the lake. In the vicinity of Manson, some wells have also been developed in the pre-Tertiary formations, which are chiefly metamorphic, granitic, and consolidated sedimentary rocks with low permeabilities.

The three wells sampled in the region are shown in figure 21. Ground-water development in the area is limited, and most wells are along the lower end of the lake in the terrace deposits or in the hills above the lake. Because of the limited development, only two wells, 28/22-32P1 and 28/22-28B1, were sampled during 1979. Well 28/22-21J1 was sampled in 1971.

Physical, chemical, and biological water-quality data for ground-water samples from the region are shown in table 31. Figure 22 illustrates the variation in chemical composition of ground water sampled in the region. Water from well 28/22-32P1, which was terminated in glacial deposits, had a higher percentage of sodium than water from the wells 28/22-32P1 and 28/22-28B1, which were terminated in the pre-Tertiary rocks. Dissolved-solids concentrations in samples from the three wells ranged from 349 to 480 mg/L, and hardness ranged from moderately hard to very hard.



EXPLANATION

Area underlain by unconsolidated alluvial and glacial deposits in the vicinity of the sample sites. Source: Huntting, M.T., and others, 1961, Geologic Map of Washington.

- ● Well sampled in 1979
- o Well sampled prior to 1979
- ⌀ Well sampled for trace metals
- 201 dissolved solids, in mg/L / 2.7 nitrate as N, in mg/L
- — Boundary of aquifer region

FIGURE 21.--The Chelan and Entiat-Wenatchee Regions showing sample sites and average nitrate and dissolved-solids concentrations.

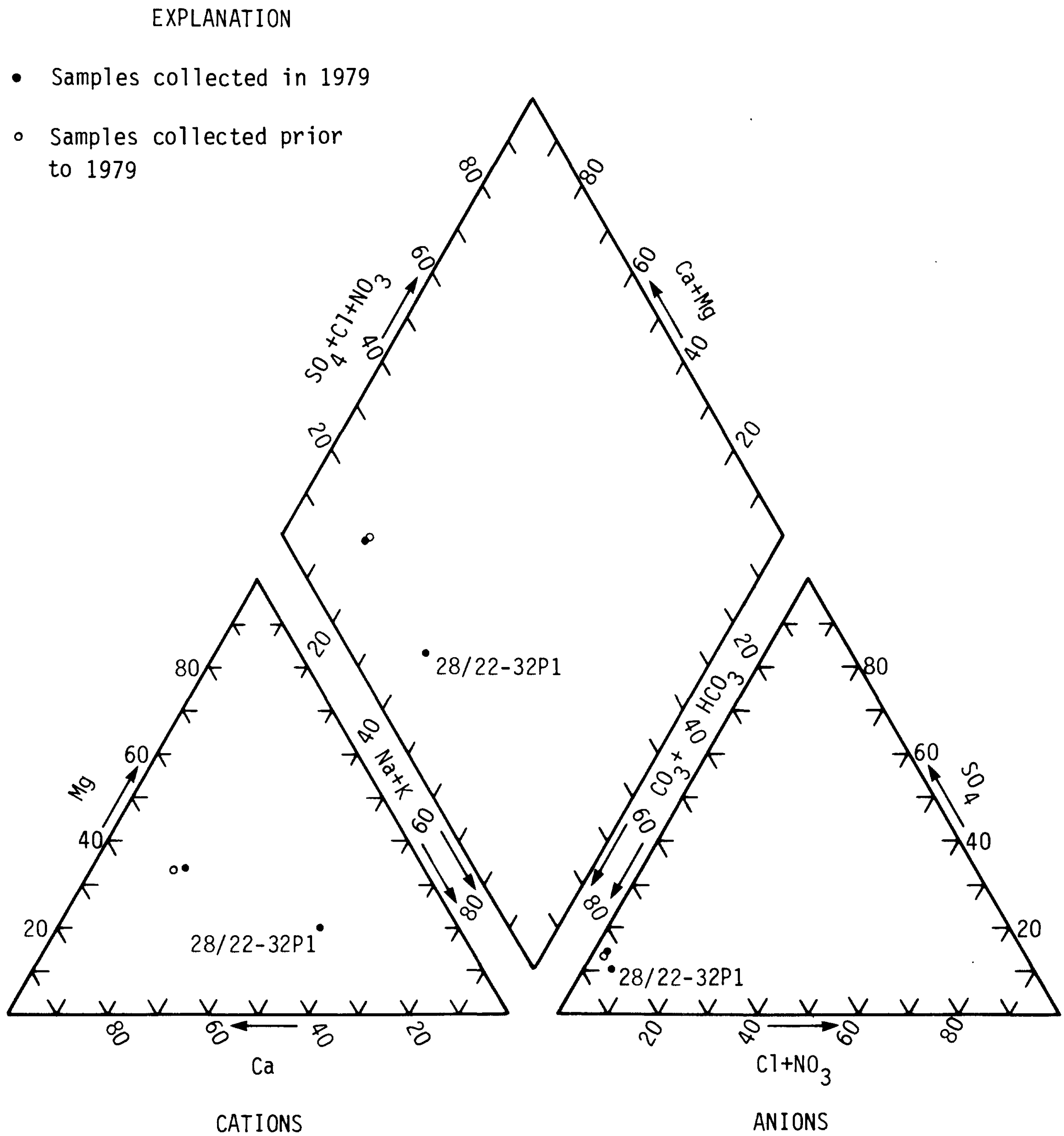


FIGURE 22.--Major ion percentages in water from the Chelan Region wells.

ENTIAT-WENATCHEE REGION

The principal aquifers in the Entiat-Wenatchee Region are the alluvial and glacial deposits in the Entiat and Wenatchee River valleys and the alluvial and glacial deposits along the Columbia River (fig. 21). On the east side of the Columbia River in Douglas County, wells extending from Rock Island north to township 27 N. were sampled. In Chelan County, most sample sites were located along the Entiat and Wenatchee River valleys; however, two wells were sampled on the west side of the Columbia River near Malaga. Ground water withdrawn from these aquifers is used for agricultural, industrial, municipal, and domestic purposes.

In the following discussion on ground-water quality, the region is divided into the Entiat subregion, which includes the Entiat River valley and the adjacent area on the eastern side of the Columbia River, and the Cashmere subregion, which includes the Wenatchee River valley and the area in townships 22, 23, and 24 N., adjacent to the Columbia River.

Entiat Subregion

In the Entiat subregion, three wells were sampled along the Entiat River valley and four were sampled along the Columbia River in Douglas County. The water-quality data for the subregion appear in tables 32 and 34 and are summarized in table 33. None of the constituent concentrations exceeded maximum contaminant levels specified by U.S. Environmental Protection Agency primary and secondary drinking water regulations. Dissolved-solids concentration samples ranged from 97 to 394 mg/L. The median dissolved-solids concentration in the samples collected from wells along the Entiat River was 104 mg/L, and for samples collected in Douglas County, 307 mg/L. Although the median dissolved-solids concentration was higher in the Douglas County samples, there was no definitive difference in the percentage composition of cations and anions in samples from the two counties (fig. 23). Samples from well 26/21E-21N2 had a higher percentage of sulfate compared with other samples from the subregion.

For irrigation purposes, the ground water sampled had a low sodium hazard and a low to medium salinity hazard.

Cashmere Subregion

Wells sampled in the Cashmere subregion include those in Chelan County in the Wenatchee River valley and along the Columbia River, and those along the Columbia River in Douglas County (fig. 21).

Plots of the percentages of anions and cations in samples from the subregion appear in figure 24, and water-quality data are summarized in tables 35, 36, and 37. In all samples except from well 24/20E-35J1, bicarbonate is the major anion. There is, however, considerable variation in the percentages of calcium and magnesium. Calcium was the principal cation in samples from wells adjacent to the Columbia River in Douglas County. The only sample from a well adjacent to the Columbia River in Chelan County with a complete cation-anion analysis was from well 22/20E-24R1. Calcium was also the principal cation in that sample (fig. 24). Samples from wells in the Wenatchee River valley had, in general, a higher percentage of magnesium than samples from wells along the Columbia River. Samples with the highest percentage magnesium were from wells in township 24 N. and ranges 17 and 18 E.

Dissolved-solids concentrations in samples from Douglas County wells ranged from 238 to 426 mg/L, and from wells in Chelan County, from 41 to 364 mg/L. Well 24/17E-23Q1, which is adjacent to Icicle Creek, was sampled in 1970 and 1979. Dissolved-solids concentrations in these samples were 81 and 41 mg/L, respectively, which were the lowest of the subregion.

Nitrate concentrations in ground-water samples from the subregion appear on figure 21 and in table 35. The median NO_3-N concentration was 2.7 mg/L, and there were few samples in which the NO_3-N concentration was less than 1 mg/L. In the upper part of the Wenatchee River basin, NO_3-N concentrations were less than 1 mg/L in samples from well 25/17E-8G1, sampled in 1965, and in well 24/17E-23Q1, sampled in 1970 and 1979. NO_3-N concentrations of 0.70 and 0.54 mg/L were found in samples from City of Cashmere wells 23/19E-24D1 and 23/19E-24D2, respectively. These wells were sampled in 1961 and 1939. A third City of Cashmere well, 24/19E-24E1, located near wells -D1 and -D2 and was sampled in 1979, had a NO_3-N concentration of 3.7 mg/L. In Douglas County, well 24/20E-35J1 was sampled in 1971, and the nitrate concentration of the sample was 0.07 mg/L as N. No other water from wells in the subregion sampled during or prior to 1979 had a lower nitrate concentration; however, this well, which is terminated at 260 ft, is over 100 ft deeper than any of the other wells sampled.

The only constituents in ground-water samples from the subregion that exceeded maximum contaminant levels specified by U.S. Environmental Protection Agency primary and secondary drinking water regulations were iron and manganese (table 35). For irrigation purposes, the ground water sampled had a low sodium hazard and a low to medium salinity hazard.

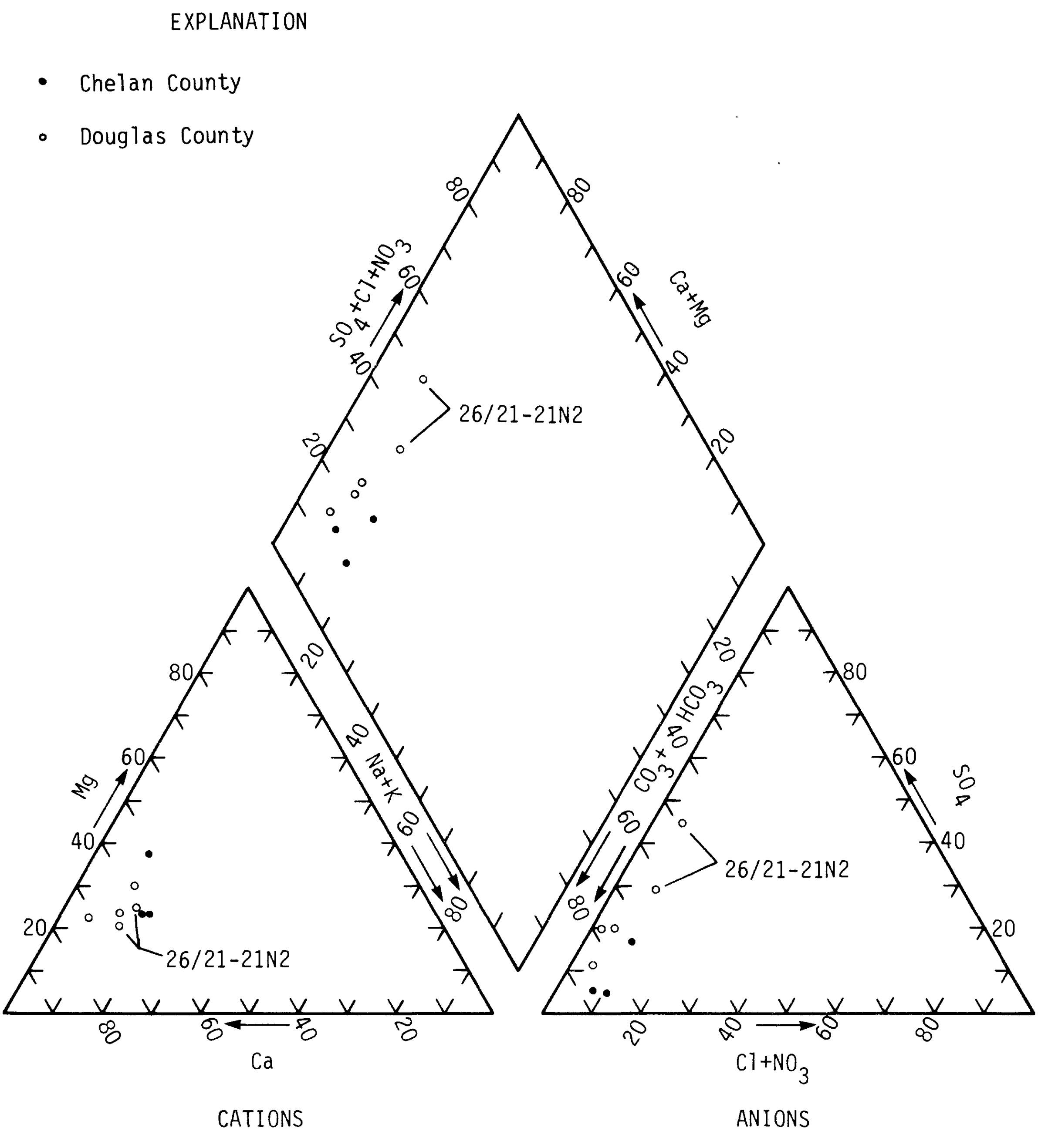


FIGURE 23.--Major ion percentages in water from the Entiat subregion wells.

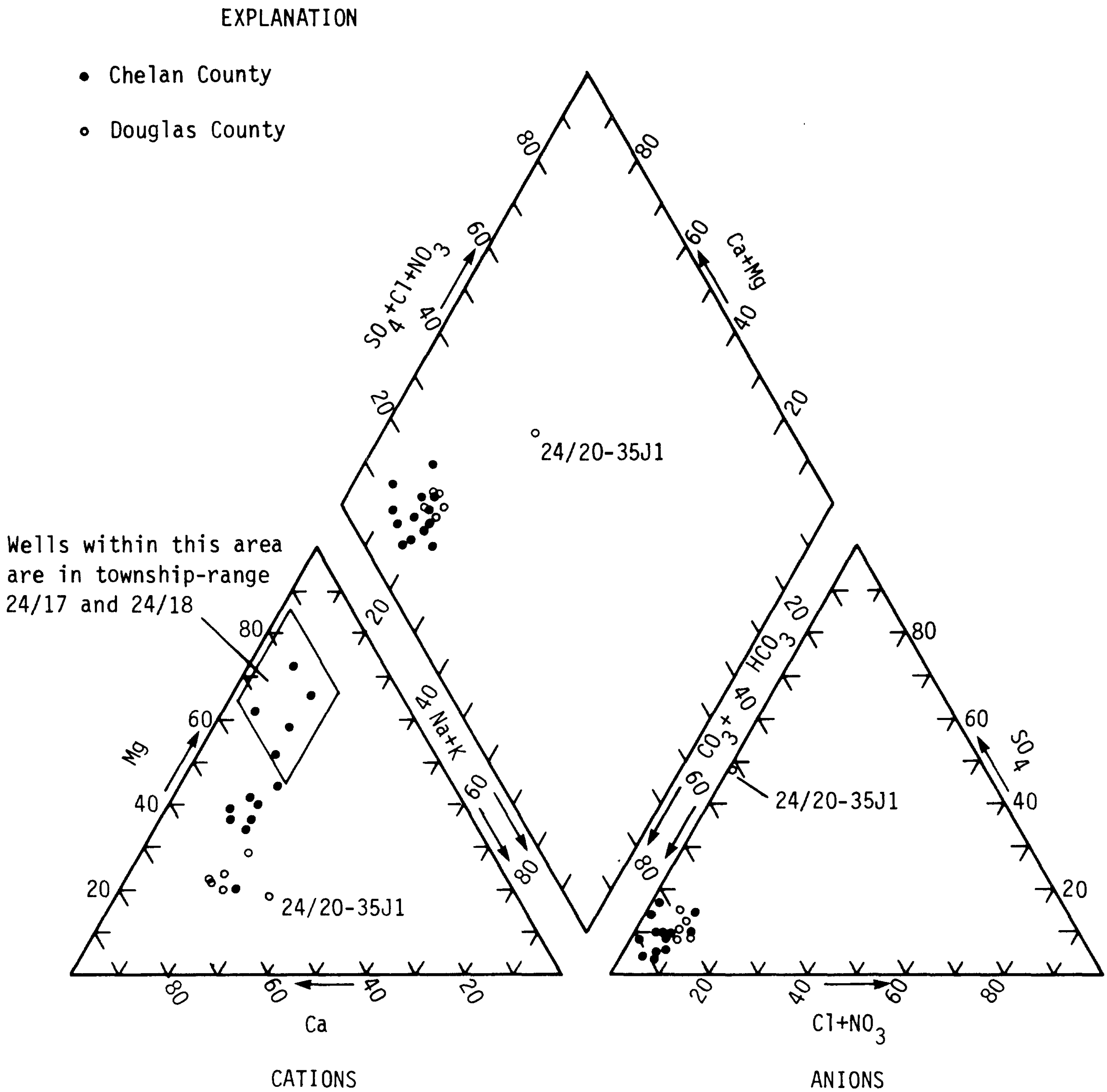


FIGURE 24.--Major ion percentages in water from the Cashmere subregion wells.

