Data on Ground-Water Quality, Carson Valley and Topaz Lake areas, Douglas County, Nevada, For Year Ending September 1986

By Carl E. Thodal

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"Inch-pound" units of measure used in this report may be converted to metric (International System) units by using the following factors:

Multiply	By	To obtain
Acre-foot (acre-ft)	1,233	Cubic meter (m^3)
Foot (ft)	0.3048	Meter (m)
Inch (in.)	25.40	Millimeter (mm)
Mile (mi)	1.609	Kilometer (km)
Square mile (mi^2)	2.590	Square kilometer (km^2)

For temperature, degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) by using the formula $°F = [(1.8)(°C)] + 32$.

SEA LEVEL

In this report, "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929), which is derived from a general adjustment of the first-order leveling networks of both the United States and Canada (formerly called "Sea-Level Datum of 1929").

DATA ON GROUND-WATER QUALITY, CARSON VALLEY AND TOPAZ LAKE AREAS, DOUGLAS COUNTY, NEVADA, FOR YEAR ENDING SEPTEMBER 1986

By Carl E. Thodal

ABSTRACT

Douglas County encompasses 708 square miles in western Nevada and has been one of the fastest growing counties in the Nation, according to the 1980 census. This rapid population growth has led to concern about the present and future impacts of development upon the ground water, which is the principal source of drinking water for most of Douglas County. In 1985, the U.S. Geological Survey, in cooperation with the Douglas County Department of Public Works, established a network of 33 wells in the Carson Valley and Topaz Lake areas to characterize the current ground-water quality and its seasonal variability and to monitor temporal responses to changing land-use activities. This report presents data collected from that network during November 1985 through September 1986. The primary drinking-water standard was exceeded for fluoride (4.0 mg/L [milligrams per liter]) at one observation well and for nitrate-nitrogen (10 mg/L) at one domestic well. The primary drinking-water standard for arsenic (50 μg/L [micrograms per liter]) was exceeded in one observation well. Secondary drinking-water standards were exceeded as follows: pH (6.5-8.5 units) at one public-supply well and one domestic well, sulfate (250 mg/L) at one observation well, dissolved solids (500 mg/L) at two observation wells, iron (600 μg/L) at one observation well, and manganese (50 μg/L) at three observation wells and one public-supply well. The presence and overall concentration (but not the individual identities) of organic compounds were estimated using a gas chromatograph and flame-ionization detector for ground-water samples collected from 30 network wells. Seven wells (two domestic and five observation) had overall concentrations greater than 10 micrograms per liter relative to the internal standard compound perdeuteronaphthalene.

INTRODUCTION

Douglas County encompasses 708 mi^2 (U.S. Bureau of the Census, 1983, p. 82) in western Nevada (figure 1). The county is bounded on the west by Lake Tahoe, on the east by the Pine Nut Mountains, and on the south by the Wellington Hills. The north-south trending mountain ranges divide the county into three major valleys: the Lake Tahoe Basin along the western border (about 70 mi^2), Carson Valley in the west-central portion (about 420 mi^2), and the Nevada portion of Antelope Valley in the southeastern apex of the county (about 220 mi^2). Two major river systems flow in a northerly direction through the county: the Carson River through Carson Valley and the West Walker River through Antelope Valley. The economics of the county are dominated by agriculture in Carson and Antelope Valleys, and by tourism and gaming along the southeast shore of Lake Tahoe. The major population centers are Stateline at Lake Tahoe and the Minden-Gardnerville area in Carson Valley.

Douglas County has been one of the fastest growing counties in the Nation, with a 182-percent increase in population between the 1970 and 1980 censuses (Governor's Office of Planning Coordination, 1984, page 37). This increase is apparently a result of recent economic growth in the gaming industry, availability of residential property, and the aesthetic qualities of the area. This rapid growth has led to concern about the present and future impacts of development on the land and water resources.