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TABLE 3.--Physical, biological, and major chemical-constituent data for Spokane Valley ground water sampled during 1979

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)
Spokane County										
25/42E-11E01	112GLCV	79-06-22	201	1707.00	261	8.0	10.4	<1	130	30
25/43E-04R02	112GLCV	79-07-10	227	2047.00	274	7.7	10.8	<1	130	10
25/43E-08A01	112GLCV	79-07-05	124	1946.00	234	8.0	11.1	<1	120	10
25/43E-23A01	112GLCV	79-06-19	142	1935.00	342	7.5	11.4	<1	170	31
25/44E-03B01	112GLCV	79-06-20	122	1989.80	515	7.4	11.5	<1	260	29
25/44E-07C01	112GLCV	79-06-20	90	1956.00	310	7.5	10.8	--	210	70
25/44E-13M01	112GLCV	79-06-19	125	2040.20	244	7.7	13.0	<1	120	20
25/44E-16E01	112GLCV	79-06-20	128	2015.00	286	7.5	9.8	<1	140	19
25/44E-18D02	112GLCV	79-06-20	120	1951.00	285	7.5	10.5	<1	140	10
25/44E-27L01	112GLCV	79-06-19	180	2013.50	498	7.7	12.4	<1	250	30
25/45E-03M01	112GLCV	79-07-10	138	2050.00	316	7.6	9.2	<1	150	10
25/45E-07A03	112GLCV	79-07-06	170	2021.00	311	7.6	9.0	<1	150	10
25/45E-17D03	112GLCV	79-07-06	215	2036.00	167	7.6	11.2	<1	79	12
26/42E-08A01	112GLCV	79-07-12	300	1740.00	367	8.1	11.2	<1	170	0
26/42E-11F01	110ALVM	79-06-21	38	1560.00	291	8.0	11.7	<1	140	20
26/42E-12A01S	110ALVM	79-06-21	--	1590.00	295	8.2	12.0	K14	150	20
26/42E-17A02	112GLCV	79-06-21	72	1640.00	176	7.8	7.8	<1	80	14
26/42E-20B01	112GLCV	79-06-22	140	1624.00	350	7.8	9.6	<1	160	10
26/43E-03P01	112GLCV	79-06-20	203	1887.00	310	7.9	12.2	<1	160	20
26/43E-07K01	112GLCV	79-06-21	164	1790.00	328	8.0	11.8	<1	160	30
26/43E-17J01	112GLCV	79-06-20	248	1966.00	320	7.8	11.6	<1	160	20
26/43E-20D01	112GLCV	79-06-21	286	1949.00	253	8.2	10.8	<1	130	20

K Based on colony count outside the ideal range.

TABLE 3.--Continued

LOCAL IDENT- I- FIER	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)	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	ALKA- LINITY (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
25/42E-11E01	33	11	3.8	.1	1.9	122	0	100	18	4.1
25/43E-04B02	28	14	3.4	.1	2.1	146	0	120	15	2.5
25/43E-08A01	32	10	3.1	.1	1.8	134	0	110	15	2.2
25/43E-23A01	44	15	6.1	.2	1.4	170	0	139	15	5.9
25/44E-03B01	68	23	8.6	.2	4.3	282	0	231	19	8.5
25/44E-07C01	58	17	4.2	.1	2.3	171	0	140	16	2.7
25/44E-13M01	32	10	3.0	.1	1.9	122	0	100	12	2.0
25/44E-16E01	33	14	3.2	.1	2.0	147	0	121	15	2.0
25/44E-18D02	34	14	3.4	.1	2.1	159	0	130	15	2.0
25/44E-27L01	65	21	9.3	.3	3.7	268	0	220	18	8.4
25/45E-03M01	33	17	3.0	.1	2.2	171	0	140	17	1.2
25/45E-07A03	33	17	3.2	.1	2.0	171	0	140	17	1.0
25/45E-17D03	19	7.7	2.1	.1	1.6	82	0	67	12	.9
26/42E-08A01	37	20	4.1	.1	3.1	220	0	180	16	1.7
26/42E-11F01	32	15	3.7	.1	1.3	146	0	120	22	3.2
26/42E-12A01S	32	17	3.5	.1	2.4	159	0	130	22	2.8
26/42E-17A02	23	5.5	3.1	.2	1.9	80	0	66	16	1.6
26/42E-20B01	43	13	10	.3	3.0	183	0	150	18	4.1
26/43E-03P01	40	15	4.5	.2	2.3	171	0	140	16	4.4
26/43E-07K01	33	18	4.5	.2	2.3	159	0	130	24	5.4
26/43E-17J01	34	19	3.7	.1	2.3	171	0	140	20	3.0
26/43E-20D01	28	14	3.2	.1	1.8	134	0	110	21	2.2

TABLE 3.--Continued

LOCAL IDENT- I- FIER	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
25/42E-11E01	.1	11	147	.84	10	10
25/43E-04B02	.1	12	154	1.1	0	<1
25/43E-08A01	.1	11	146	1.1	10	<1
25/43E-23A01	.1	14	199	3.0	10	10
25/44E-03B01	.1	22	318	5.8	10	0
25/44E-07C01	.1	9.8	201	1.4	20	0
25/44E-13M01	.1	11	139	1.6	10	10
25/44E-16E01	.0	9.7	158	1.4	10	0
25/44E-18D02	.1	10	165	1.4	0	0
25/44E-27L01	.1	18	297	4.8	10	0
25/45E-03M01	.1	12	175	1.1	0	<1
25/45E-07A03	.1	12	174	1.0	0	<1
25/45E-17D03	.1	11	98	.66	0	<1
26/42E-08A01	.1	13	204	.00	110	100
26/42E-11F01	.1	11	166	1.4	0	0
26/42E-12A01S	.1	9.8	174	1.3	0	0
26/42E-17A02	.2	9.3	102	.01	1800	360
26/42E-20B01	.2	28	220	2.4	10	0
26/43E-03P01	.1	12	185	1.4	0	0
26/43E-07K01	.0	9.9	185	2.1	0	10
26/43E-17J01	.0	9.3	184	1.9	10	0
26/43E-20D01	.1	.1	141	1.1	10	0

TABLE 4.--Summary of physical, biological, and major chemical-constituent data for Spokane Valley ground water sampled during 1979

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration Maximum	Minimum	Median
Specific conductance (umho)	22	515	167	303
pH (units)	22	8.2	7.4	7.6
Temperature (°C)	22	7.4	8.2	7.75
Fecal-coliform bacteria (col/100 mL)	21	14	<1	<1
Hardness (as $CaCO_3$)	22	260	79	150
Hardness, noncarbonate (as $CaCO_3$)	22	70	0	20
Calcium, dissolved	22	68	19	33
Magnesium, dissolved	22	23	5.5	15
Sodium, dissolved	22	10	2.1	3.6
Sodium-adsorption ratio	22	.3	.1	.1
Potassium, dissolved	22	4.3	1.3	2.1
Bicarbonate	22	282	80	164
Carbonate	22	0	0	0
Alkalinity (as $CaCO_3$)	22	231	66	130
Sulfate, dissolved	22	24	12	16.5
Chloride, dissolved	22	8.5	.9	2.6
Fluoride, dissolved	22	.2	.1	.1
Silica, dissolved (as SiO_2)	22	28	.1	11
Solids, dissolved (residue at 180°C)	--	--	--	--
Soilds, dissolved (sum of constituents)	22	318	98	174
Nitrate (as N)	22	5.8	.01	1.4
Iron, total recoverable (ug/L)	--	--	--	--
Iron, dissolved (ug/L)	22	1,800	10	10
Manganese, total recoverable (ug/L)	--	--	--	--
Manganese, dissolved (ug/L)	22	360	<1	10

TABLE 5.--Summary of specific-conductance values in ground-water samples from the Spokane Valley

LOCAL IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM (MICRO-MHOS)	MINIMUM (MICRO-MHOS)	MEAN MICRO-MHOS)	NUMBER OF SAMPLES
25/42E-03H01	124	1977	1978	300	251	273	3
25/42E-11E01	201	1947	1979	325	194	249	17
25/42E-11E02	52	1948	1961	275	184	207	14
25/42E-11M02	230	1955	1965	279	257	273	8
25/42E-13B01	200	1942	1978	410	268	344	10
25/42E-14J01	160	1977	1977	189	189	189	1
25/42E-23B01	59	1977	1978	300	258	278	3
25/43E-04B02	227	1952	1980	372	274	326	3
25/43E-08A01	124	1978	1980	252	233	240	3
25/43E-08D01	-	1942	1942	245	245	245	1
25/43E-09G01	32	1951	1951	73	73	73	1
25/43E-09G03	73	1977	1978	190	97	149	3
25/43E-10P02	96	1977	1978	350	260	285	15
25/43E-11B03	128	1977	1978	145	111	132	3
25/43E-11D02	80	1977	1978	165	145	154	3
25/43E-11E02	-	1977	1977	160	160	160	1
25/43E-11G04	44	1962	1962	294	294	294	1
25/43E-11J03	125	1960	1962	301	287	293	3
25/43E-11M03	98	1977	1978	280	245	267	16
25/43E-11N01	70	1977	1978	320	300	309	3
25/43E-11R01	104	1977	1978	440	281	350	3
25/43E-12H01	94	1971	1978	360	264	313	18
25/43E-12L02	100	1977	1978	490	340	415	2
25/43E-13A01	110	1973	1978	270	216	257	9
25/43E-13H01	71	1974	1974	265	265	265	1
25/43E-13R01	140	1977	1977	275	275	275	1
25/43E-14E01	211	1977	1978	255	225	238	16
25/43E-14K01	83	1973	1978	400	225	265	9
25/43E-14L01	120	1977	1978	265	225	244	14
25/43E-15G02	129	1977	1978	270	235	256	3
25/43E-16K01	65	1977	1978	290	232	271	3
25/43E-17R01	100	1977	1978	450	380	423	3
25/43E-21B01	87	1977	1977	305	305	305	1
25/43E-22F01	77	1977	1978	397	350	370	3
25/43E-23A01	142	1970	1979	370	234	309	20
25/43E-23A02	150	1972	1973	400	280	312	15
25/43E-24G01	144	1971	1973	420	360	391	14
25/44E-01J01	160	1973	1974	325	284	300	4
25/44E-01R01	150	1977	1978	300	280	292	5
25/44E-02B01	127	1955	1978	430	319	352	4
25/44E-02Q01	129	1973	1979	775	310	550	11

TABLE 5.--Continued

LOCAL IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM (MICRO-MHOS)	MINIMUM (MICRO-MHOS)	MEAN MICRO-MHOS)	NUMBER OF SAMPLES
25/44E-03B01	122	1977	1979	515	465	483	3
25/44E-04R03	118	1971	1978	296	267	281	5
25/44E-05D01	202	1977	1978	290	240	270	3
25/44E-05K01	234	1977	1978	270	270	270	2
25/44E-05R01	130	1977	1978	320	261	299	3
25/44E-06A01	104	1955	1978	228	204	216	2
25/44E-07B01	120	1977	1978	350	260	320	3
25/44E-07C01	90	1973	1979	330	306	314	7
25/44E-07J02	110	1977	1978	332	300	313	3
25/44E-07J03	-	1979	1981	309	284	295	61
25/44E-08D01	112	1977	1978	340	271	310	3
25/44E-08N01	135	1978	1978	301	290	295	2
25/44E-09C01	125	1977	1978	285	250	267	3
25/44E-09C02	150	1977	1978	310	250	275	16
25/44E-09E01	-	1977	1978	300	270	288	3
25/44E-09P01	121	1977	1978	325	290	303	16
25/44E-12D01	-	1977	1978	320	280	298	3
25/44E-12M01	100	1978	1978	300	280	295	4
25/44E-13M01	125	1977	1979	370	210	275	3
25/44E-15E01	156	1942	1978	300	269	283	4
25/44E-15E02	150	1970	1973	360	232	265	15
25/44E-15J01	156	1977	1978	410	190	278	3
25/44E-16E01	128	1978	1979	286	280	284	3
25/44E-17A01	125	1977	1978	300	285	292	3
25/44E-17M01	114	1977	1978	270	256	265	3
25/44E-17R01	125	1977	1978	375	225	269	16
25/44E-18D02	120	1973	1979	285	255	273	9
25/44E-18F01	110	1977	1978	263	221	247	3
25/44E-18M01	79	1951	1951	237	237	237	1
25/44E-19D01	88	1973	1977	394	369	381	5
25/44E-20K01	129	1977	1978	360	294	327	2
25/44E-21J01	117	1977	1978	340	241	297	3
25/44E-21L01	177	1977	1978	537	247	360	3
25/44E-21N01	181	1977	1978	337	269	297	3
25/44E-22H02	160	1977	1978	380	250	315	2
25/44E-22R01	176	1977	1978	410	222	316	2
25/44E-26L01	166	1977	1978	390	320	350	3
25/44E-27E01	220	1977	1978	355	295	323	3
25/44E-27L01	180	1977	1979	529	378	482	4
25/44E-28L01	131	1977	1978	520	309	443	3

TABLE 5.--Continued

LOCAL IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM (MICRO-MHOS)	MINIMUM (MICRO-MHOS)	MEAN MICRO-MHOS)	NUMBER OF SAMPLES
25/44E-28P01	167	1977	1978	493	440	467	2
25/44E-28R01	132	1977	1978	530	374	461	3
25/44E-29A01	157	1977	1978	533	354	444	2
25/44E-29H01	154	1978	1978	367	367	367	1
25/45E-01H03	165	1977	1978	112	110	111	2
25/45E-02G02	235	1977	1978	263	240	249	3
25/45E-03M01	138	1977	1980	316	310	314	3
25/45E-04A01	135	1951	1951	297	297	297	1
25/45E-05H01	137	1977	1977	255	255	255	1
25/45E-05R02	130	1978	1978	375	250	326	10
25/45E-06D03	146	1977	1978	635	435	505	3
25/45E-07A03	170	1977	1980	311	275	295	4
25/45E-08R02	165	1978	1978	205	195	200	5
25/45E-09B01	107	1977	1978	140	135	138	2
25/45E-10F01	85	1977	1978	155	73	110	3
25/45E-11K02	225	1977	1978	115	94	105	2
25/45E-14C01	238	1977	1978	210	185	198	2
25/45E-15C01	157	1977	1978	243	240	242	2
25/45E-15D01	195	1972	1977	270	184	241	21
25/45E-15R01	155	1971	1978	145	40	116	18
25/45E-16K01	185	1973	1977	1040	780	860	5
25/45E-17D02	213	1977	1977	187	187	187	1
25/45E-17D03	215	1978	1980	170	155	164	3
25/45E-17P01	203	1977	1977	180	180	180	1
25/45E-17P02	218	1978	1978	200	165	183	2
25/45E-18A01	118	1942	1942	183	183	183	1
25/45E-18R01	190	1970	1978	210	120	165	16
25/45E-18R02	227	1978	1978	170	170	170	1
26/42E-02N01	29	1977	1978	308	280	294	2
26/42E-03E01S	-	1977	1978	265	244	255	3
26/42E-05C03	22	1977	1978	288	258	273	3
26/42E-05E01	64	1977	1978	495	325	424	16
26/42E-05F02	25	1977	1978	315	272	291	3
26/42E-06L01	94	1977	1978	315	297	306	2
26/42E-07A04	126	1977	1978	241	174	207	3
26/42E-07G01	45	1951	1951	569	569	569	1
26/42E-08A01	300	1977	1980	367	324	341	4
26/42E-08N01	58	1977	1978	374	300	329	3
26/42E-10F01	9	1977	1978	350	273	305	3
26/42E-11F01	38	1977	1979	300	280	291	4

TABLE 5.--Continued

LOCAL IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM (MICRO-MHOS)	MINIMUM (MICRO-MHOS)	MEAN MICRO-MHOS)	NUMBER OF SAMPLES
26/42E-11J01S	-	1973	1978	367	320	354	9
26/42E-12A01S	-	1973	1979	344	287	302	7
26/42E-12L01	126	1964	1978	349	312	330	4
26/42E-17A02	72	1977	1979	280	169	218	4
26/42E-20B01	140	1977	1979	350	330	343	4
26/42E-20N01	159	1954	1961	283	222	271	8
26/42E-21F02	-	1977	1978	482	301	400	3
26/42E-21R03	93	1977	1978	820	730	780	3
26/42E-23P01	578	1977	1978	300	239	270	2
26/42E-27F01	126	1977	1978	530	270	425	17
26/42E-27N01	129	1962	1978	300	269	287	9
26/42E-27N02	150	1962	1962	278	278	278	1
26/42E-34N03	71	1977	1978	306	300	303	2
26/43E-03N01	180	1977	1978	639	298	442	3
26/43E-03P01	203	1977	1979	650	300	438	4
26/43E-05D01	30	1977	1978	530	351	414	3
26/43E-05L01S	-	1973	1978	445	387	407	6
26/43E-06G01	30	1977	1978	350	260	313	3
26/43E-06J01	75	1977	1978	440	300	386	3
26/43E-07B01S	-	1973	1977	320	294	307	5
26/43E-07G01	-	1978	1978	420	310	369	7
26/43E-07K01	164	1977	1979	361	249	309	4
26/43E-07P01	126	1977	1978	387	246	308	3
26/43E-08B04	90	1964	1978	632	301	427	4
26/43E-08G02	49	1977	1978	710	602	641	3
26/43E-10K01	107	1964	1978	637	472	567	4
26/43E-16D02	285	1977	1978	350	312	334	3
26/43E-16F02	268	1960	1960	291	290	290	2
26/43E-17B01	220	1978	1978	340	336	338	2
26/43E-17J01	248	1977	1979	320	304	314	4
26/43E-19A01	163	1942	1978	308	243	270	4
26/43E-19L03	-	1977	1978	341	321	332	3
26/43E-20D01	286	1977	1979	306	215	258	4
26/43E-20N01	238	1977	1978	270	249	260	3
26/43E-21E02	246	1978	1978	387	387	387	1
26/43E-21R01	260	1978	1978	365	365	365	1
26/43E-27E01	258	1951	1978	310	248	276	4
26/43E-28Q01	274	1978	1978	350	270	308	10
26/43E-30F01	312	1977	1978	317	310	312	3
26/43E-30H01	310	1977	1978	243	215	233	3

TABLE 5.--Continued

LOCAL IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM (MICRO-MHOS)	MINIMUM (MICRO-MHOS)	MEAN MICRO-MHOS)	NUMBER OF SAMPLES
26/43E-30R02	293	1964	1978	263	235	245	4
26/43E-31A01	270	1977	1978	242	208	225	3
26/43E-34P01	210	1977	1978	340	276	319	3
26/44E-32R01	113	1955	1955	358	358	358	1
26/45E-25J01	263	1977	1978	300	225	289	15
26/45E-33N01	120	1978	1978	340	320	327	3
26/45E-34L01	198	1978	1978	240	240	240	1
26/45E-34L03	212	1977	1978	255	220	238	2
26/45E-35F01	232	1973	1978	277	230	262	5
26/45E-35F02	223	1977	1978	270	245	258	2
26/45E-36E01	149	1942	1942	295	295	295	1
26/45E-36N01	145	1973	1974	305	296	301	3
26/45E-36Q01	-	1973	1974	279	274	276	3
26/46E-30D01	190	1977	1978	300	250	262	16
26/46E-30M01	140	1978	1978	210	210	210	1
26/46E-31M01	249	1970	1978	315	208	240	15
26/46E-31M04	223	1977	1977	242	242	242	1
26/46E-31M05	222	1978	1978	315	230	272	2
26/46E-31M06	184	1978	1978	350	280	308	10

TABLE 6.--Summary of nitrate concentrations in ground water samples from the Spokane Valley

IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM NITRATE (MG/L AS N)	MINIMUM NITRATE (MG/L AS N)	MEAN NITRATE MG/L AS N)	NUMBER OF SAMPLES
25/42E-03H01	124	1977	1978	1.70	1.20	1.43	3
25/42E-11E01	201	1947	1979	1.40	0.29	0.74	17
25/42E-11E02	52	1948	1961	1.08	0.23	0.48	13
25/42E-11M02	230	1955	1965	1.11	0.84	1.02	8
25/42E-13B01	200	1942	1978	2.40	1.30	1.85	10
25/42E-14J01	160	1977	1977	0.76	0.76	0.76	1
25/42E-23B01	59	1977	1978	1.80	1.20	1.50	3
25/43E-04B02	227	1952	1980	3.61	1.10	2.27	3
25/43E-08A01	124	1978	1980	1.40	1.10	1.30	3
25/43E-08D01	-	1942	1942	0.99	0.99	0.99	1
25/43E-09G01	32	1951	1951	0.09	0.09	0.09	1
25/43E-09G03	73	1977	1978	0.72	0.24	0.45	3
25/43E-10P02	96	1977	1978	2.10	1.20	1.53	15
25/43E-11B03	128	1977	1978	0.41	0.17	0.26	3
25/43E-11D02	80	1977	1978	0.46	0.00	0.19	3
25/43E-11E02	-	1977	1977	0.67	0.67	0.67	1
25/43E-11G01	37	1939	1939	0.72	0.72	0.72	1
25/43E-11G04	44	1962	1962	1.04	1.04	1.04	1
25/43E-11J03	125	1960	1962	0.97	0.90	0.94	2
25/43E-11M03	98	1977	1978	0.94	0.80	0.89	16
25/43E-11N01	70	1977	1978	1.00	0.90	0.95	3
25/43E-11R01	104	1977	1978	1.50	1.30	1.40	3
25/43E-12H01	94	1971	1978	1.80	0.68	1.26	18
25/43E-12L02	100	1977	1978	1.40	1.30	1.35	2
25/43E-13A01	110	1973	1978	1.40	0.84	1.08	9
25/43E-13H01	71	1974	1974	1.00	1.00	1.00	1
25/43E-13R01	140	1977	1977	1.40	1.40	1.40	1
25/43E-14E01	211	1977	1978	1.30	1.10	1.21	16
25/43E-14K01	83	1973	1978	1.40	0.90	1.17	9
25/43E-14L01	120	1977	1978	1.50	1.30	1.40	14
25/43E-15G02	129	1977	1978	1.50	1.30	1.40	3
25/43E-16K01	65	1977	1978	1.70	1.40	1.53	3
25/43E-17R01	100	1977	1978	3.90	3.50	3.73	3
25/43E-21B01	87	1977	1977	2.80	2.80	2.80	1
25/43E-22F01	77	1977	1978	4.20	3.70	4.03	3
25/43E-23A01	142	1970	1979	9.20	1.40	2.84	20
25/43E-23A02	150	1972	1973	3.50	1.60	2.52	15
25/43E-24G01	144	1971	1973	5.60	2.30	3.64	14
25/44E-01J01	160	1973	1974	2.10	0.71	1.11	4
25/44E-01R01	150	1977	1978	1.20	0.88	0.98	5

TABLE 6.--Continued

IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM NITRATE (MG/L AS N)	MINIMUM NITRATE (MG/L AS N)	MEAN NITRATE MG/L AS N)	NUMBER OF SAMPLES
25/44E-02B01	127	1955	1978	3.40	1.54	2.38	4
25/44E-02Q01	129	1973	1978	5.40	1.40	2.68	6
25/44E-03B01	122	1977	1979	6.50	4.30	5.53	3
25/44E-04R03	118	1971	1978	1.50	1.33	1.41	4
25/44E-05D01	202	1977	1978	2.60	2.20	2.43	3
25/44E-05K01	234	1977	1978	1.80	1.70	1.75	2
25/44E-05R01	130	1977	1978	1.50	1.20	1.30	3
25/44E-06A01	104	1955	1978	1.80	1.13	1.46	2
25/44E-07B01	120	1977	1978	1.30	1.20	1.27	3
25/44E-07C01	90	1973	1979	1.40	0.76	1.07	7
25/44E-07J02	110	1977	1978	1.20	1.10	1.17	3
25/44E-07J03	-	1979	1981	1.40	0.86	1.05	67
25/44E-08D01	112	1977	1978	1.60	1.30	1.43	3
25/44E-08N01	135	1978	1978	1.60	1.00	1.30	2
25/44E-09C01	125	1977	1978	1.20	1.10	1.13	3
25/44E-09C02	150	1977	1978	1.20	1.00	1.11	16
25/44E-09E01	-	1977	1978	0.84	0.82	0.83	3
25/44E-09P01	121	1977	1978	1.00	0.84	0.93	16
25/44E-12D01	-	1977	1978	1.20	1.00	1.10	3
25/44E-12M01	100	1978	1978	0.83	0.73	0.79	5
25/44E-13M01	125	1977	1979	2.60	1.00	1.73	3
25/44E-15E01	156	1942	1978	1.20	0.54	1.01	4
25/44E-15E02	150	1970	1973	2.50	0.16	1.05	15
25/44E-15J01	156	1977	1978	2.60	0.76	1.65	3
25/44E-16E01	128	1978	1979	1.40	1.10	1.30	3
25/44E-17A01	125	1977	1978	1.20	1.00	1.10	3
25/44E-17M01	114	1977	1978	1.80	1.30	1.50	3
25/44E-17R01	125	1977	1978	2.40	1.20	1.55	16
25/44E-18D02	120	1973	1979	1.40	0.91	1.25	9
25/44E-18F01	110	1977	1978	1.40	1.10	1.23	3
25/44E-18M01	79	1951	1951	1.17	1.17	1.17	1
25/44E-19D01	88	1973	1977	3.70	2.20	2.86	5
25/44E-20K01	129	1977	1978	2.70	2.60	2.65	2
25/44E-21J01	117	1977	1978	2.30	1.50	1.87	3
25/44E-21L01	177	1977	1978	3.20	1.70	2.63	3
25/44E-21N01	181	1977	1978	3.50	2.00	2.63	3
25/44E-22H02	160	1977	1978	2.60	1.60	2.10	2
25/44E-22R01	176	1977	1978	2.80	1.60	2.20	2
25/44E-26L01	166	1977	1978	2.80	2.50	2.70	3

TABLE 6.--Continued

IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM NITRATE (MG/L AS N)	MINIMUM NITRATE (MG/L AS N)	MEAN NITRATE MG/L AS N)	NUMBER OF SAMPLES
25/44E-27E01	220	1977	1978	2.60	2.10	2.40	3
25/44E-27L01	180	1977	1979	5.70	3.70	4.75	4
25/44E-28L01	131	1977	1978	6.00	5.80	5.90	3
25/44E-28P01	167	1977	1978	5.80	5.60	5.70	2
25/44E-28R01	132	1977	1978	5.70	3.70	4.73	3
25/44E-29A01	157	1977	1978	5.60	3.60	4.60	2
25/44E-29H01	154	1978	1978	3.70	3.70	3.70	1
25/45E-01H03	165	1977	1978	0.74	0.70	0.72	2
25/45E-02G02	235	1977	1978	1.00	0.89	0.93	3
25/45E-03M01	138	1977	1980	1.10	0.94	1.05	3
25/45E-04A01	135	1951	1951	1.22	1.22	1.22	1
25/45E-05H01	137	1977	1977	0.84	0.84	0.84	1
25/45E-05R02	130	1978	1978	1.40	1.20	1.27	10
25/45E-06D03	146	1977	1978	6.00	4.40	5.20	3
25/45E-07A03	170	1977	1980	1.10	0.83	0.94	4
25/45E-08R02	165	1978	1978	1.00	0.76	0.84	5
25/45E-09B01	107	1977	1978	0.79	0.72	0.75	2
25/45E-10F01	85	1977	1978	0.85	0.35	0.52	3
25/45E-11K02	225	1977	1978	1.00	0.64	0.82	2
25/45E-14C01	238	1977	1978	2.80	2.40	2.60	2
25/45E-15C01	157	1977	1978	2.50	1.50	2.00	2
25/45E-15D01	195	1972	1977	3.50	0.45	1.93	21
25/45E-15R01	155	1971	1978	1.80	0.01	0.81	19
25/45E-16K01	185	1973	1977	1.60	0.95	1.17	5
25/45E-17D02	213	1977	1977	0.81	0.81	0.81	1
25/45E-17D03	215	1978	1980	0.82	0.66	0.76	3
25/45E-17P01	203	1977	1977	1.50	1.50	1.50	1
25/45E-17P02	218	1978	1978	1.40	1.30	1.35	2
25/45E-18A01	118	1942	1942	0.52	0.52	0.52	1
25/45E-18R01	190	1970	1978	2.00	0.05	0.97	16
25/45E-18R02	227	1978	1978	0.89	0.89	0.89	1
26/42E-02N01	29	1977	1978	0.24	0.01	0.12	2
26/42E-03E01S	-	1977	1978	0.91	0.82	0.86	3
26/42E-05C03	22	1977	1978	0.35	0.20	0.29	3
26/42E-05E01	64	1977	1978	1.60	0.00	1.07	16
26/42E-05F02	25	1977	1978	1.60	0.05	0.57	3
26/42E-06L01	94	1977	1978	1.40	1.20	1.30	2
26/42E-07A04	126	1977	1978	0.85	0.34	0.52	3
26/42E-07G01	45	1951	1951	7.23	7.23	7.23	1

TABLE 6.--Continued

IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM NITRATE (MG/L AS N)	MINIMUM NITRATE (MG/L AS N)	MEAN NITRATE MG/L AS N)	NUMBER OF SAMPLES
26/42E-08A01	300	1977	1980	0.00	0.00	0.00	4
26/42E-08N01	58	1977	1978	2.80	2.50	2.63	3
26/42E-10F01	9	1977	1978	0.10	0.04	0.06	3
26/42E-11F01	38	1977	1979	1.40	1.30	1.37	4
26/42E-11J01S	-	1973	1978	2.70	2.00	2.42	9
26/42E-12A01S	-	1973	1979	1.40	0.92	1.22	7
26/42E-12L01	126	1964	1978	2.70	2.17	2.44	4
26/42E-17A02	72	1977	1979	0.01	0.00	0.00	4
26/42E-20B01	140	1977	1979	2.40	1.90	2.20	4
26/42E-20N01	159	1954	1961	2.01	0.05	1.33	8
26/42E-21F02	-	1977	1978	2.80	2.20	2.43	3
26/42E-21R03	93	1977	1978	3.50	3.40	3.47	3
26/42E-23P01	578	1977	1978	0.00	0.00	0.00	2
26/42E-27F01	126	1977	1978	4.50	3.20	3.98	17
26/42E-27N01	129	1962	1978	4.97	0.97	1.80	9
26/42E-27N02	150	1962	1962	4.74	4.74	4.74	1
26/42E-34N03	71	1977	1978	1.70	1.70	1.70	2
26/43E-03N01	180	1977	1978	8.40	1.80	4.13	3
26/43E-03P01	203	1977	1979	8.80	1.40	4.45	4
26/43E-05D01	30	1977	1978	0.80	0.34	0.58	3
26/43E-05L01S	-	1973	1978	1.80	0.95	1.34	6
26/43E-06G01	30	1964	1978	1.50	1.33	1.46	4
26/43E-06J01	75	1977	1978	1.50	1.40	1.43	3
26/43E-07B01S	-	1973	1977	1.60	0.85	1.19	5
26/43E-07G01	-	1978	1978	2.00	1.50	1.73	3
26/43E-07K01	164	1977	1979	2.20	1.60	1.87	4
26/43E-07P01	126	1977	1978	2.20	1.60	1.80	3
26/43E-08B04	90	1964	1978	8.40	1.76	3.47	4
26/43E-08G02	49	1977	1978	3.20	2.80	3.03	3
26/43E-10K01	107	1964	1978	8.80	5.42	7.80	4
26/43E-16D02	285	1977	1978	2.60	1.70	2.30	3
26/43E-16F02	268	1960	1960	1.13	1.13	1.13	1
26/43E-17B01	220	1978	1978	1.80	1.70	1.75	2
26/43E-17J01	248	1977	1979	1.90	1.20	1.55	4
26/43E-19A01	163	1942	1978	2.20	1.00	1.33	4
26/43E-19L03	-	1977	1978	2.30	1.90	2.10	3
26/43E-20D01	286	1977	1979	2.10	1.00	1.32	4
26/43E-20N01	238	1977	1978	1.50	1.40	1.43	3
26/43E-21E02	246	1978	1978	2.40	2.40	2.40	1

TABLE 6.--Continued

IDENTIFIER	DEPTH OF WELL	BEGIN YEAR	END YEAR	MAXIMUM NITRATE (MG/L AS N)	MINIMUM NITRATE (MG/L AS N)	MEAN NITRATE MG/L AS N)	NUMBER OF SAMPLES
26/43E-21R01	260	1978	1978	0.91	0.91	0.91	1
26/43E-27E01	258	1951	1978	1.70	0.88	1.25	4
26/43E-28Q01	274	1978	1978	2.60	1.10	1.68	10
26/43E-30F01	312	1977	1978	2.40	1.80	2.10	3
26/43E-30H01	310	1977	1978	0.89	0.79	0.86	3
26/43E-30R02	293	1964	1978	1.50	1.04	1.31	4
26/43E-31A01	270	1977	1978	1.10	1.00	1.07	3
26/43E-34P01	210	1977	1978	1.30	0.00	0.59	3
26/44E-32R01	113	1955	1955	2.48	2.48	2.48	1
26/45E-25J01	263	1977	1978	0.70	0.56	0.63	15
26/45E-33N01	120	1978	1978	1.80	0.88	1.49	3
26/45E-34L01	198	1978	1978	0.82	0.82	0.82	1
26/45E-34L03	212	1977	1978	0.75	0.74	0.74	2
26/45E-35F01	232	1973	1978	0.69	0.43	0.56	5
26/45E-35F02	223	1977	1978	0.64	0.62	0.63	2
26/45E-36E01	149	1942	1942	0.38	0.38	0.38	1
26/45E-36N01	145	1973	1974	0.87	0.62	0.75	3
26/45E-36Q01	-	1973	1974	1.00	0.94	0.98	3
26/46E-30D01	190	1977	1978	1.20	0.88	0.98	16
26/46E-30M01	140	1978	1978	0.57	0.57	0.57	1
26/46E-31M01	249	1970	1973	1.40	0.06	0.85	14
26/46E-31M04	223	1977	1977	0.94	0.94	0.94	1
26/46E-31M05	222	1978	1978	1.10	1.10	1.10	2
26/46E-31M06	184	1978	1978	1.70	1.10	1.37	10

TABLE 7.--Trace-element concentrations in ground-water samples from Spokane Valley

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
				Spokane County										
25/42E-13B01	73-06-28	--	--	0	--	1	0	2	0	.0	--	--	--	10
	73-09-26	--	--	6	--	0	0	4	4	.0	--	--	--	20
	73-12-17	--	--	2	--	0	0	3	0	.0	--	--	--	30
	74-03-20	--	--	1	--	0	0	8	1	.0	--	--	--	30
	77-03-24	--	--	2	0	0	0	1	2	.1	--	0	0	0
	77-10-04	--	--	1	0	0	0	2	0	.0	--	0	0	10
25/43E-13A01	73-06-29	--	--	29	--	1	0	20	3	.1	--	--	--	50
	73-09-25	--	--	5	--	0	0	30	3	.0	--	--	--	20
	73-12-17	--	--	2	--	0	0	50	4	.0	--	--	--	90
	74-03-22	--	--	2	--	0	0	50	17	.0	--	--	--	70
	77-03-25	--	--	3	0	0	0	280	61	.0	--	0	0	10
	77-10-03	--	--	1	0	0	0	12	1	.0	--	0	0	10
25/43E-13H01	73-09-25	--	--	5	--	0	0	30	3	.0	--	--	--	20
25/43E-14K01	73-06-27	--	--	0	--	1	0	6	4	.1	--	--	--	10
	73-09-25	--	--	0	--	0	0	4	3	.0	--	--	--	40
	73-12-17	--	--	0	--	0	0	3	1	.0	--	--	--	0
	74-03-20	--	--	1	--	0	0	4	1	.0	--	--	--	20
	77-03-24	--	--	2	0	0	0	1	2	.1	--	0	0	0
	77-10-03	--	--	2	0	0	10	1	0	.0	--	0	0	20
25/44E-01J01	73-06-27	--	--	3	--	0	0	10	2	.2	--	--	--	30
	73-09-25	--	--	4	--	0	0	16	3	.0	--	--	--	20
	73-12-18	--	--	4	--	0	0	2	0	.0	--	--	--	0
	74-03-20	--	--	3	--	0	0	5	1	.0	--	--	--	20
25/44E-01R01	77-03-25	--	--	2	0	0	0	6	2	.6	--	0	0	10
	77-10-04	--	--	3	0	0	0	2	1	.0	--	0	0	10
25/44E-02Q01	73-06-27	--	--	4	--	1	0	9	3	.0	--	--	--	360
	73-09-25	--	--	6	--	0	0	3	5	.1	--	--	--	60
	73-12-18	--	--	3	--	0	0	4	0	.0	--	--	--	80
	74-03-20	--	--	2	--	0	30	4	1	.0	--	--	--	90
	77-03-28	--	--	3	0	0	0	3	0	.2	--	0	0	10
	77-10-03	--	--	3	0	0	10	2	0	.0	--	0	0	0
25/44E-03B01	79-06-20	--	0	2	100	1	0	1	2	--	.0	0	0	20
25/44E-04R03	70-11-10	30	--	--	--	--	<30	<50	<100	--	--	--	--	<10