Ground water is the principal source of drinking water for most of Douglas County except in the Lake Tahoe basin where the lake is the primary source. Ground water is also used for irrigation in Carson and Antelope Valleys. In 1969, just prior to the rapid population increase, the estimated 6,000 inhabitants in Douglas County withdrew approximately 7,000 acre-feet of ground water for irrigation and about 420 acre-feet for public supply. By 1985, the County's population had increased to 23,200 inhabitants and estimated annual ground-water withdrawals had increased to 10,500 acre-feet for irrigation and 3,900 acre-feet for public supply. Estimates of surface-water withdrawals decreased from 240,000 acre-feet for irrigation in 1969 to 220,000 acre-feet in 1985, while surface-water withdrawals for public supply increased from 1,200 acre-feet in 1969 to about 2,200 acre-feet in 1985 (Smales and Harrill, 1971, p. 18; E. A. Frick, U.S. Geological Survey, written communication, 1987).

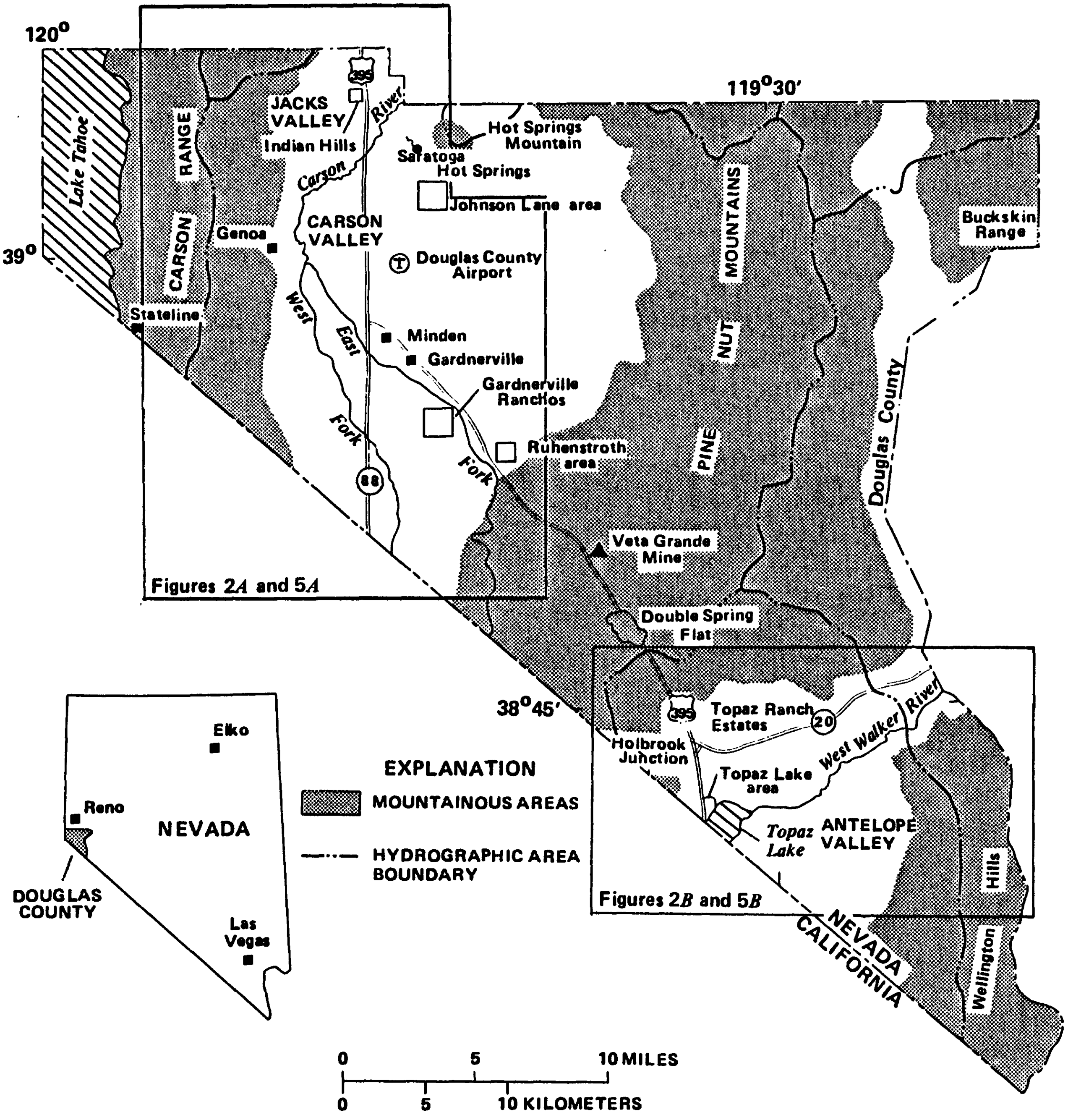

FIGURE 1.--Geographic features of Douglas County and approximate areal extent of figures 2 and 5.

Six community water-supply systems of varying sizes serve developed areas in and near the Minden-Gardnerville area in southern Carson Valley and a residential area in Indian Hills in the northern part of the valley. Smaller community systems serve developments adjacent to and northeast of Topaz Lake in Antelope Valley. The remainder of the county outside the Lake Tahoe basin is served by private domestic wells.

Potential sources of ground-water contamination in Douglas County include (1) natural, localized sources of mineralized water and of uranium and its radioactive daughter products (Otton and others, 1985); (2) a gold mining and milling operation in the southeastern corner of Carson Valley; (3) a large regional landfill in Carson Valley; (4) infiltration of nutrients from the use of agricultural fertilizers in Carson and Antelope Valleys; (5) land application of municipal sewage effluents in Carson Valley; (6) percolation of domestic wastes from private septic tanks in more densely developed suburban areas of the county (Garcia, 1989); and (7) localized contamination by improper disposal of organic solvents and leakage of petroleum products from underground storage tanks. Potentially adverse health effects of organic compounds, the increasing reliance on land application for disposal of municipal sewage effluents, and percolation of domestic wastes are the principal water-quality concerns for maintenance of the public water supply. Currently, local communities in Carson Valley operate two land disposal systems, and sewage sludge and effluents are imported for land disposal from sewage-treatment systems in the Lake Tahoe basin. Increased use of land application in Carson Valley is being considered to expand the sewage-treatment facilities.

Previous studies have identified areas where degradation of ground-water quality may occur in Douglas County (Nowlin, 1982; Garcia, 1989). In addition to the ground-water quality analysis, a three-dimensional model was developed to predict surface-water outflow and ground-water levels in response to various land-use alternatives (Maurer, 1986). Actual measurements of ground-water levels and estimates of pumpage have been compiled from ongoing data-collection efforts related to ground-water resources in Carson Valley (Berger, 1987).

In 1985, the U.S. Geological Survey, in cooperation with the Douglas County Department of Public Works, established a network of 33 wells for monitoring ground-water quality in the Carson Valley and Topaz Lake areas. Several of the monitoring wells are not used for domestic purposes and only five represent public supply sources. The monitoring wells are identified and described in table 1 and locations are shown in figure 2.

TABLE 1.--Information regarding wells used in monitoring network

["--" indicates that no information was available]