TABLE 7.--Continued

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY TOTAL RECOV-ERABLE (UG/L AS HG)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
25/44E-07C01	73-06-27	--	--	6	--	1	0	5	0	.1	--	--	--	10
	73-09-25	--	--	1	--	0	0	2	1	.0	--	--	--	20
	73-12-18	--	--	6	--	1	0	3	0	.0	--	--	--	0
	74-03-19	--	--	3	--	0	0	3	1	.0	--	--	--	30
	77-10-04	--	--	3	0	0	0	3	2	.0	--	0	0	20
25/44E-18D02	73-06-27	--	--	2	--	1	0	6	0	.0	--	--	--	10
	73-09-25	--	--	2	--	1	0	4	1	.0	--	--	--	40
	73-12-18	--	--	4	--	0	0	3	0	.0	--	--	--	0
	77-04-01	--	--	22	0	0	0	2	0	.0	--	1	0	0
	77-10-04	--	--	1	0	0	0	4	0	.0	--	0	0	20
25/44E-19D01	73-06-27	--	--	4	--	1	0	8	0	.1	--	--	--	20
	73-09-26	--	--	6	--	0	0	2	4	.0	--	--	--	10
	73-12-18	--	--	6	--	0	0	5	0	.0	--	--	--	10
	74-03-20	--	--	4	--	0	0	8	1	.0	--	--	--	20
	77-03-25	--	--	5	100	0	0	3	1	.0	--	0	0	10
25/44E-27L01	79-06-19	--	0	3	100	0	0	1	1	--	.0	0	0	10
25/45E-03M01	79-07-10	--	0	3	30	2	10	0	1	--	.0	0	0	<3
25/45E-15D01	73-06-28	--	--	5	--	1	0	3	1	.1	--	--	--	10
	73-09-25	--	--	6	--	0	0	6	2	.0	--	--	--	50
	73-12-18	--	--	5	--	0	0	3	0	.0	--	--	--	0
	74-03-20	--	--	2	--	0	0	5	1	.1	--	--	--	20
	77-03-31	--	--	3	0	0	0	1	0	.0	--	0	0	0
25/45E-16K01	73-06-28	--	--	0	--	1	0	13	1	.2	--	--	--	90
	73-09-25	--	--	0	--	0	0	9	6	.2	--	--	--	200
	73-12-18	--	--	0	--	0	0	7	1	.1	--	--	--	170
	74-03-20	--	--	0	--	0	0	10	0	.2	--	--	--	140
	77-03-31	--	--	0	100	0	0	4	0	.1	--	1	0	60
26/42E-08A01	79-07-12	--	0	9	100	3	10	0	0	--	.0	0	0	20
26/42E-11J01S	73-06-27	--	--	1	--	1	0	0	0	.1	--	--	--	10
	73-09-26	--	--	9	--	0	0	0	3	.0	--	--	--	10
	73-12-17	--	--	4	--	0	0	1	0	.0	--	--	--	0
	74-03-19	--	--	3	--	0	0	3	2	.0	--	--	--	20
	77-03-24	--	--	3	0	0	0	0	1	.0	--	0	0	0
	77-10-04	--	--	3	0	0	0	1	0	.0	--	0	0	0
26/42E-12A01S	73-06-29	--	--	1	--	1	0	1	1	.0	--	--	--	30
	73-09-26	--	--	0	--	0	0	0	2	.0	--	--	--	10

TABLE 7.--Continued

LOCAL IDENT- I- FIER	DATE OF SAMPLE	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COPPER, DIS- SOLVED (UG/L AS CU)	LEAD, DIS- SOLVED (UG/L AS PB)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG)	MERCURY DIS- SOLVED (UG/L AS HG)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, DIS- SOLVED (UG/L AS ZN)
26/42E-12A01S	73-12-17	--	--	5	--	0	0	0	0	.0	--	--	--	20
	74-03-19	--	--	2	--	0	0	7	2	.0	--	--	--	10
	77-03-24	--	--	4	0	0	0	0	2	.0	--	0	0	0
	77-10-04	--	--	3	0	0	0	0	0	.0	--	0	0	0
26/42E-27N01	73-06-29	--	--	5	--	1	0	2	0	.1	--	--	--	40
	73-09-26	--	--	7	--	0	0	0	3	.0	--	--	--	90
	73-12-17	--	--	4	--	0	0	2	0	.0	--	--	--	130
	74-03-19	--	--	2	--	0	0	4	1	.0	--	--	--	160
	77-03-24	--	--	3	0	0	0	0	4	.1	--	0	0	160
26/43E-05L01S	73-06-29	--	--	10	--	1	0	0	0	.1	--	--	--	10
	73-09-26	--	--	3	--	0	0	0	3	.0	--	--	--	20
	73-12-17	--	--	1	--	0	0	0	0	.0	--	--	--	0
	74-03-19	--	--	2	--	0	0	2	2	.0	--	--	--	20
	77-03-28	--	--	2	0	0	0	0	0	.1	--	0	0	0
	77-10-04	--	--	2	0	2	10	1	0	.0	--	0	0	0
26/43E-07B01S	73-06-29	--	--	4	--	1	0	0	0	.0	--	--	--	10
	73-09-26	--	--	64	--	0	0	0	1	.1	--	--	--	10
	73-12-17	--	--	3	--	0	0	1	0	.0	--	--	--	0
	74-03-19	--	--	2	--	0	0	6	1	.1	--	--	--	20
	77-03-24	--	--	3	0	0	0	0	1	.0	--	0	0	0
26/43E-07K01	79-06-21	--	0	2	0	1	10	1	3	--	.9	0	0	10
26/43E-17J01	79-06-20	--	0	2	0	0	0	4	2	--	.0	0	0	100
26/45E-35F01	73-06-28	--	--	1	--	1	0	3	0	.1	--	--	--	30
	73-09-25	--	--	2	--	0	0	5	11	.0	--	--	--	30
	77-03-25	--	--	3	0	0	0	0	1	.0	--	0	0	0
	77-10-04	--	--	2	100	0	0	2	0	.0	--	0	0	10
26/45E-36N01	73-06-28	--	--	0	--	3	0	70	45	.1	--	--	--	560
	73-09-26	--	--	5	--	0	0	29	11	.0	--	--	--	250
	73-12-18	--	--	7	--	--	0	--	--	.0	--	--	--	460
26/45E-36Q01	73-06-27	--	--	4	--	0	0	9	2	.0	--	--	--	120
	73-09-26	--	--	31	--	0	0	1	4	.0	--	--	--	120
	73-12-18	--	--	6	--	0	0	4	0	.0	--	--	--	160

TABLE 8.--Summary of trace-element concentrations in ground-water samples from the Spokane Valley

[Values in micrograms per liter]

Constituent	Number of sample sites	Trace element concentrations[1]		
		Maximum	Minimum	Median
Total aluminum	22	100	0	0
Dissolved aluminum	6	0	0	0
Dissolved arsenic	26	64	0	3.5
Dissolved barium	22	100	0	0
Dissolved cadmium	26	3	0	.2
Dissolved chromium	27	<30	0	0
Dissolved copper	27	280	0	3.3
Dissolved lead	27	<100	0	1.5
Total mercury	20	.6	0	.03
Dissolved mercury	6	.9	0	0
Dissolved selenium	22	1	0	0
Dissolved silver	22	0	0	0
Dissolved zinc	27	560	0	16

[1]For calculation of medians, values expressed as "less than" were treated as absolute values.

TABLE 9.--Phenol and methylene-blue-active-substance concentrations in ground-water samples from the Spokane Valley

LOCAL IDENT-I-FIER	DATE OF SAMPLE	PHENOLS (UG/L)	METHYLENE BLUE ACTIVE SUBSTANCE (MG/L)
25/42E-13B01	73-06-28	0	.00
	73-09-26	1	.03
	73-12-17	0	.02
	74-03-20	0	.01
	77-03-24	2	.00
	77-10-04	2	--
25/43E-13A01	73-06-29	0	.00
	73-09-25	0	.10
	73-12-17	0	.00
	74-03-22	0	.00
	77-03-25	2	.00
	77-10-03	4	--
25/43E-13H01	73-09-25	0	.10
25/43E-14K01	73-06-27	2	.00
	73-09-25	0	.00
	73-12-17	0	.03
	74-03-20	0	.00
	77-03-24	1	.00
	77-10-03	4	--
25/44E-01J01	73-06-27	0	.00
	73-09-25	0	.06
	73-12-18	0	.01
	74-03-20	0	.04
25/44E-01P01	77-03-25	2	.00
	77-10-04	5	--
25/44E-02Q01	73-06-27	7	.03
	73-09-25	0	.05
	73-12-18	0	.02
	74-03-20	0	.04
	77-03-28	0	.00
	77-10-03	2	--
25/44E-03H01	79-06-20	0	--
25/44E-07C01	73-06-27	0	.00
	73-09-25	2	.00
	73-12-18	0	.03
	74-03-19	0	.00
	77-10-04	3	--
25/44E-18D02	73-06-27	2	.00
	73-09-25	0	.08
	73-12-18	0	.06
	77-04-01	2	.00
	77-10-04	1	--
	79-06-20	0	--
25/44E-19D01	73-06-27	0	.00
	73-09-26	2	.04
	73-12-18	0	.04
	74-03-20	0	.03
	77-03-25	2	.00
25/45E-15D01	73-06-28	0	.00
	73-09-25	4	.04
	73-12-18	0	.02
	74-03-20	0	--
	77-03-31	0	.00
25/45E-16K01	73-06-28	1	.00
	73-09-25	3	.05
	73-12-18	1	.04
	74-03-20	0	.04
	77-03-31	3	.10
26/42E-08A01	79-07-12	1	--
26/42E-11J01S	73-06-27	5	.00
	73-09-26	1	.00
	73-12-17	0	.02
	74-03-19	0	.03
	77-03-24	1	.00
	77-10-04	5	--
26/42E-12A01S	73-06-29	3	.00
	73-09-26	4	.00
	73-12-17	0	.03
	74-03-19	0	.02
	77-03-24	1	.00
	77-10-04	4	--
	79-06-21	0	--
26/42E-27N01	73-06-29	12	.00
	73-09-26	1	.04
	73-12-17	0	.02
	74-03-19	0	.00
	77-03-24	1	.00
26/43E-05L01S	73-06-29	2	.00
	73-09-26	0	.00
	73-12-17	0	.05
	74-03-19	0	.03
	77-03-28	0	.00
	77-10-04	3	--
26/43E-07H01S	73-06-29	4	.00
	73-09-26	1	--
	73-12-17	0	.02
	74-03-19	0	.00
	77-03-24	1	.10
26/43E-17J01	79-06-20	0	--
26/45E-35F01	73-06-28	4	.00
	73-09-25	0	.04
	77-03-25	2	.00
	77-10-04	2	--
26/45E-36N01	73-06-28	1	.00
	73-09-26	1	.00
	73-12-18	1	.00
26/45E-36Q01	73-06-27	0	.00
	73-09-26	2	.03
	73-12-18	0	.00

TABLE 10.--Physical and major chemical-constituent data for ground-water samples from the Airway Heights subregion

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)
				Spokane County						
24/40E-03N01	122CBRV	59-12-01	440	2375.00	255	7.8	--	97	0	23
	122CBRV	60-05-16	440	2375.00	265	7.9	14.5	100	0	--
24/40E-22L01	122CBRV	57-11-06	345	--	284	7.9	13.5	118	0	29
	122CBRV	58-07-22	345	--	277	7.6	20.5	116	0	30
	122CBRV	59-09-23	345	--	294	8.3	15.5	116	0	30
	122CBRV	60-09-12	345	--	296	8.2	--	118	0	29
	122CBRV	60-11-08	345	--	291	8.0	12.0	118	0	29
	122CBRV	61-10-06	345	--	293	7.6	18.0	118	0	29
	122CBRV	62-10-04	345	--	295	7.3	14.5	124	0	30
	122CBRV	64-04-29	345	--	299	7.5	18.0	120	0	30
	122CBRV	65-03-12	345	--	298	7.4	8.0	124	0	30
	122CBRV	65-12-08	345	--	300	7.4	17.0	127	0	31
24/41E-03N01	122CBRV	47-02-26	410	2375.00	220	--	15.0	90	0	21
	122CBRV	47-08-05	410	2375.00	220	7.9	16.0	86	0	19
	122CBRV	48-01-01	410	2375.00	225	7.6	--	89	0	20
	122CBRV	48-08-11	410	2375.00	218	7.7	15.0	87	0	20
	122CBRV	49-07-19	410	2375.00	203	7.6	14.0	80	1	20
	122CBRV	50-12-06	410	2375.00	215	7.7	13.5	89	0	19
	122CBRV	51-00-00	410	2375.00	212	7.7	15.0	85	0	19
	122CBRV	53-01-14	410	2375.00	220	7.5	16.0	89	0	20
	122CBRV	53-12-15	410	2375.00	183	7.5	15.0	68	0	17
	122CBRV	54-10-06	410	2375.00	219	7.9	16.0	86	0	19
	122CBRV	55-06-16	410	2375.00	224	7.2	--	87	0	19
	122CBRV	56-06-05	410	2375.00	219	7.7	11.0	86	0	19
	122CBRV	56-10-30	410	2375.00	215	7.6	12.0	85	0	19
	122CBRV	57-07-30	410	2375.00	184	7.4	12.0	71	0	19
	122CBRV	57-11-06	410	2375.00	214	7.6	14.5	85	0	20
	122CBRV	58-07-22	410	2375.00	218	7.8	20.5	88	0	21
	122CBRV	59-09-22	410	2375.00	208	7.8	15.5	82	0	20
	122CBRV	62-10-09	410	2375.00	206	7.4	13.5	79	0	18
	122CBRV	64-04-29	410	2375.00	216	7.4	14.0	82	0	18
	122CBRV	65-03-12	410	2375.00	215	7.4	12.0	83	0	18
	122CBRV	65-11-22	410	2375.00	198	7.2	13.0	75	0	18
	122CBRV	67-12-12	410	2375.00	216	7.4	16.0	80	0	18
24/41E-03N02	122CBRV	61-10-06	410	--	283	7.6	18.0	136	9	38

TABLE 10.--Continued

LOCAL IDENT- I- FIER	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)	BICAR- BONATE FET-FLD (MG/L AS HCO3)	CAR- BONATE FET-FLD (MG/L AS CO3)	ALKA- LINITY FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)	FLUO- RIDE, DIS- SOLVED (MG/L AS F)
24/40E-03N01	9.7	18	.8	1.7	149	0	122	11	3.0	.5
	--	--	--	--	148	0	121	--	--	--
24/40E-22L01	11	15	.6	2.8	148	0	121	20	5.5	.2
	10	14	.6	2.8	150	0	123	21	3.8	.3
	10	16	.7	3.0	148	2	125	21	5.5	.4
	11	15	.6	2.8	154	0	126	19	5.0	.3
	11	16	.7	2.9	153	0	125	19	6.2	.3
	11	15	.6	2.0	156	0	128	20	4.0	.4
	12	14	.6	2.9	160	0	131	20	3.8	.3
	11	14	.6	2.8	160	0	131	20	4.0	.4
	12	15	.6	2.9	162	0	133	20	4.0	.3
	12	16	.6	2.8	160	0	131	20	4.5	.2
24/41E-03N01	9.2	--	--	--	130	0	107	11	2.8	.2
	9.4	--	--	--	130	0	107	11	2.4	.4
	9.5	--	--	--	130	0	107	11	3.8	.3
	9.0	--	--	--	122	0	100	11	2.6	.2
	7.4	--	--	--	96	0	79	12	2.1	.2
	10	13	.6	2.4	127	0	104	11	2.2	.2
	9.2	12	.6	5.1	127	0	104	10	2.1	.4
	9.5	12	.6	2.1	124	0	102	11	2.1	.3
	6.3	11	.6	1.7	87	0	71	9.7	2.8	.3
	9.4	13	.6	2.1	125	0	103	11	2.6	.3
	9.5	13	.6	1.4	129	0	106	10	2.8	.3
	9.3	13	.6	1.8	121	0	99	11	2.5	.4
	9.1	13	.6	2.0	113	0	93	14	1.8	.3
	5.7	10	.5	1.6	86	0	71	11	2.0	.2
	8.5	13	.6	2.1	118	0	97	11	2.2	.3
	8.6	13	.6	2.1	126	0	103	10	1.8	.4
	7.7	12	.6	1.7	109	0	89	12	2.2	.4
	8.2	12	.6	2.0	106	0	87	12	2.2	.3
	9.0	13	.6	1.9	122	0	100	10	1.2	.4
	9.3	14	.7	1.9	122	0	100	11	2.0	.4
	7.3	11	.6	2.1	98	0	80	12	2.5	.3
	8.5	14	.7	2.1	119	0	98	11	2.0	.4
24/41E-03N02	10	5.3	.2	2.3	155	0	127	14	3.5	.3

TABLE 10.--Continued

LOCAL IDENT- I- FIER	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
24/40E-03N01	45	178	185	.00	--	--	200	--	--	--
	--	--	--	--	--	--	--	--	--	--
24/40E-22L01	--	197	191	.40	--	--	120	--	--	--
	45	195	201	.00	--	--	--	--	--	--
	45	204	208	.00	--	--	100	--	--	--
	43	205	201	.20	--	--	30	--	--	--
	43	197	203	.20	--	--	70	--	--	--
	43	206	201	.00	--	--	10	--	<50	--
	44	204	206	.10	--	--	30	--	<50	--
	44	205	205	.20	--	--	60	--	<50	--
	40	196	204	.00	--	--	200	--	<50	--
	41	205	206	4.1	--	--	40	--	<50	--
24/41E-03N01	51	163	--	.10	--	--	20	--	--	--
	50	167	--	.00	--	--	20	--	--	--
	51	164	--	.00	--	--	40	--	--	--
	55	168	--	.90	--	--	60	--	--	--
	48	155	--	3.5	--	--	130	--	--	--
	50	164	170	.30	--	--	50	--	--	--
	49	164	169	.20	--	--	10	--	--	--
	49	166	167	.10	--	--	40	--	--	--
	43	143	135	8.0	--	--	30	--	--	--
	48	154	167	.40	--	--	80	--	--	--
	50	166	169	.20	--	--	100	--	--	--
	47	160	163	.30	--	--	460	--	--	--
	42	155	157	1.0	--	--	120	--	--	--
	--	139	--	9.3	--	--	30	--	--	--
	--	154	--	.40	--	--	170	--	--	--
	47	164	166	.60	--	--	--	--	--	--
	45	156	155	2.3	--	--	290	--	--	--
	35	155	142	3.0	--	--	330	--	<50	--
	46	156	159	.00	--	--	200	--	<50	--
	41	151	158	.10	--	--	210	--	<50	--
	41	144	142	5.1	--	--	200	--	<50	--
	30	144	145	.40	--	--	390	--	170	--
24/41E-03N02	19	180	169	3.7	--	--	<10	--	<50	--