Site number[1] (figure 2)	Type of site[2]	U.S. Geological Survey site designations[1]		Land-surface altitude (feet above sea level)	Depth (feet below land surface)			Casing diameter (inches)
		Standard identification	Local identification		Well	Top of open interval	Bottom of open interval	
1	P	390503119463501	105 N14 E20 18ABAB1	4,760	425	151	301	8
2	P	385719119454701	105 N13 E20 29CDC1	4,720	400	--	--	--
3	P	385604119435601	105 N12 E20 04ADA1	4,780	300	100	300	16
4	P	385414119425401	105 N12 E20 15ADD1	4,850	375	183	372	16
5	P	385412119401401	105 N12 E21 18CAB1	5,110	--	--	--	8
6	P	384333119301701	106 N10 E22 15DCB1	5,120	--	--	--	--
7	L	390622119470301	105 N14 E20 06CBA1	4,840	94	70	90	8
8	L	390542119472001	105 N14 E19 12ADA1	4,895	150	120	150	7
9	L	390457119491301	105 N14 E19 14BBD1	5,040	100	76	96	8
10	L	390446119451401	105 N14 E20 17ADCA1	4,640	27	--	--	2
11	L	390232119443201	105 N14 E20 28CDC1	4,690	88	68	88	7
12	L	390208119433201	105 N14 E20 34BDC1	4,760	100	--	--	6
13	L	390106119424301	105 N13 E20 02CBB1	4,860	176	156	176	6
14	L	390021119504301	105 N13 E19 09ADCA1	4,820	180	156	176	8
15	L	390017119453901	105 N13 E20 08CAA1	4,695	130	110	125	7
16	L	390015119500101	105 N13 E19 10DBB1	4,680	115	80	115	8
17	L	385926119481601	105 N13 E19 13BCC1	4,675	500	150	500	16
18	L	385801119421501	105 N13 E20 26ABB1	4,870	130	90	130	9
19	L	385742119453801	105 N13 E20 29BDDD1	4,720	118	93	114	7
20	L	385654119431801	105 N13 E20 34ACC1	4,790	80	--	--	8
21	L	385509119414801	105 N12 E20 11ADD1	4,900	125	105	125	6
22	L	385352119455401	105 N12 E20 17CCD1	4,760	91	67	87	8
23	L	385321119405002	105 N12 E20 24ADC2	4,980	145	122	142	8
24	L	385255119482301	105 N12 E19 23DDD1	4,740	141	121	141	9
25	L	384156119323301	106 N10 E22 29CADA1	5,067	183	140	183	6
26	L	384136119323901	106 N10 E22 32BAAB2	5,075	105	80	105	7
27	S	390205119464301	105 N14 E20 30DCCB1	4,654	20.5	10.5	20.5	2
28	S	390137119453601	105 N14 E20 32DCCC1	4,679	21	11	21	2
29	S	390024119453501	105 N13 E20 08ACBC1	4,692	21.1	--	--	1
30	S	390006119453601	105 N13 E20 08CAD1	4,700	423	123	423	16
31	S	385948119464401	105 N13 E20 18BAAA1	4,682	20.5	10.5	20.5	2
32	S	385834119464101	105 N13 E20 19ACCC1	4,694	11	2	11	2
33	S	385434119430001	105 N12 E20 15AAB1	4,820	450	167	442	18

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[1] In this table, wells are identified by a short site number, and by the standard identification (ID), and the local (Nevada) ID used by the U.S. Geological Survey. Except in this table, only the short site numbers (1-33) are used, for convenience.

The standard Geological Survey site ID is based on the grid system of latitude and longitude. The ID indicates the geographic location of each site, and provides a unique number for each. The ID consists of 15 digits: The first 6 denote the degrees, minutes, and seconds of latitude; the next 7 denote degrees, minutes, and seconds of longitude; and the last 2 digits (assigned sequentially) identify the sites within a 1-second grid. For example, site 385604119435601 is at 38°56'04" latitude and 119°43'56" longitude, and it is the first site recorded in that 1-second grid.

The local well-identification system is based on an index of hydrographic areas in Nevada (Rush, 1968) and the rectangular subdivision of the public lands referenced to the Mount Diablo base line and meridian. Each designation consists of four units separated by spaces: The first unit is the hydrographic area number. The second unit is the township, preceded by an N or S to indicate location north or south of the base line. The third unit is the range, preceded by an E to indicate location east of the meridian. The fourth unit consists of the section number and letters designating the quarter section, quarter-quarter section, and so on (A, B, C, and D indicate the northeast, northwest, southwest, and southeast quarters, respectively), followed by a number indicating the sequence in which the well was recorded. For example, well 105 N12 E21 18CAB1 is in Carson Valley (hydrographic area 105). It is the first well recorded in the NW¼ of the NE¼ of the SW¼ of section 18, Township 12 North, Range 21 East, Mount Diablo base line and meridian.

[2] P, primary; L, long-term term; S, supplemental.

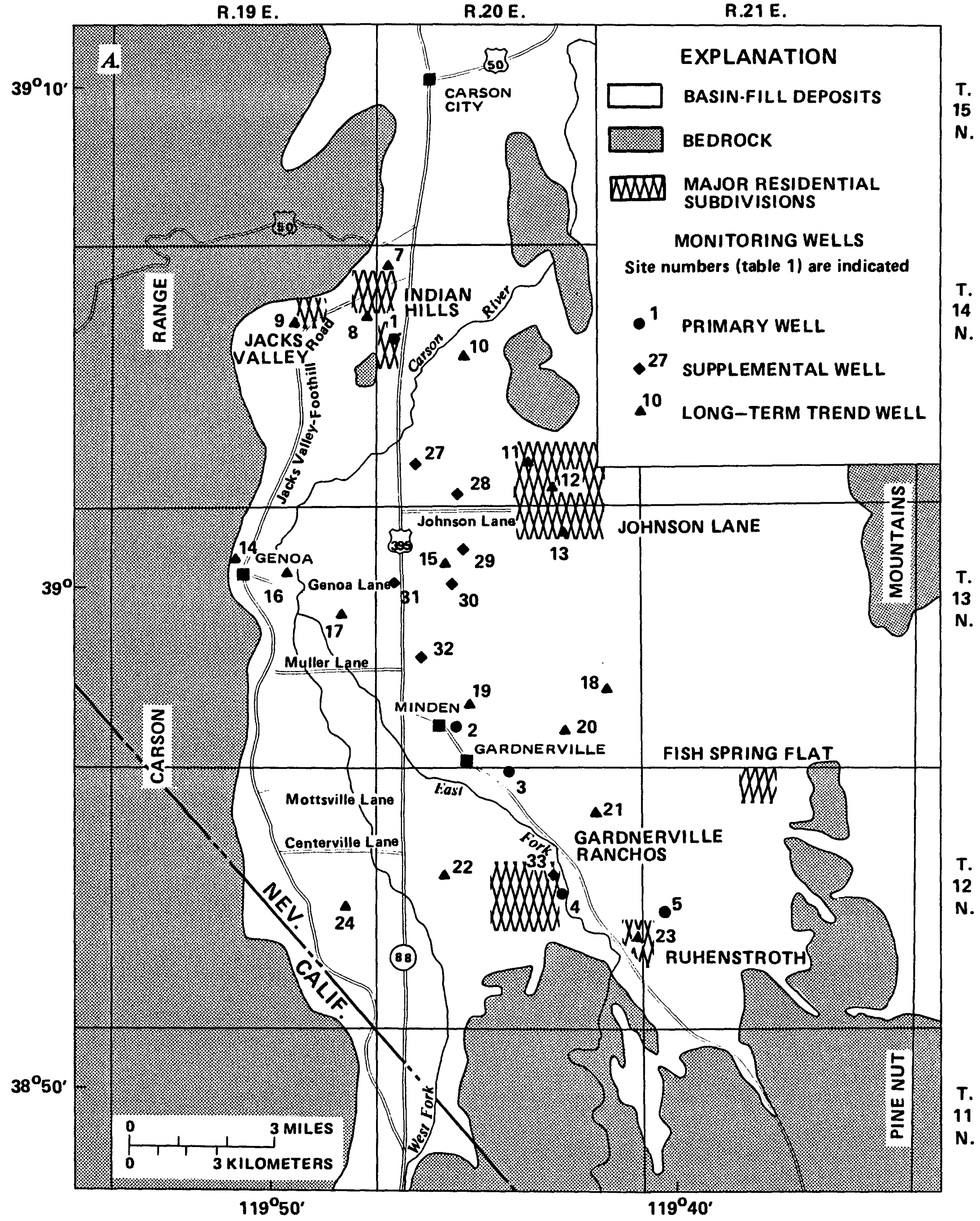

FIGURE 2.–Monitoring-well locations in *(A)* Carson Valley and *(B)* Topaz Lake area.