TABLE 10.--Continued

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)
24/41E-03N02	122CBRV	64-04-29	410	--	247	7.4	11.0	119	0	31
24/41E-11N01	122CBRV	57-11-05	274	2411.00	129	7.5	13.0	51	0	14
	122CBRV	58-07-22	274	2411.00	121	7.1	15.0	51	3	13
	122CBRV	59-09-23	274	2411.00	136	7.8	15.5	52	2	14
	122CBRV	60-11-08	274	2411.00	135	7.9	10.0	50	1	13
24/41E-15A02	122CBRV	79-07-19	148	2420.00	155	7.6	12.1	63	10	17
24/41E-23K01	--	70-11-10	200	2410.00	294	7.7	12.2	135	17	36
	--	71-05-26	200	2410.00	302	7.6	13.0	140	19	38
24/42E-11R01	122CBRV	71-10-06	227	1980.00	458	7.5	9.8	207	2	58
24/42E-25G01	122CBRV	79-07-20	122	--	226	7.9	12.6	83	0	21
25/40E-02Q01	--	62-10-04	196	--	288	7.5	13.5	109	0	30
	--	64-04-29	196	--	286	7.6	11.5	110	0	30
	--	65-03-12	196	--	311	7.4	8.0	121	0	32
	--	65-12-08	196	--	290	7.4	17.0	110	0	30
25/40E-14R01	122CBRV	57-11-06	356	--	229	7.8	14.5	93	0	21
	122CBRV	58-07-22	356	--	240	7.5	20.0	99	0	20
	122CBRV	59-09-23	356	--	235	8.3	16.0	96	0	22
	122CBRV	60-11-08	356	--	247	8.0	11.0	95	0	20
	122CBRV	61-10-06	356	--	243	7.2	14.5	94	0	21
	122CBRV	62-10-04	356	--	237	7.1	14.0	96	0	22
	122CBRV	64-04-29	356	--	242	7.2	10.5	98	0	21
	122CBRV	65-03-12	356	--	239	6.8	6.5	98	0	21
25/40E-34P01	--	57-11-05	196	2358.00	283	7.8	10.5	109	0	30
	--	58-07-22	196	2358.00	281	7.2	21.0	112	0	32
	--	59-09-23	196	2358.00	282	7.7	15.5	111	0	31
	--	60-11-08	196	2358.00	288	7.7	12.0	111	0	29
25/41E-10G01	122CBRV	57-11-06	150	2344.00	373	7.9	16.0	160	42	41
	122CBRV	58-07-22	150	--	334	7.4	19.0	148	36	38
	122CBRV	59-09-23	150	--	306	8.0	16.0	133	29	32
	122CBRV	60-11-08	150	--	291	7.8	12.0	120	21	30
25/41E-19B03	122CBRV	79-07-16	325	--	244	6.9	15.3	90	0	18
25/41E-28L01	122CBRV	53-12-16	312	2432.00	230	7.7	14.0	109	2	28
25/41E-34C01	--	56-10-30	433	2400.00	311	7.5	13.5	128	28	33
	--	58-07-23	433	2400.00	330	7.4	15.5	128	31	38
	--	59-09-22	433	2400.00	302	7.6	13.5	123	25	34
	--	60-11-08	433	2400.00	327	8.0	12.0	130	31	36
	--	61-10-13	433	2400.00	291	7.6	14.5	116	22	31
	--	62-10-04	433	2400.00	319	7.4	12.0	129	29	36

TABLE 10.--Continued

LOCAL IDENT-I-FIER	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)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	ALKA-LINITY FIELD (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
24/41E-03N02	10	4.6	.2	1.6	133	0	109	14	2.5	.4
24/41E-11N01	4.0	5.3	.3	1.3	62	0	51	5.8	1.0	.2
	4.5	4.9	.3	1.3	59	0	48	6.3	1.2	.2
	4.2	6.3	.4	1.3	61	0	50	7.0	2.8	.5
	4.3	5.9	.4	1.1	60	0	49	6.6	2.2	.2
24/41E-15A02	5.1	4.4	.2	1.6	65	0	53	6.5	1.9	.2
24/41E-23K01	11	5.8	.2	1.5	144	0	118	10	1.7	.1
	11	--	--	--	148	0	121	--	1.7	--
24/42E-11R01	15	17	.5	4.9	250	0	205	26	10	.1
24/42E-25G01	7.5	8.4	.4	2.9	112	0	92	9.0	2.2	.3
25/40E-02Q01	8.2	17	.7	1.3	151	0	124	5.6	6.8	.5
	8.5	15	.6	1.2	148	0	121	6.0	4.5	.5
	10	17	.7	1.5	152	0	125	7.0	10	.5
	8.6	18	.8	1.5	148	0	121	6.4	7.2	.5
25/40E-14R01	9.8	12	.6	1.5	129	0	106	9.6	3.0	.3
	12	14	.6	1.5	138	0	113	8.1	5.2	.7
	10	14	.6	1.6	134	2	113	8.2	3.8	.6
	11	15	.7	1.2	141	0	116	7.8	5.5	.4
	10	15	.7	1.6	141	0	116	8.4	4.2	.4
	10	13	.6	1.4	142	0	116	7.6	2.0	.4
	11	13	.6	1.2	145	0	119	7.4	2.2	.4
	11	13	.6	1.3	143	0	117	7.2	2.2	.5
25/40E-34P01	8.2	16	.7	1.3	152	0	125	4.5	5.0	.3
	7.8	16	.7	1.5	153	0	125	5.2	4.5	.4
	8.2	18	.8	1.6	154	0	126	5.4	5.2	.8
	9.4	18	.8	1.3	152	0	125	5.0	6.8	.4
25/41E-10G01	14	12	.4	2.3	144	0	118	22	3.0	.1
	13	12	.4	2.2	137	0	112	20	3.0	.2
	13	11	.4	2.0	127	0	104	18	2.2	.4
	11	12	.5	2.0	121	0	99	17	4.2	.3
25/41E-19B03	11	13	.6	2.3	134	0	110	9.5	2.1	.4
25/41E-28L01	9.5	5.3	.2	1.7	130	0	107	10	2.8	.3
25/41E-34C01	11	14	.6	1.3	122	0	100	13	7.8	.3
	8.0	14	.6	1.4	118	0	97	14	9.5	.3
	9.3	14	.6	1.6	120	0	98	13	7.0	.2
	9.8	15	.6	1.4	121	0	99	15	9.5	.3
	9.4	14	.6	1.5	115	0	94	14	8.5	.3
	9.4	14	.6	1.4	122	0	100	14	7.8	.4

TABLE 10.--Continued

LOCAL IDENT-I-FIER	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
24/41E-03N02	17	148	146	2.4	--	--	2500	--	<50	--
24/41E-11N01	--	110	--	6.0	--	--	80	--	--	--
	42	110	102	6.2	--	--	30	--	--	--
	39	112	105	7.1	--	--	10	--	--	--
	35	107	98	6.2	--	--	60	--	--	--
24/41E-15A02	44	--	113	--	--	3.2	--	<10	--	<1
24/41E-23K01	26	188	163	24	--	--	120	--	<20	--
	--	--	--	--	--	--	--	--	--	--
24/42E-11R01	39	300	293	--	3.0	--	40	--	<20	--
24/42E-25G01	48	--	154	--	--	1.3	--	<10	--	<1
25/40E-02Q01	50	213	194	13	--	--	<10	--	<50	--
	49	207	187	13	--	--	<10	--	<50	--
	45	216	198	16	--	--	20	--	<50	--
	46	206	191	15	--	--	20	--	<50	--
25/40E-14R01	--	155	--	.70	--	--	40	--	--	--
	42	167	171	1.0	--	--	--	--	--	--
	43	164	173	.50	--	--	20	--	--	--
	44	165	174	.40	--	--	40	--	--	--
	43	172	173	.40	--	--	40	--	<50	--
	44	169	170	.10	--	--	90	--	<50	--
	44	171	171	.00	--	--	110	--	<50	--
	40	163	167	.10	--	--	1300	--	<50	--
25/40E-34P01	--	203	--	12	--	--	40	--	--	--
	49	206	192	12	--	--	--	--	--	--
	50	205	196	13	--	--	<10	--	--	--
	48	198	193	13	--	--	30	--	--	--
25/41E-10G01	--	257	--	53	--	--	30	--	--	--
	43	239	199	46	--	--	--	--	--	--
	43	219	184	38	--	--	<10	--	--	--
	42	203	178	34	--	--	50	--	--	--
25/41E-19B03	46	--	168	--	--	.17	--	<10	--	<10
25/41E-28L01	21	145	143	1.5	--	--	20	--	--	--
25/41E-34C01	45	219	185	39	--	--	180	--	--	--
	45	256	188	49	--	--	--	--	--	--
	48	231	186	40	--	--	130	--	--	--
	40	229	186	43	--	--	620	--	--	--
	28	199	163	31	--	--	320	--	100	--
	40	221	183	42	--	--	250	--	<50	--

TABLE 10.--Continued

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)	CALCIUM DIS-SOLVED (MG/L AS CA)
25/41E-34C01	--	64-04-29	433	2400.00	317	7.8	14.5	126	23	34
	--	65-11-08	433	2400.00	263	7.9	13.5	129	26	35
	--	66-12-05	433	2400.00	342	7.2	10.0	138	31	37
	--	67-12-12	433	2400.00	336	7.4	7.0	133	27	35
25/41E-35C01	--	65-03-12	--	--	331	7.8	9.0	137	34	35
25/42E-04B01	122CBRV	79-07-20	275	--	212	8.4	12.3	90	6	18
25/42E-25P01	--	59-09-22	261	--	284	8.2	14.5	140	12	38
	--	60-11-08	261	--	305	7.7	10.0	160	17	41
25/42E-29R01	122CBRV	52-02-14	380	2320.00	211	7.9	--	91	0	20
	122CBRV	52-10-15	380	2320.00	253	8.0	13.0	111	13	28
	122CBRV	53-10-27	380	2320.00	213	8.1	--	89	0	19
	122CBRV	55-01-07	380	2320.00	211	7.8	--	89	0	19
	122CBRV	55-12-22	380	2320.00	213	8.1	11.0	86	0	19
	122CBRV	56-12-18	380	2320.00	211	8.0	11.5	89	0	19
	122CBRV	57-11-06	380	2320.00	214	7.8	5.0	91	0	21
	122CBRV	58-09-26	380	2320.00	258	7.8	4.5	116	9	30
	122CBRV	59-09-29	380	2320.00	220	7.8	--	93	0	22
	122CBRV	60-09-21	380	2320.00	216	8.0	14.5	88	0	20
	122CBRV	61-10-03	380	2320.00	209	8.0	10.0	90	0	20
	122CBRV	65-02-09	380	2320.00	218	8.0	5.5	91	0	20
	122CBRV	66-01-12	380	2320.00	220	7.6	5.5	91	0	20
	122CBRV	66-11-15	380	2320.00	219	7.4	5.5	96	0	22
25/42E-32J01	122CBRV	62-02-05	630	--	176	7.6	12.0	75	9	19

TABLE 10.--Continued

LOCAL IDENT-I-FIER	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)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	ALKA-LINITY FIELD (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)
25/41E-34C01	10	13	.5	1.4	125	0	103	13	6.5	.3
	10	12	.5	1.7	126	0	103	14	6.5	.3
	11	15	.6	1.6	130	0	107	17	8.5	.4
	11	14	.5	1.6	129	0	106	17	7.5	.4
25/41E-35C01	12	15	.6	1.5	126	0	103	15	8.5	.4
25/42E-04B01	11	4.5	.2	2.6	103	0	84	16	3.5	.1
25/42E-25P01	11	5.4	.2	2.2	156	0	128	14	3.5	.1
	14	3.1	.1	1.7	174	0	143	16	3.5	.0
25/42E-29R01	10	9.7	.5	2.5	122	0	100	6.7	1.8	.2
	10	7.6	.3	2.1	119	0	98	15	4.5	.1
	10	9.4	.4	2.8	121	0	99	6.0	1.6	.3
	10	9.0	.4	2.3	114	0	94	7.2	2.5	.2
	9.3	9.2	.4	2.8	117	0	96	6.8	1.8	.3
	10	9.2	.4	2.7	121	0	99	6.5	1.8	.1
	9.3	9.5	.4	2.6	118	0	97	6.7	2.0	.2
	10	7.8	.3	2.2	130	0	107	14	3.0	.3
	9.2	9.3	.4	2.8	119	0	98	7.8	2.2	.4
	9.2	9.2	.4	2.7	118	0	97	6.2	2.0	.3
	9.8	9.2	.4	2.8	119	0	98	7.4	2.5	.3
	10	9.5	.4	2.7	122	0	100	7.4	1.8	.4
	10	9.1	.4	1.7	121	0	99	7.6	1.5	.7
	10	7.9	.4	2.6	122	0	100	7.6	2.5	.2
25/42E-32J01	6.7	5.8	.3	1.3	80	0	66	8.8	4.5	.3

TABLE 10.--Continued

LOCAL IDENT- I- FIER	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
25/41E-34C01	42	232	182	39	--	--	50	--	<50	--
	39	222	180	33	--	--	340	--	<50	--
	39	232	193	44	--	--	250	--	20	--
	42	232	192	38	--	--	230	--	<5	--
25/41E-35C01	37	229	186	45	--	--	180	--	<50	--
25/42E-04B01	40	--	146	--	--	.70	--	<10	--	<1
25/42E-25P01	21	173	172	5.1	--	--	<10	--	--	--
	14	177	179	5.6	--	--	90	--	--	--
25/42E-29R01	49	166	160	2.0	--	--	40	--	--	--
	44	188	170	12	--	--	80	--	--	--
	51	155	160	3.2	--	--	50	--	--	--
	49	160	155	2.6	--	--	60	--	--	--
	41	153	148	4.2	--	--	<10	--	--	--
	39	157	148	4.2	--	--	20	--	--	--
	--	153	--	6.3	--	--	70	--	--	--
	49	195	180	9.7	--	--	30	--	--	--
	46	161	158	5.8	--	--	20	--	--	--
	45	161	153	5.3	--	--	10	--	--	--
	46	153	157	4.7	--	--	<10	--	--	--
	40	155	152	4.7	--	--	10	--	<50	--
	43	152	153	3.9	--	--	10	--	<50	--
	42	150	155	3.9	--	--	10	--	<5	--
25/42E-32J01	50	142	136	8.1	--	--	110	--	<50	--

TABLE 11.--Summary of physical and major chemical-constituent data for ground-water samples from the Airway Heights subregion

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentrations[1]		
		Maximum	Minimum	Median
Specific conductance (umho)	21	458	121	260
pH (units)	21	8.4	6.8	7.6
Temperature (°C)	21	21.0	4.5	12.6
Fecal-coliform bacteria (col/100 mL)	--	--	--	--
Hardness (as $CaCO_3$)	21	210	50	109
Hardness, noncarbonate (as $CaCO_3$)	21	42	0	2
Calcium, dissolved	21	58	13	28
Magnesium, dissolved	21	15	4	9.9
Sodium, dissolved	21	18	3.1	11.8
Sodium-adsorption ratio	21	2.2	.1	.5
Potassium, dissolved	21	5.1	1.1	1.7
Bicarbonate	21	250	59	132
Carbonate	21	2	0	0
Alkalinity (as $CaCO_3$)	21	205	48	108
Sulfate, dissolved	21	26	4.5	10
Chloride, dissolved	21	10	1	3.1
Fluoride, dissolved	21	.8	.0	.3
Silica, dissolved (as SiO_2)	21	55	14	43
Solids, dissolved (residue at 180°C)	17	300	107	178
Solids, dissolved (sum of constituents)	21	306	105	172
Nitrate (as N)	21	12	.00	1.3
Iron, total recoverable (ug/L)	17	2,500	0	73
Iron, dissolved (ug/L)	4	10	0	0
Manganese, total recoverable (ug/L)	11	170	5	.<50
Manganese, dissolved (ug/L)	4	10	1	1

TABLE 12.--Trace-element concentrations in ground-water samples from the Airway Heights subregion

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
				Spokane County			
24/41E-15A02	79-07-19	--	0	2	20	<1	0
24/41E-23K01	70-11-10	10	--	--	--	--	<30
24/42E-11R01	71-10-06	10	--	--	--	--	<30

LOCAL IDENT-I-FIER	DATE OF SAMPLE	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
24/41E-15A02	79-07-19	1	0	1.9	0	0	110
24/41E-23K01	70-11-10	<50	<100	--	--	--	200
24/42E-11R01	71-10-06	<50	<100	--	--	--	70

TABLE 13.--Physical, biological, and major chemical-constituent data for ground-water samples from the Chamokane Creek subregion

LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	SPE- CIFIC CON- DUCT- ANCE (UMHOS)	PH (STAND- ARD UNITS)	TEMPER- ATURE (DEG C)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)
Stevens County										
27/39E-13F01	110ALVM	79-07-25	282	--	390	8.1	17.1	<1	197	7
28/39E-24G01	110ALVM	79-07-25	42	--	412	7.6	11.5	<1	210	0
28/39E-25H01	--	59-12-01	350	1771.00	271	7.8	--	--	129	0
	--	60-05-17	350	1771.00	279	8.0	12.0	--	132	0
28/39E-35L01	110ALVM	79-07-25	131	1700.00	355	7.9	15.5	<1	165	0
28/40E-05Q01	110ALVM	79-07-25	60	--	339	7.6	12.3	<1	165	5
28/40E-17L01	110ALVM	79-07-25	41	--	325	7.8	10.9	<1	154	4
29/40E-22Q01	110ALVM	79-07-25	61	--	397	7.8	10.3	<1	197	0

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)	BICAR- BONATE FET-FLD (MG/L AS HCO3)	CAR- BONATE FET-FLD (MG/L AS CO3)	ALKA- LINITY FIELD (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
36	26	4.3	.1	4.2	232	0	190	20	1.5
48	22	5.1	.2	2.8	256	0	210	9.7	.9
36	9.5	7.3	.3	2.2	173	0	142	5.9	1.2
--	--	--	--	--	176	0	144	--	--
43	14	10	.4	3.0	207	0	170	11	.8
38	17	5.0	.2	2.6	195	0	160	7.8	1.2
37	15	6.0	.2	2.4	183	0	150	6.7	1.2
46	20	5.4	.2	3.1	244	0	200	7.5	1.3

FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
.1	13	--	220	--	.81	--	360	2
.1	24	--	239	--	.64	--	100	<1
.5	24	165	172	.00	--	10	--	--
--	--	--	--	--	--	--	--	--
.3	22	--	207	--	.03	--	330	90
.1	27	--	195	--	.90	--	150	2
.2	27	--	186	--	1.1	--	110	<1
.1	31	--	235	--	.78	--	290	2

TABLE 14.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Chamokane Creek subregion

[Values in milligrams per liter except as indicated
umho, micromho; col/100 mL, colonies per 100 milliliter;
ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	7	412	271	355
pH (units)	7	8.1	7.6	7.8
Temperature (°C)	7	17.1	10.3	12.0
Fecal-coliform bacteria (col/100 mL)	6	<1	<1	<1
Hardness (as $CaCO_3$)	7	210	130	170
Hardness, noncarbonate (as $CaCO_3$)	7	10	0	0
Calcium, dissolved	7	48	36	38
Magnesium, dissolved	7	26	9.5	17
Sodium, dissolved	7	10	4.3	5.4
Sodium-adsorption ratio	7	.3	.1	.1
Potassium, dissolved	7	4.2	2.2	2.8
Bicarbonate	7	256	173	207
Carbonate	7	0	0	0
Alkalinity (as $CaCO_3$)	7	210	142	170
Sulfate, dissolved	7	20	5.9	7.8
Chloride, dissolved	7	1.5	.8	1.2
Fluoride, dissolved	7	.5	.1	.1
Silica, dissolved (as SiO_2)	7	31	13	24
Solids, dissolved (residue at 180°C)	1	165	165	165
Solids, dissolved (sum of constituents)	7	242	172	207
Nitrate (as N)	7	1.1	.00	.78
Iron, total recoverable (ug/L)	1	10	10	10
Iron, dissolved (ug/L)	6	360	100	220
Manganese, total recoverable (μg/L)	--	--	--	--
Manganese, dissolved (ug/L)	6	90	<1	2

TABLE 15.--Trace-element concentrations in ground-water samples from the Chamokane Creek subregion

LOCAL IDENT- I- FIER	DATE OF SAMPLE	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COPPER, DIS- SOLVED (UG/L AS CU)
		Stevens County					
28/39E-35L01	79-07-25	10	9	80	<1	10	4

LOCAL IDENT- I- FIER	DATE OF SAMPLE	LEAD, DIS- SOLVED (UG/L AS PB)	MERCURY DIS- SOLVED (UG/L AS HG)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, DIS- SOLVED (UG/L AS ZN)
28/39E-35L01	79-07-25	0	.1	0	0	110

TABLE 16.--Physical, biological, and major chemical-constituent data for ground-water samples from the Curlew-Sanpoil subregion

Ferry County

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)
29/33E-04M01	110ALVM	67-10-17	205	1304.00	286	7.8	10.6	--	131	3
	110ALVM	79-06-25	205	1304.00	292	7.4	11.8	<1	120	0
32/33E-32N01	110ALVM	79-06-25	18	1640.00	225	7.0	9.4	<1	98	9
36/33E-07F01	112GLCV	70-11-12	80	2270.00	444	7.2	7.2	--	188	66
	112GLCV	71-05-27	80	2270.00	318	7.6	5.8	--	130	30
	112GLCV	79-06-25	80	2270.00	355	7.3	8.2	<1	140	30
36/33E-07F02	112GLCV	60-04-07	79	2270.00	375	7.0	--	--	150	43
	112GLCV	60-10-20	79	2270.00	394	7.2	7.0	--	167	59
37/33E-08J01	112GLCV	79-06-24	97	2330.00	490	7.6	10.8	<1	220	20
38/33E-11N01	112GLCV	79-06-23	63	2200.00	285	7.4	8.4	<1	120	0
39/33E-01J01	110ALVM	79-06-24	36	1750.00	135	7.1	10.4	--	--	--

LOCAL IDENT-I-FIER	DATE OF SAMPLE	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)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
29/33E-04M01	67-10-17	38	8.6	8.4	.3	1.3	156	0	128	17	.4
	79-06-25	35	9.0	9.1	.4	1.4	159	0	130	20	.7
32/33E-32N01	79-06-25	21	11	6.6	.3	1.2	109	0	89	13	3.1
36/33E-07F01	70-11-12	54	13	17	.5	2.7	149	0	122	86	7.3
	71-05-27	36	8.8	--	--	--	117	0	96	--	4.1
	79-06-25	40	10	15	.6	2.2	134	0	110	52	5.2
36/33E-07F02	60-04-07	46	8.6	14	.5	2.6	130	0	107	65	4.2
	60-10-20	--	--	--	--	--	132	0	108	--	--
37/33E-08J01	79-06-24	54	21	14	.4	2.3	244	0	200	49	2.4
38/33E-11N01	79-06-23	33	9.6	9.4	.4	2.0	159	0	130	13	1.5
39/33E-01J01	79-06-24	--	--	--	--	--	68	0	56	8.3	1.3

LOCAL IDENT-I-FIER	DATE OF SAMPLE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
29/33E-04M01	67-10-17	.3	21	183	172	.30	--	570	--	<50	--
	79-06-25	.3	21	--	175	--	.00	--	0	--	<1
32/33E-32N01	79-06-25	.4	25	--	139	--	.86	--	20	--	<1
36/33E-07F01	70-11-12	.2	26	309	262	6.8	--	70	--	<20	--
	71-05-27	--	--	--	--	--	--	--	--	--	--
	79-06-25	.3	27	--	222	--	1.0	--	10	--	<1
36/33E-07F02	60-04-07	.3	29	248	238	3.8	--	20	--	--	--
	60-10-20	--	--	--	--	--	--	--	--	--	--
37/33E-08J01	79-06-24	.5	17	--	287	--	1.6	--	0	--	<1
38/33E-11N01	79-06-23	.3	12	--	160	--	.24	--	30	--	1
39/33E-01J01	79-06-24	.3	--	--	--	--	.14	--	--	--	--

TABLE 17.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Curlew-Sanpoil subregion

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	7	490	135	289
pH (units)	7	7.8	7.0	7.4
Temperature (°C)	7	11.8	5.8	9.4
Fecal-coliform bacteria (col/100 mL)	5	<1	<1	<1
Hardness (as $CaCO_3$)	6	220	98	139
Hardness, noncarbonate (as $CaCO_3$)	6	66	0	14.5
Calcium, dissolved	6	54	21	40
Magnesium, dissolved	6	21	8.6	10.1
Sodium, dissolved	6	17	6.6	11.7
Sodium-adsorption ratio	6	.6	.3	.4
Potassium, dissolved	6	2.7	1.2	2.2
Bicarbonate	7	244	68	133
Carbonate	7	0	0	0
Alkalinity (as $CaCO_3$)	7	200	56	109
Sulfate, dissolved	7	86	8.3	18.5
Chloride, dissolved	7	7.3	.4	2.4
Fluoride, dissolved	7	.5	.2	.3
Silica, dissolved (as SiO_2)	6	29	12	23
Solids, dissolved (residue at 180°C)	3	309	183	248
Solids, dissolved (sum of constituents)	6	287	139	206
Nitrate (as N)	7	1.6	.04	.86
Iron, total recoverable (ug/L)	3	570	20	70
Iron, dissolved (ug/L)	5	30	0	10
Manganese, total recoverable (ug/L)	2	<50	<20	--
Manganese, dissolved (ug/L)	5	1	<1	<1

TABLE 18.--Trace-element concentrations in ground-water samples from the Curlew-Sanpoil subregion

LOCAL IDENT- I- FIER	DATE OF SAMPLE	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)
				FERRY COUNTY			
29/33E-04M01	67-10-17	--	--	<10	<1000	<5	<50
	79-06-25	--	10	5	40	1	0
36/33E-07F01	70-11-12	40	--	--	--	--	<30
	79-06-25	--	0	5	40	<1	0

LOCAL IDENT- I- FIER	DATE OF SAMPLE	COPPER, DIS- SOLVED (UG/L AS CU)	LEAD, DIS- SOLVED (UG/L AS PB)	MERCURY DIS- SOLVED (UG/L AS HG)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, DIS- SOLVED (UG/L AS ZN)
29/33E-04M01	67-10-17	<400	<40	--	<10	<40	<500
	79-06-25	0	0	.4	0	0	10
36/33E-07F01	70-11-12	<50	<100	--	--	--	<10
	79-06-25	4	0	.5	2	0	20

TABLE 19.--Physical, biological, and major chemical-constituent data for ground-water samples from the Colville-Kettle subregion

LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)
Ferry County										
37/37E-08A02	110ALVM	79-06-22	64	1340.00	408	7.4	13.0	<1	180	10
37/37E-08R02	110ALVM	79-06-23	41	1320.00	525	7.4	13.6	<1	240	0
Stevens County										
32/40E-28B01	--	71-10-06	110	2060.00	208	8.0	10.0	--	96	0
33/39E-13C01	112GLCV	79-06-21	520	1620.00	280	7.7	13.4	--	130	0
34/39E-10F02	110ALVM	79-06-21	48	1600.00	300	7.7	10.4	<1	130	0
34/39E-10L01	110ALVM	61-05-02	38	1600.00	303	7.6	11.5	--	147	6
35/39E-09J01	112GLCV	71-10-06	90	1863.00	427	7.8	10.8	--	200	34
35/39E-10A01	112GLCV	60-01-25	236	1900.00	392	7.8	--	--	206	14
	112GLCV	60-05-17	236	1900.00	393	7.8	10.0	--	210	20
	112GLCV	79-06-22	236	1900.00	420	7.4	10.4	<1	200	10
35/39E-10B01	112GLCV	58-03-27	210	--	382	7.7	10.0	--	200	11
35/39E-20K01	110ALVM	79-06-22	110	1560.00	325	7.6	11.4	<1	150	10
35/39E-32P02	112GLCV	79-06-22	290	1880.00	635	7.4	12.4	<1	280	0
36/37E-26Q01	110ALVM	67-09-26	58	1307.00	298	8.1	10.0	--	145	3
36/37E-26R01	110ALVM	70-11-11	67	1325.00	403	7.9	8.4	--	203	3
	110ALVM	71-05-26	67	1325.00	418	8.4	9.4	--	210	0
36/37E-35A01	110ALVM	67-09-20	72	1300.00	327	8.1	8.3	--	165	6

LOCAL IDENT- I- FIER	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)	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	ALKA- LINITY (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
Ferry County										
37/37E-08A02	49	15	6.1	.2	1.0	207	0	170	27	4.5
37/37E-08R02	61	21	16	.5	4.0	317	0	260	30	1.3
Stevens County										
32/40E-28B01	23	9.4	5.0	.2	1.8	129	0	106	6.3	2.2
33/39E-13C01	33	11	5.6	.2	1.5	159	0	130	17	.5
34/39E-10F02	39	8.4	6.1	.2	1.8	171	0	140	9.4	1.6
34/39E-10L01	46	7.8	6.2	.2	1.7	172	0	141	8.2	1.5
35/39E-09J01	50	19	6.5	.2	2.3	206	0	.69	47	2.9
35/39E-10A01	60	14	3.9	.1	1.4	234	0	.92	20	.8
	--	--	--	--	--	232	0	190	--	--
	55	16	4.9	.2	1.5	232	0	190	32	2.6
35/39E-10B01	57	14	3.6	.1	2.0	231	0	189	20	.0
35/39E-20K01	40	11	8.1	.3	4.5	171	0	140	28	1.3
35/39E-32P02	86	15	16	.4	3.8	354	0	290	54	2.4
36/37E-26Q01	42	9.6	5.3	.2	2.3	173	0	142	15	.8
36/37E-26R01	55	16	6.5	.2	3.8	244	0	200	18	.8
	57	17	--	--	--	273	--	224	--	1.3
36/37E-35A01	46	12	5.4	.2	2.8	194	0	159	15	.8

TABLE 19.--Continued

LOCAL IDENT-I-FIER	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
Ferry County											
37/37E-08A02	.4	17	--	230	--	--	1.7	--	10	--	<1
37/37E-08R02	.5	15	--	305	--	--	.00	--	0	--	3
Stevens County											
32/40E-28B01	.0	31	150	144	--	.44	--	50	--	<20	--
33/39E-13C01	.1	16	--	163	--	--	.00	--	190	--	90
34/39E-10F02	.2	21	--	175	--	--	.73	--	10	--	2
34/39E-10L01	.2	23	202	193	13	--	--	<10	--	--	--
35/39E-09J01	.0	18	284	262	--	3.3	--	40	--	<20	--
35/39E-10A01	.2	14	225	229	.00	--	--	90	--	--	--
	--	--	--	--	--	--	--	--	--	--	--
	.1	14	--	241	--	--	.00	--	30	--	290
35/39E-10B01	.2	16	240	227	.00	--	--	130	--	--	--
35/39E-20K01	.2	19	--	196	--	--	.00	--	10	--	5
35/39E-32P02	.2	23	--	381	--	--	1.3	--	0	--	<1
36/37E-26Q01	.2	25	191	188	2.0	--	--	60	--	<50	--
36/37E-26R01	.3	20	237	242	1.7	--	--	120	--	<20	--
	--	--	--	--	--	--	--	--	--	--	--
36/37E-35A01	.3	20	198	199	1.3	--	--	50	--	<50	--

TABLE 20.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Colville-Kettle subregion

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	14	635	208	354
pH (units)	14	8.4	7.4	7.7
Temperature (^{o}C)	14	13.6	8.3	10.6
Fecal-coliform bacteria (col/100 mL)	6	<1	<1	<1
Hardness (as $CaCO_3$)	14	280	96	173
Hardness, noncarbonate (as $CaCO_3$)	14	34	0	4.5
Calcium, dissolved	14	86	23	47.5
Magnesium, magnesium	14	21	7.8	13
Sodium, dissolved	14	16	3.6	6.1
Sodium-adsorption ratio	14	.5	.1	.2
Potassium, dissolved	14	4.5	1.0	2.2
Bicarbonate	14	354	129	200
Carbonate	14	0	0	0
Alkalinity (as $CaCO_3$)	14	290	106	164
Sulfate, dissolved	14	54	6.3	19
Chloride, dissolved	14	4.5	.0	1.4
Fluoride, dissolved	14	.5	.0	.2
Silica, dissolved (as SiO_2)	14	31	14	19.5
Solids, dissolved (residue at 180^{o}C)	8	284	150	214
Solids, dissolved (sum of constituents)	14	381	144	213
Nitrate (as N)	14	3.3	.00	.41
Iron, total recoverable (ug/L)	8	130	<10	55
Iron, dissolved (ug/L)	7	190	0	10
Manganese, total recoverable (ug/L)	5	<50	<20	<20
Manganese, dissolved (ug/L)	7	290	<1	3

TABLE 21.--Trace-element concentrations in ground-water samples from the Colville-Kettle subregion

LOCAL IDENT- I- FIER	DATE OF SAMPLE	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)
32/40E-28B01	71-10-06	<10	--	--	--	--	<30
33/39E-13C01	79-06-21	--	0	7	100	<1	0
35/39E-09J01	71-10-06	120	--	--	--	--	<30
35/39E-10A01	79-06-22	--	0	1	100	<1	0
36/37E-26D01	67-09-26	--	--	<10	<1000	<5	<50
36/37E-26R01	70-11-11	30	--	--	--	--	<30
36/37E-35A01	67-09-20	--	--	<10	<1000	<5	<50

LOCAL IDENT- I- FIER	DATE OF SAMPLE	COPPER, DIS- SOLVED (UG/L AS CU)	LEAD, DIS- SOLVED (UG/L AS PB)	MERCURY DIS- SOLVED (UG/L AS HG)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, DIS- SOLVED (UG/L AS ZN)
32/40E-28B01	71-10-06	<50	<100	--	--	--	<10
33/39E-13C01	79-06-21	0	0	.4	0	0	<3
35/39E-09J01	71-10-06	<50	<100	--	--	--	<10
35/39E-10A01	79-06-22	1	0	.2	0	0	<3
36/37E-26D01	67-09-26	<400	<40	--	<10	<40	<500
36/37E-26R01	70-11-11	<50	<100	--	--	--	70
36/37E-35A01	67-09-20	<400	<40	--	<10	<40	<500

TABLE 22.--Physical, biological, and major chemical-constituent data for ground-water samples from the Pend Oreille subregion

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. ABOVE NGVD)	SPE-CIFIC CON-DUCT-ANCE (UMHOS)	PH (STAND-ARD UNITS)	TEMPER-ATURE (DEG C)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)
31/45E-24B01	110ALVM	79-07-18	175	2166.00	330	7.9	10.5	<1	144	14
31/45E-34G01	112GLCV	79-08-03	208	--	211	8.2	16.2	<1	109	9
32/44E-07R01	110ALVM	79-07-18	77	--	470	7.5	10.9	<1	242	2
32/44E-27G01	110ALVM	79-08-02	99	--	360	8.0	12.4	<1	178	0
32/44E-36C01	110ALVM	79-08-02	57	--	292	7.8	12.2	<1	143	3
32/45E-32E01	110ALVM	61-05-02	37	2060.00	120	6.7	9.5	--	50	1
32/45E-32M01	110ALVM	70-11-11	50	2065.00	123	6.8	7.2	--	50	1
	110ALVM	71-05-26	50	2065.00	116	8.1	8.7	--	46	0
32/45E-33H01	110ALVM	79-08-02	91	--	200	8.2	11.4	<1	96	9
32/45E-34P01	110ALVM	79-08-03	171	--	240	8.0	11.4	<1	119	0
33/43E-11N01	110ALVM	79-08-03	160	--	357	7.8	12.0	<1	179	0
35/43E-12L01	110ALVM	79-08-03	60	--	545	7.2	15.0	<1	289	9
36/43E-35F01	110ALVM	79-08-02	87	2080.00	504	7.4	9.8	<1	263	3
37/43E-29K01	110ALVM	79-08-02	90	--	450	6.7	9.1	<1	220	0