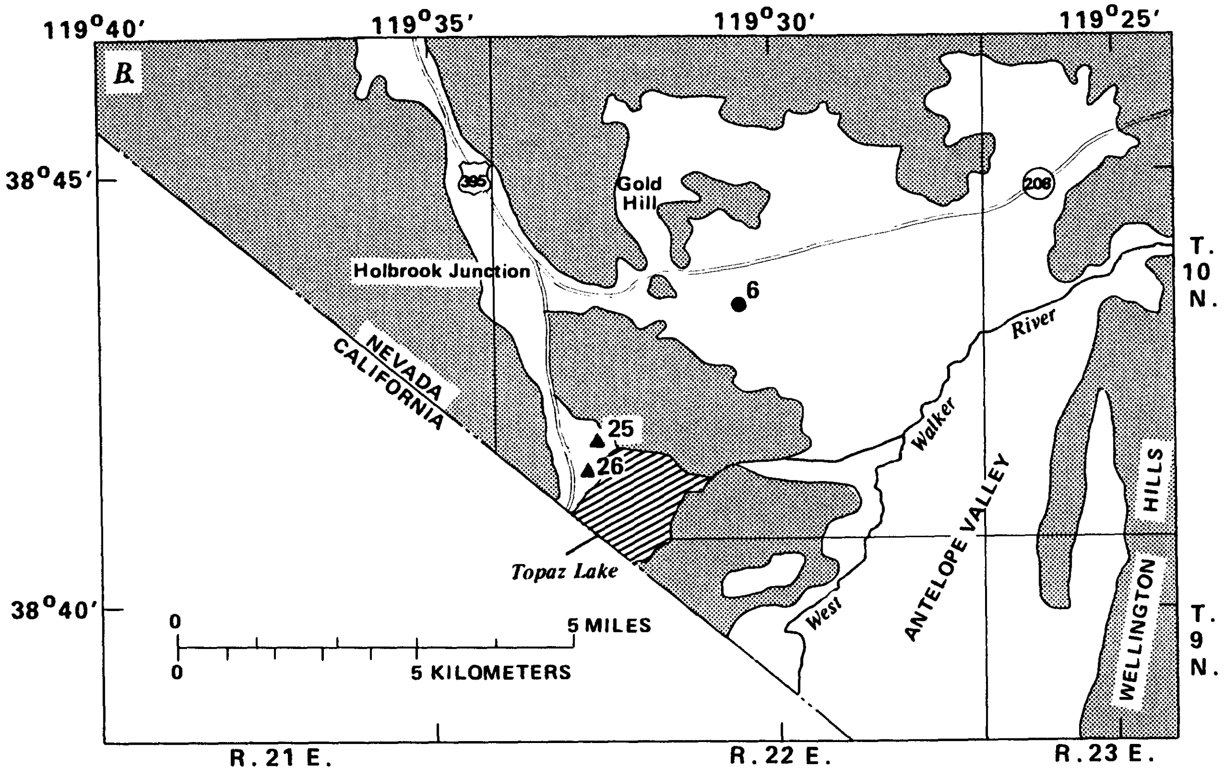

FIGURE 2.--Continued.

The purpose of this report is to present the ground-water quality data collected during November 1985 through September 1986. The data include: physical properties and major chemical constituents; nutrients; trace elements; methylene-chloride-extractable organic compounds; and radionuclides. The frequency of data collection was every other month for 6 "primary" sites, every third month for 20 "long-term trend" sites, and once for 7 "supplemental" sites. The data will serve as a baseline to establish current ground-water quality conditions in the study area and to characterize their seasonal variability. This report will also assist in the assessment of future ground-water quality responses to changing land-use practices.

METHODS AND MATERIALS USED

The monitoring network is composed of wells defined as (1) primary sites--heavily pumped municipal wells or wells in areas with a high potential for contamination; (2) long-term trend sites--wells that will indicate time trends in water-quality; and (3) supplemental sites--wells added on a one-time basis each year to fill in data gaps. The network consists of 6 primary sites, 20 long-term trend sites, and 7 supplemental sites (table 1, figure 2). Five shallow (less than 30 feet deep) observation wells, installed by the Geological Survey, were selected as supplemental sites in order to characterize the chemical quality of the water-table aquifer in Carson Valley. The sampling schedule is listed in table 2.

Four supplemental sites (numbers 27, 28, 31, and 32) and long-term trend site number 10 are constructed of polyvinyl chloride (PVC) thermoplastic well casings. PVC has many desirable properties for monitoring-well construction. Some data, however, suggest potential interferences from the use of PVC for monitoring trace chemical species (Barcelona and others, 1983, page 43) and particularly when casing sections and screens are joined by solvent primers and cements (Barcelona and others, page 41). The integrity of major chemical data collected from these sites to characterize the water quality of the shallow ground-water system should not be affected by the materials used for well construction, but interpretation of trace chemical data (for example, organic compounds and trace metals) warrants careful scrutiny.