LOCAL IDENT-I-FIER	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)	BICAR-BONATE FET-FLD (MG/L AS HCO3)	CAR-BONATE FET-FLD (MG/L AS CO3)	ALKA-LINITY FIELD (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
31/45E-24B01	41	10	8.1	.3	2.2	159	--	130	11	7.6
31/45E-34G01	29	8.8	3.6	.2	1.5	122	--	100	14	.5
32/44E-07R01	74	14	5.5	.2	2.7	293	0	240	7.9	1.9
32/44E-27G01	53	11	11	.4	2.4	232	0	190	15	.8
32/44E-36C01	42	9.2	4.9	.2	1.5	171	0	140	14	.6
32/45E-32E01	14	3.6	4.2	.3	.9	60	0	49	8.6	.8
32/45E-32M01	13	4.2	4.6	.3	.9	60	0	49	7.6	1.7
	12	3.8	--	--	--	61	0	50	--	.9
32/45E-33H01	26	7.5	3.1	.1	1.0	106	0	87	15	.5
32/45E-34P01	35	7.7	3.3	.1	1.5	146	0	120	13	1.2
33/43E-11N01	47	15	6.6	.2	2.7	220	0	180	14	.5
35/43E-12L01	78	23	4.1	.1	2.6	341	0	280	22	1.2
36/43E-35F01	74	19	5.2	.1	1.6	317	0	260	16	1.0
37/43E-29K01	65	14	9.9	.3	2.1	268	0	220	22	.7

TABLE 22.--Continued

LOCAL IDENT-I-FIER	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
31/45E-24B01	.1	24	--	162	--	5.6	--	<10	--	7
31/45E-34G01	.1	15	--	133	--	.18	--	80	--	2
32/44E-07R01	.3	18	--	269	--	.05	--	130	--	320
32/44E-27G01	.2	19	--	227	--	.17	--	140	--	240
32/44E-36C01	.1	17	--	174	--	.06	--	<10	--	590
32/45E-32E01	.2	24	89	86	1.8	--	<10	--	--	--
32/45E-32M01	.1	23	85	85	2.7	--	60	--	<20	--
	--	--	--	--	--	--	--	--	--	--
32/45E-33H01	.1	14	--	119	--	.08	--	110	--	1
32/45E-34P01	.1	13	--	147	--	.14	--	340	--	7
33/43E-11N01	.1	18	--	213	--	.02	--	360	--	100
35/43E-12L01	.1	17	--	316	--	.04	--	230	--	<10
36/43E-35F01	.2	26	--	299	--	1.2	--	<10	--	<1
37/43E-29K01	.1	21	--	269	--	.02	--	1800	--	180

TABLE 23.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Pend Oreille subregion

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	13	545	116	330
pH (units)	13	8.2	6.7	7.8
Temperature (°C)	13	16.2	7.2	11.4
Fecal-coliform bacteria (col/100 mL)	11	<1	<1	<1
Hardness (as $CaCO_3$)	13	290	46	140
Hardness, noncarbonate (as $CaCO_3$)	13	10	0	0
Calcium, dissolved	13	78	12	42
Magnesium, dissolved	13	23	3.6	10
Sodium, dissolved	13	11	3.1	4.9
Sodium-adsorption ratio	13	.4	.1	.2
Potassium, dissolved	13	2.7	.9	1.6
Bicarbonate	13	341	60	171
Carbonate	13	0	0	0
Alkalinity (as $CaCO_3$)	13	280	49	140
Sulfate, dissolved	13	22	7.6	14
Chloride, dissolved	13	7.6	.5	.8
Fluoride, dissolved	13	.3	.1	.1
Silica, dissolved (as SiO_2)	13	26	13	18
Solids, dissolved (residue at 180°C)	2	89	85	--
Solids, dissolved (sum of constituents)	13	316	88	207
Nitrate (as N)	13	5.6	.02	.14
Iron, total recoverable (ug/L)	2	60	< 10	--
Iron, dissolved (ug/L)	11	1,800	0	130
Manganese, total recoverable (ug/L)	1	< 20	< 20	--
Manganese, dissolved (ug/L)	10	590	<1	10

TABLE 24.--Trace-element concentrations in ground-water samples from the Pend Oreille subregion

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
31/45E-24B01	79-07-18	--	0	3	60	2	0
32/45E-32M01	70-11-11	<10	--	--	--	--	<30
36/43E-35F01	79-08-02	--	0	1	50	<1	10

LOCAL IDENT-I-FIER	DATE OF SAMPLE	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
31/45E-24B01	79-07-18	15	2	.0	0	0	70
32/45E-32M01	70-11-11	<50	<100	--	--	--	220
36/43E-35F01	79-08-02	2	2	.0	2	0	150

TABLE 25.--Physical, biological, and major chemical-constituent data for ground-water samples from the Okanogan Region

LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)
				Okanogan County						
30/25E-10N01	110ALVM	79-06-28	61	780.00	610	7.7	14.0	--	250	10
31/25E-15C01	112GLCV	79-06-28	223	795.00	540	7.6	14.0	--	210	30
31/25E-30M01	112GLCV	71-10-08	143	1270.00	405	8.0	12.8	--	150	0
32/25E-02A01	110ALVM	79-06-28	88	850.00	545	7.5	13.3	--	260	80
32/25E-04P01	112GLCV	79-06-28	237	1030.00	675	7.5	13.0	--	300	80
32/25E-29D01	112GLCV	79-06-28	142	860.00	530	7.8	13.8	<1	260	40
33/26E-09B01	112GLCV	79-06-27	117	840.00	670	7.5	15.2	<1	300	140
33/26E-16F01	112GLCV	58-03-27	118	880.00	567	7.8	14.5	--	229	43
33/26E-30L01	110ALVM	79-06-27	78	900.00	690	7.5	14.8	<1	320	120
34/26E-02L01	112GLCV	71-10-08	118	1330.00	866	7.7	11.2	--	390	190
34/26E-02P01	112GLCV	79-06-27	117	1320.00	718	7.2	11.0	--	330	90
34/26E-11D01	112GLCV	71-05-27	113	1330.00	608	7.8	9.8	--	320	120
34/26E-26Q01	110ALVM	59-10-21	30	820.00	519	8.0	15.5	--	256	56
	110ALVM	60-05-17	30	820.00	412	7.8	11.5	--	196	37
	110ALVM	60-10-20	30	820.00	532	7.9	13.5	--	257	--
34/27E-20F01	110ALVM	79-06-27	73	880.00	430	7.4	12.4	--	190	0
35/26E-03C01	112GLCV	79-06-27	82	1020.00	770	7.5	11.0	--	370	110
36/26E-03D01	--	71-10-08	68	1900.00	788	7.9	9.0	--	380	140
36/26E-13K02	112GLCV	79-06-27	172	1050.00	585	7.4	12.5	<1	270	40
37/27E-16C02	112GLCV	59-10-20	155	885.00	555	7.8	10.5	--	250	21
	112GLCV	60-05-17	155	885.00	571	7.6	11.5	--	258	28
37/27E-16H01	112GLCV	59-10-20	130	--	709	7.2	12.0	--	338	7
	112GLCV	60-05-17	130	--	672	7.3	11.5	--	325	13
37/27E-16L03	112GLCV	79-06-26	73	900.00	620	7.4	10.8	<1	240	0
37/27E-20K01	112GLCV	79-06-26	52	920.00	690	7.5	12.0	--	290	0
38/27E-10N01	112GLCV	70-11-12	372	1210.00	1461	7.5	14.8	--	38	0
	112GLCV	71-05-27	372	1210.00	1390	8.2	16.3	--	9	0
39/25E-26B01	112GLCV	79-06-26	78	1220.00	460	7.4	12.2	--	190	0
39/25E-35A01	112GLCV	79-06-26	90	1180.00	224	7.3	8.2	--	98	0
39/27E-28J01	110ALVM	79-06-26	25	950.00	790	7.3	13.0	--	340	90
40/25E-08J02	--	79-06-26	110	1135.00	245	7.6	10.0	--	110	0
40/27E-28L01	110ALVM	59-10-20	33	935.00	543	7.7	13.5	--	228	20
	110ALVM	60-05-17	33	935.00	515	7.7	--	--	221	19

TABLE 25.--Continued

LOCAL IDENT- I- FIER	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)	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	ALKA- LINITY (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
30/25E-10N01	63	23	28	.8	5.3	293	0	240	80	4.6
31/25E-15C01	55	18	27	.8	5.0	220	0	180	96	4.1
31/25E-30M01	42	10	29	1.0	3.5	243	0	199	14	5.2
32/25E-02A01	71	19	8.6	.2	5.3	220	0	180	65	2.9
32/25E-04P01	82	24	21	.5	6.5	268	0	220	140	2.9
32/25E-29D01	66	24	9.8	.3	4.2	268	0	220	62	3.0
33/26E-09B01	64	33	20	.5	7.1	195	0	160	190	2.7
33/26E-16F01	54	23	34	1.0	4.4	227	0	186	109	3.0
33/26E-30L01	92	23	17	.4	7.8	243	0	199	150	15
34/26E-02L01	110	29	28	.6	5.9	252	0	207	260	4.5
34/26E-02P01	94	24	20	.5	6.3	293	0	240	130	4.2
34/26E-11D01	92	23	15	.4	5.5	255	0	209	130	2.1
34/26E-26Q01	55	29	13	.4	5.2	244	0	200	75	1.8
	40	23	10	.3	4.0	194	0	159	55	2.0
	--	--	--	--	--	249	0	204	--	--
34/27E-20F01	43	19	15	.5	3.4	232	0	190	33	3.2
35/26E-03C01	96	31	24	.5	5.4	317	0	260	160	5.0
36/26E-03D01	97	33	16	.4	3.1	289	0	237	160	5.7
36/26E-13K02	65	26	15	.4	3.4	280	0	230	72	2.7
37/27E-16C02	70	19	23	.6	4.0	279	0	229	52	8.8
	--	--	--	--	--	280	0	230	--	--
37/27E-16H01	100	21	26	.6	4.0	403	0	331	58	3.5
	--	--	--	--	--	380	0	312	--	--
37/27E-16L03	68	17	28	.8	4.5	305	0	250	49	17
37/27E-20K01	81	21	27	.7	5.4	354	0	290	48	5.8
38/27E-10N01	10	3.2	314	22	1.5	237	0	194	490	1.9
	3.4	.2	--	--	--	252	0	207	--	2.8
39/25E-26R01	53	15	15	.5	5.1	244	0	200	41	3.4
39/25E-35A01	28	6.7	5.2	.2	2.2	120	0	98	15	.9
39/27E-28J01	80	33	31	.7	6.4	305	0	250	240	3.2
40/25E-08J02	36	4.8	4.1	.2	1.3	134	0	110	16	.7
40/27E-28L01	65	16	27	.8	4.6	254	0	208	67	3.5
	--	--	--	--	--	246	0	202	--	--

TABLE 25.--Continued

LOCAL IDENT-I-FIER	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
30/25E-10N01	.2	19	--	372	--	--	1.0	--	0	--	30
31/25E-15C01	.4	20	--	334	--	--	.00	--	60	--	140
31/25E-30M01	.3	25	208	255	--	1.5	--	40	--	<20	--
32/25E-02A01	.1	20	--	314	--	--	3.0	--	10	--	<1
32/25E-04P01	.3	21	--	432	--	--	.52	--	10	--	<1
32/25E-29D01	.3	23	--	325	--	--	.00	--	110	--	90
33/26E-09B01	.6	23	--	437	--	--	.09	--	0	--	100
33/26E-16F01	.5	19	--	360	.70	--	--	440	--	--	--
33/26E-30L01	.3	19	--	447	--	--	.68	--	10	--	<1
34/26E-02L01	.1	23	488	592	--	1.8	--	200	--	40	--
34/26E-02P01	.3	22	--	450	--	--	1.1	--	20	--	<1
34/26E-11D01	.2	24	380	419	--	.37	--	20	--	<20	--
34/26E-26Q01	.5	28	320	329	1.6	--	--	190	--	--	--
	.4	23	257	254	.50	--	--	410	--	--	--
	--	--	--	--	--	--	--	--	--	--	--
34/27E-20F01	.3	18	--	253	--	--	.82	--	0	--	4
35/26E-03C01	.4	22	--	510	--	--	2.2	--	10	--	<1
36/26E-03D01	.3	25	576	502	--	4.5	--	30	--	<20	--
36/26E-13K02	.4	20	--	348	--	--	1.2	--	40	--	20
37/27E-16C02	.4	23	337	342	4.9	--	--	40	--	--	--
	--	--	--	--	--	--	--	--	--	--	--
37/27E-16H01	.4	32	434	444	.30	--	--	1600	--	--	--
	--	--	--	--	--	--	--	--	--	--	--
37/27E-16L03	.5	23	--	359	--	--	.45	--	0	--	<1
37/27E-20K01	.6	39	--	403	--	--	.05	--	130	--	330
38/27E-10N01	.6	17	983	955	4.3	--	--	50	--	<20	--
	--	--	--	--	--	--	--	--	--	--	--
39/25E-26B01	.2	19	--	276	--	--	.95	--	10	--	<1
39/25E-35A01	.1	18	--	136	--	--	.03	--	340	--	60
39/27E-28J01	.5	26	--	580	--	--	2.1	--	10	--	<1
40/25E-08J02	.1	16	--	145	--	--	.00	--	0	--	<1
40/27E-28L01	.3	22	328	335	4.8	--	--	20	--	--	--
	--	--	--	--	--	--	--	--	--	--	--

TABLE 26.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Okanogan Region

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration Maximum	Minimum	Median
Specific conductance (umho)	33	1,461	224	585
pH (units)	33	8.2	7.2	7.6
Temperature (^{o}C)	32	16.3	8.2	12.4
Fecal-coliform bacteria (col/100 mL)	5	<1	<1	<1
Hardness (as $CaCO_3$)	33	390	9	257
Hardness, noncarbonate (as $CaCO_3$)	32	190	0	29
Calcium, dissolved	29	110	3.4	65
Magnesium, dissolved	29	33	.2	23
Sodium, dissolved	28	314	4.1	20.5
Sodium-adsorption ratio	28	22	.2	.5
Potassium, dissolved	28	7.8	1.3	4.8
Bicarbonate	33	403	120	252
Carbonate	33	0	0	0
Alkalinity (as $CaCO_3$)	33	331	98	207
Sulfate, dissolved	28	490	14	73.5
Chloride, dissolved	29	17	.7	3.2
Fluoride, dissolved	28	.6	.1	.3
Silica, dissolved (as SiO_2)	28	39	16	22
Solids, dissolved (residue at 180^{o}C)	10	983	208	359
Solids, dissolved (sum of constituents)	28	955	136	340
Nitrate (as N)	28	4.5	.00	.60
Iron, total recoverable (ug/L)	11	1,600	20	50
Iron, dissolved (ug/L)	17	340	0	10
Manganese, total recoverable (ug/L)	5	40	<20	<20
Manganese, dissolved (ug/L)	17	330	<1	<1

TABLE 27.--Trace-element concentrations in ground-water samples from the Okanogan Region

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
Okanogan County													
30/25E-10N01	79-06-28	--	10	5	50	<1	0	3	0	.0	12	0	3
31/25E-30M01	71-10-08	30	--	--	--	--	<30	<50	<100	--	--	--	<10
33/26E-09B01	79-06-27	--	20	6	40	<1	0	2	0	.0	1	0	<3
34/26E-02L01	71-10-08	50	--	--	--	--	<30	<50	<100	--	--	--	<10
34/26E-11D01	71-05-27	<10	--	--	--	--	<30	<50	<100	--	--	--	<10
36/26E-03D01	71-10-08	90	--	--	--	--	<30	<50	<100	--	--	--	<10
37/27E-16L03	79-06-26	--	10	2	40	<1	0	1	0	.0	0	0	5
38/27E-10N01	70-11-12	30	--	--	--	--	<30	<50	<100	--	--	--	70

TABLE 28.--Physical, biological, and major chemical-constituent data for ground-water samples from the Methow Region

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)
Okanogan County										
30/22E-13G01	110ALVM	79-07-10	52	1040.00	215	7.8	11.0	<1	89	0
30/23E-06K01	110ALVM	70-11-12	75	--	230	7.7	9.6	--	107	2
	110ALVM	71-05-27	75	--	113	7.9	10.8	--	46	0
31/22E-26N01	110ALVM	79-07-10	41	1210.00	240	7.6	11.0	<1	100	0
32/22E-10F01	110ALVM	79-07-10	105	1490.00	290	7.8	12.3	--	82	1
33/22E-08N01	110ALVM	59-10-20	50	--	215	7.2	11.0	--	100	9
	110ALVM	60-05-18	50	--	190	7.2	8.0	--	98	9
33/22E-17D01	110ALVM	79-07-09	100	1608.71	176	7.4	8.8	<1	74	3
35/21E-32K01	110ALVM	79-07-10	103	1830.00	160	7.3	10.5	<1	71	0
36/19E-26B01	110ALVM	59-09-16	50	--	111	7.1	--	--	49	0

LOCAL IDENT-I-FIER	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)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
30/22E-13G01	28	4.7	5.4	.2	1.3	109	0	89	10	1.0
30/23E-06K01	33	5.8	6.0	.3	1.0	128	0	105	13	.6
	14	2.8	--	--	--	70	0	57	--	1.0
31/22E-26N01	31	6.2	6.6	.3	1.2	134	0	110	11	.8
32/22E-10F01	21	7.1	4.6	.2	1.4	99	0	81	17	1.1
33/22E-08N01	33	4.1	4.3	.2	1.2	111	0	91	14	.8
	--	--	--	--	--	109	0	89	--	--
33/22E-17D01	23	4.1	3.0	.2	.5	87	0	71	9.4	1.3
35/21E-32K01	21	4.4	2.7	.1	.5	91	0	75	6.0	.5
36/19E-26B01	18	1.0	1.9	.1	.5	62	0	51	3.7	.0

LOCAL IDENT-I-FIER	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)
30/22E-13G01	.2	13	--	121	--	.77	--	10	--	<1
30/23E-06K01	.1	13	138	138	2.5	--	20	--	<20	--
	--	--	--	--	--	--	--	--	--	--
31/22E-26N01	.2	15	--	142	--	.85	--	0	--	<1
32/22E-10F01	.2	14	--	118	--	.55	--	<0	--	<1
33/22E-08N01	.0	13	127	128	2.1	--	20	--	--	--
	--	--	--	--	--	--	--	--	--	--
33/22E-17D01	.1	11	--	98	--	.53	--	0	--	2
35/21E-32K01	.1	9.9	--	90	--	.09	--	0	--	<1
36/19E-26B01	.0	9.0	65	66	.50	--	20	--	--	--

TABLE 29.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Methow Region

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	10	290	111	203
pH (units)	10	7.9	7.1	7.5
Temperature (^{o}C)	9	12.3	8.0	10.8
Fecal-coliform bacteria (col/100 mL)	4	<1	<1	<1
Hardness (as $CaCO_3$)	10	107	46	86
Hardness, noncarbonate (as $CaCO_3$)	10	9	0	.5
Calcium, dissolved	9	33	14	23
Magnesium, dissolved	9	7.1	1	4.4
Sodium, dissolved	8	6.6	1.9	4.5
Sodium-adsorption ratio	8	.3	.1	.2
Potassium, dissolved	8	1.4	.5	1.1
Bicarbonate	10	134	62	104
Carbonate	10	0	0	0
Alkalinity (as $CaCO_3$)	10	110	51	85
Sulfate, dissolved	8	17	3.7	10.5
Chloride, dissolved	9	1.3	.0	.8
Fluoride, dissolved	8	.2	.0	.1
Silica, dissolved (as SiO_2)	8	15	9	13
Solids, dissolved (residue at 180^{o}C)	3	138	65	127
Solids, dissolved (sum of constituents)	8	142	66	120
Nitrate (as N)	8	.85	.09	.54
Iron, total recoverable (ug/L)	3	20	20	20
Iron, dissolved (ug/L)	5	10	0	0
Manganese, total recoverable (ug/L)	1	<20	<20	<20
Manganese, dissolved (ug/L)	5	2	1	<1

TABLE 30.--Trace-element concentrations in ground-water samples from the Methow Region

LOCAL IDENT- I- FIER	DATE OF SAMPLE	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL)	ALUM- INUM, DIS- SOLVED (UG/L AS AL)	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COPPER, DIS- SOLVED (UG/L AS CU)	LEAD, DIS- SOLVED (UG/L AS PB)	MERCURY DIS- SOLVED (UG/L AS HG)	SELE- NIUM, DIS- SOLVED (UG/L AS SE)	SILVER, DIS- SOLVED (UG/L AS AG)	ZINC, DIS- SOLVED (UG/L AS ZN)
Okanogan County													
30/23E-06K01	70-11-12	70	--	--	--	--	<30	<50	<100	--	--	--	<10
33/22E-17D01	79-07-09	--	0	0	10	<1	0	0	0	.0	0	0	10

TABLE 31.--Physical, biological, and major chemical-constituent data for ground-water samples from the Chelan Region

LOCAL IDENT-I-FIER	GEO-LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS)	PH FIELD (UNITS)	TEMPER-ATURE, WATER (DEG C)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML)	HARD-NESS (MG/L AS CACO3)	HARD-NESS, NONCAR-BONATE (MG/L CACO3)
Chelan County										
28/22E-21J01	--	71-10-20	82	2150.00	750	7.6	9.5	--	350	0
28/22E-28B01	--	79-07-24	65	2050.00	610	7.3	11.2	<1	260	0
28/22E-32P01	112GLCV	79-07-11	93	1200.00	560	7.4	12.5	<1	140	0

LOCAL IDENT-I-FIER	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)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)
28/22E-21J01	86	34	30	.7	2.6	437	0	358	56
28/22E-28B01	60	27	25	.7	2.8	354	0	290	44
28/22E-32P01	33	14	69	2.5	3.2	305	0	250	30

LOCAL IDENT-I-FIER	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE)	IRON, DIS-SOLVED (UG/L AS FE)
28/22E-21J01	8.1	.4	44	490	480	1.0	--	40	--
28/22E-28B01	6.0	.2	38	--	381	--	.79	--	0
28/22E-32P01	3.3	.4	31	--	349	--	3.3	--	10

LOCAL IDENT-I-FIER	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	ZINC, DIS-SOLVED (UG/L AS ZN)
28/22E-21J01	<20	--	40	<30	<50	<100	<10
28/22E-28B01	--	<1					
28/22E-32P01	--	<1					

TABLE 32.--Physical, biological, and major chemical-constituent data for ground-water samples from the Entiat subregion

LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)
Chelan County										
25/20E-03D01	110ALVM	79-07-12	75	1013.00	165	7.1	9.4	--	71	0
25/20E-14D01	110ALVM	79-07-24	40	890.00	145	7.2	11.8	--	60	9
26/20E-20P01	110ALVM	79-07-12	40	1235.00	275	7.5	13.1	<1	120	0
Douglas County										
25/21E-16K01	112GLCV	79-07-11	115	760.00	510	7.3	11.8	--	270	40
25/21E-32K02	112GLCV	79-07-11	97	720.00	725	7.3	13.1	<1	300	30
26/21E-11H02	112GLCV	79-07-11	164	720.00	255	7.7	12.2	--	110	19
26/21E-21N02	112GLCV	71-05-25	159	801.00	399	8.2	13.7	--	170	48
	112GLCV	71-10-20	159	801.00	499	--	13.6	--	220	--
	112GLCV	79-07-11	159	801.00	520	7.6	14.0	--	250	110

LOCAL IDENT- I- FIER	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)	BICAR- BONATE (MG/L AS HCO3)	CAR- BONATE (MG/L AS CO3)	ALKA- LINITY (MG/L AS CACO3)	SULFATE DIS- SOLVED (MG/L AS SO4)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL)
Chelan County										
25/20E-03D01	20	5.0	5.1	.3	1.7	91	0	75	5.6	2.4
25/20E-14D01	17	4.3	4.3	.2	2.3	62	0	51	10	1.0
26/20E-20P01	29	12	6.2	.2	2.4	146	0	120	6.3	1.3
Douglas County										
25/21E-16K01	82	15	8.5	.2	2.3	280	0	230	29	3.4
25/21E-32K02	79	25	18	.5	3.8	329	0	270	65	2.8
26/21E-11H02	32	7.2	5.7	.2	1.9	111	0	91	24	2.2
26/21E-21N02	48	12	12	.4	3.6	148	0	121	54	4.4
	68	13	--	--	--	--	--	--	--	7.9
	76	14	14	.4	4.2	171	0	140	120	7.1

LOCAL IDENT- I- FIER	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
Chelan County										
25/20E-03D01	.1	16	--	104	--	.70	--	0	--	<1
25/20E-14D01	.1	21	--	97	--	1.5	--	0	--	<1
26/20E-20P01	.1	17	--	163	--	3.8	--	0	--	<1
Douglas County										
25/21E-16K01	.2	22	--	311	--	2.3	--	0	--	<1
25/21E-32K02	.2	27	--	393	--	2.4	--	0	--	<1
26/21E-11H02	.2	13	--	145	--	.86	--	10	--	<1
26/21E-21N02	.2	27	262	250	3.7	--	10	--	<20	--
	--	--	--	--	--	--	--	--	--	--
	.3	21	--	356	--	3.4	--	10	--	<1

TABLE 33.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Entiat subregion

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	7	725	145	275
pH (units)	7	8.2	7.1	7.3
Temperature (^{o}C)	7	14.0	9.4	12.2
Fecal-coliform bacteria (col/100 mL)	2	<1	<1	<1
Hardness (as $CaCO_3$)	7	300	60	120
Hardness, noncarbonate (as $CaCO_3$)	7	110	0	19
Calcium, dissolved	7	82	17	32
Magnesium, dissolved	7	25	4.3	12
Sodium, dissolved	7	18	4.3	6.2
Sodium-adsorption ratio	7	.5	.2	.2
Potassium, dissolved	7	4.2	1.7	2.3
Bicarbonate	7	329	62	146
Carbonate	7	0	0	0
Alkalinity (as $CaCO_3$)	7	270	51	120
Sulfate, dissolved	7	120	5.6	24
Chloride, dissolved	7	7.9	1.0	2.4
Fluoride, dissolved	7	.3	.1	.2
Silica, dissolved (as SiO_2)	7	27	13	21
Solids, dissolved (residue at 180^{o}C)	1	262	262	262
Solids, dissolved (sum of constituents)	7	394	97	163
Nitrate (as N)	7	3.8	.7	2.3
Iron, total recoverable (ug/L)	1	10	10	10
Iron, dissolved (ug/L)	7	10	0	0
Manganese, total recoverable (ug/L)	1	20	20	20
Manganese, dissolved (ug/L)	7	<1	<1	<1

TABLE 34.--Trace-element concentrations in ground-water samples from the Entiat subregion

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR
25/20E-03D01	79-07-12	--	0	0	30	<1	0
26/21E-21N02	71-05-25	<10	--	--	--	--	<30
	79-07-11	--	0	2	80	<1	0

LOCAL IDENT-I-FIER	DATE OF SAMPLE	COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
25/20E-03D01	79-07-12	2	0	.0	0	0	<3
26/21E-21N02	71-05-25	<50	<100	--	--	--	<10
	79-07-11	2	0	.0	1	0	<3

TABLE 35.--Physical, biological, and major chemical-constituent data for ground-water samples from the Cashmere subregion

LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE OF SAMPLE	DEPTH OF WELL, TOTAL (FEET)	ELEV. OF LAND SURFACE DATUM (FT. NGVD)	SPE- CIFIC CON- DUCT- ANCE (MICRO- MHOS)	PH FIELD (UNITS)	TEMPER- ATURE, WATER (DEG C)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	HARD- NESS (MG/L AS CACO3)	HARD- NESS, NONCAR- BONATE (MG/L CACO3)
				Chelan County						
22/20E-24R01	--	61-05-03	52	--	591	7.5	15.0	--	252	0
22/21E-28H01	112GLCV	79-07-12	118	690.00	610	7.6	14.8	<1	--	--
23/19E-04D01	110ALVM	61-05-11	47	780.00	447	7.2	10.0	--	208	0
23/19E-04D02	110ALVM	39-01-24	43	780.00	--	--	10.0	--	199	0
23/19E-04E01	110ALVM	79-07-13	63	820.00	585	7.3	10.7	--	200	20
23/19E-05L02	110ALVM	79-07-23	60	860.00	575	7.3	13.2	<1	260	0
23/19E-05M02	110ALVM	71-05-25	65	880.00	574	7.9	11.8	--	240	0
	110ALVM	71-10-20	65	880.00	671	--	12.2	--	320	--
23/19E-13N02	110ALVM	79-07-13	39	680.00	290	7.3	11.0	<1	120	0
24/17E-23Q01	112GLCV	70-11-09	80	1150.00	117	7.8	8.4	--	57	0
	112GLCV	79-07-25	80	1150.00	55	7.2	7.2	--	22	0
24/18E-17J01	112GLCV	79-07-25	20	1040.00	300	6.9	11.5	<1	130	10
24/18E-22N01	112GLCV	79-07-25	62	1120.00	220	7.1	11.3	<1	110	15
24/18E-35J03	110ALVM	79-07-23	30	870.00	540	7.4	11.8	<1	250	0
25/17E-08G01	--	65-03-24	74	--	211	6.8	4.4	--	88	0
				Douglas County						
22/21E-26B01	112GLCV	79-07-25	82	670.00	420	7.3	15.0	<1	180	0
23/20E-10R01	112GLCV	79-07-12	95	650.00	500	7.6	13.8	<1	190	0
23/20E-34R01	110ALVM	59-10-20	60	645.00	377	7.6	14.5	--	168	5
	110ALVM	60-05-18	60	645.00	444	7.5	14.5	--	196	14
23/20E-35N01	110ALVM	79-07-12	50	651.00	550	7.5	14.7	--	230	0
24/20E-35J01	112GLCV	71-10-20	260	660.00	680	7.8	16.4	--	210	30

TABLE 35.--Continued

LOCAL IDENT-I-FIER	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)	BICAR-BONATE (MG/L AS HCO3)	CAR-BONATE (MG/L AS CO3)	ALKA-LINITY (MG/L AS CACO3)	SULFATE DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)
Chelan County										
22/20E-24R01	74	16	32	.9	3.4	333	0	273	28	5.2
22/21E-28H01	71	--	35	--	5.5	317	0	260	42	13
23/19E-04D01	48	21	16	.5	1.7	276	0	226	10	4.5
23/19E-04D02	45	21	14	.4	2.5	252	0	207	16	2.6
23/19E-04E01	44	21	18	.6	2.2	220	0	180	23	7.4
23/19E-05L02	53	30	23	.6	2.1	341	0	280	20	2.6
23/19E-05M02	42	32	25	.7	1.5	318	0	261	27	2.1
	72	35	--	--	--	--	0	--	--	2.2
23/19E-13N02	25	15	8.3	.3	2.4	158	0	130	9.0	2.9
24/17E-23Q01	4.6	11	1.9	.1	2.1	69	0	57	2.4	.6
	1.9	4.3	.9	.1	1.9	27	0	22	3.9	.3
24/18E-17J01	20	19	8.3	.3	3.3	146	0	120	21	4.2
24/18E-22N01	14	17	3.0	.1	1.4	116	0	95	8.3	1.3
24/18E-35J03	31	41	19	.5	3.9	305	0	250	29	5.5
25/17E-08G01	21	8.8	7.0	.3	4.5	111	0	91	15	.8
Douglas County										
22/21E-26B01	52	11	19	.6	4.2	220	0	180	20	4.2
23/20E-10R01	48	17	23	.7	4.7	256	0	210	44	3.6
23/20E-34R01	49	11	14	.5	3.0	199	0	163	14	3.8
	58	13	16	.5	3.1	222	0	182	25	5.5
23/20E-35N01	65	16	23	.7	4.1	280	0	230	23	14
24/20E-35J01	61	14	39	1.2	9.4	219	0	180	160	4.5

TABLE 35.--Continued

LOCAL IDENT- I- FIER	FLUO- RIDE, DIS- SOLVED (MG/L AS F)	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	NITRO- GEN, NITRATE TOTAL (MG/L AS NO3)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE)	IRON, DIS- SOLVED (UG/L AS FE)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)
Chelan County											
22/20E-24R01	.5	30	362	364	11	--	--	20	--	--	--
22/21E-28H01	.2	26	--	359	--	--	2.2	--	--	--	--
23/19E-04D01	.2	22	256	263	3.1	--	--	<10	--	--	--
23/19E-04D02	.0	19	237	247	2.4	--	--	100	--	--	--
23/19E-04E01	.2	20	--	261	--	--	3.7	--	0	--	<1
23/19E-05L02	.3	32	--	347	--	--	3.7	--	10	--	<1
23/19E-05M02	.3	39	300	340	--	3.4	--	20	--	<20	--
	--	--	--	--	--	--	--	--	--	--	--
23/19E-13N02	.1	15	--	163	--	--	1.7	--	0	--	<1
24/17E-23Q01	.0	20	77	81	4.5	--	--	120	--	<20	--
	.0	14	--	41	--	--	.04	--	0	--	<1
24/18E-17J01	.2	41	--	201	--	--	2.7	--	0	--	<1
24/18E-22N01	.1	20	--	128	--	--	1.3	--	10	--	1
24/18E-35J03	.3	25	--	321	--	--	3.7	--	10	--	1
25/17E-08G01	.2	18	130	131	.80	--	--	2100	--	400	--
Douglas County											
22/21E-26B01	.4	24	--	263	--	--	4.4	--	--	--	--
23/20E-10R01	.3	21	--	298	--	--	2.4	--	10	--	<1
23/20E-34R01	.2	29	235	238	16	--	--	20	--	--	--
	.2	26	270	274	18	--	--	10	--	--	--
23/20E-35N01	.3	26	--	329	--	--	4.4	--	10	--	<1
24/20E-35J01	.5	29	488	426	--	.07	--	990	--	120	--

TABLE 36.--Summary of physical, biological, and major chemical-constituent data for ground-water samples from the Cashmere subregion

[Values in milligrams per liter except as indicated umho, micromho; col/100 mL, colonies per 100 milliliter; ug/L, microgram per liter]

Constituent	Number of sample sites	Trace element concentration		
		Maximum	Minimum	Median
Specific conductance (umho)	17	680	55	500
pH (units)	17	7.9	6.8	7.4
Temperature (°C)	18	16.4	4.4	11.9
Fecal-coliform bacteria (col/100 mL)	8	<1	<1	<1
Hardness (as $CaCO_3$)	17	320	22	199
Hardness, noncarbonate (as $CaCO_3$)	17	30	0	0
Calcium, dissolved	18	74	1.9	48
Magnesium, dissolved	17	41	4.3	17
Sodium, dissolved	18	39	.9	18.5
Sodium-adsorption ratio	17	1.2	.1	.5
Potassium, dissolved	18	9.4	1.4	3.2
Bicarbonate	18	341	27	236
Carbonate	18	0	0	0
Alkalinity (as $CaCO_3$)	18	280	22	194
Sulfate, dissolved	18	160	2.4	20.5
Chloride, dissolved	14	14	.3	4.2
Fluoride, dissolved	18	.5	.0	.2
Silica, dissolved (as SiO_2)	18	41	14	24.5
Solids, dissolved (residue at 180°C)	8	488	77	254
Solids, dissolved (sum of constituents)	18	426	41	263
Nitrate (as N)	19	4.4	.04	2.4
Iron, total recoverable (ug/L)	8	2,100	10	60
Iron, dissolved (ug/L)	9	10	0	10
Manganese, total recoverable (ug/L)	4	400	20	70
Manganese, dissolved (ug/L)	9	1	<1	<1

TABLE 37.--Trace-element concentrations in ground-water samples from the Cashmere subregion

LOCAL IDENT-I-FIER	DATE OF SAMPLE	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	ARSENIC DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	CADMIUM DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)
			Chelan County				
23/19E-05M02	71-05-25	<10	--	--	--	--	<30
23/19E-13N02	79-07-13	--	0	1	70	<1	0
24/17E-23Q01	70-11-09	<10	--	--	--	--	<30
24/18E-17J01	79-07-25	--	10	2	70	<1	0
			Douglas County				
22/21E-26B01	79-07-25	--	0	--	--	--	0
24/20E-35J01	71-10-20	40	--	--	--	--	<30

COPPER, DIS-SOLVED (UG/L AS CU)	LEAD, DIS-SOLVED (UG/L AS PB)	MERCURY DIS-SOLVED (UG/L AS HG)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	ZINC, DIS-SOLVED (UG/L AS ZN)
		Chelan County			
<50	<100	--	--	--	<10
100	0	.0	0	0	40
<50	<100	--	--	--	40
4	3	.0	0	0	<3
		Douglas County			
2	8	.0	0	0	--
<50	<100	--	--	--	<10