Water-quality variables measured at each site included (1) temperature, by hand thermometer, accurate to ±0.5 °C; (2) pH, by digital field instrument, accurate to ±0.1 unit; (3) specific conductance, by field instrument, accurate to ±5 microsiemens per centimeter (μs/cm); and (4) alkalinity, by incremental-pH titration with a field instrument, accurate to ±1 milligram per liter (mg/L) $CaCO_3$. Field instruments were calibrated immediately before each use according to the methods described by the U.S. Environmental Protection Agency (1972, chapters 3 and 4) and by Barnes (1964).

Ground-water samples were collected using the existing pump in each monitoring well, or from the natural discharge from flowing wells. Samples from Geological Survey observation wells and well number 105 N14 E20 17ADCA1 were obtained with a peristaltic pump. Each well was allowed to discharge a minimum volume equivalent to the calculated volume of three well bores in an attempt to collect samples which are representative of the aquifer. Water temperature, pH, and specific-conductance measurements were made frequently during this flushing period.

TABLE 2.--Sampling schedule

[P, primary sites; L, long-term trend sites; S, supplemental sites; Z, selected sites; --, no sampling scheduled]

Constituent or property	Nov. 1985	Jan. 1986	Feb. 1986	Mar. 1986	May 1986	July 1986	Aug. 1986	Sep. 1986
Field measurements:								
Temperature, pH, specific conductance, and alkalinity	P,L	P	L	P	P,L	P	L,S	P
Major dissolved constituents:								
Bicarbonate-carbonate, calcium, chloride, fluoride, magnesium, potassium, silica, sodium, sulfate, and dissolved solids	P,L	P	L	P	P,L	P	L,S	P
Selected nutrients:								
Dissolved nitrogen and phosphorus compounds and dissolved organic carbon	P,L	P	L	P	P,L	P	L,S	P
Trace elements:								
Dissolved arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, silver, and zinc	P	P	--	P	P,L	P	S	P
Radiochemistry:								
Dissolved radium-226, radon-222, and uranium	--	--	--	--	Z	Z	--	--
Semiquantitative organic scan:	--	--	--	--	P	L,S	--	--

Water sampled for laboratory analysis was collected and treated by standard Geological Survey methods (Skougstad and others, 1979) and shipped within 2 days to the U.S. Geological Survey laboratory in Arvada, Colo. The types of containers and field treatment procedures used for the various determinations are listed in table 3. The methods and precisions of these analyses are described by Feltz and Anthony (1985, part 5).

TABLE 3.--Sample containers and field treatments for laboratory analyses

[Abbreviations: mL, milliliter: °C, degrees Celsius]

Type of analysis	Container	Treatment
Dissolved major anions	250-mL polyethylene bottle, field-rinsed	Filtered[1]
Dissolved major cations and trace constituents	500-mL polyethylene bottle, acid-rinsed	Filtered,[1] acidified with nitric acid
Dissolved nutrients	250-mL brown polyethylene bottle, field-rinsed	Filtered,[1] chilled, preserved with mercuric chloride
Dissolved organic carbon	125-mL glass bottle, baked, 350 °C	Filtered,[2] chilled
Dissolved mercury	250-mL glass bottle, acid-rinsed	Filtered,[1] acidified with nitric acid, preserved with potassium dichromate
Dissolved radon-222	80-mL glass bubbler	None
Semiquantitative organic scan	1-liter glass bottle, baked, 350 °C	Chilled

[1] Prerinsed, 0.45-micrometer-pore-size cellulose-nitrate membrane filter.

[2] Prerinsed, 0.45-micrometer-pore-size, silver-metal membrane filter.

A semiquantitative "scan" for the presence and overall concentration (but not the individual identities) of organic substances was made on samples from 30 selected sites using a gas chromatograph and flame-ionization detector. Gas chromatography (GC) is an analytical technique used to separate a mixture of organic compounds into discrete "GC peaks." Each peak represents an individual organic component of the original mixture. Organic compounds originally dissolved in water must first be extracted from aqueous solution into an organic solvent prior to GC analysis. Methylene chloride serves as the organic solvent for this analysis. Each extracted sample is injected into the GC where a flow of inert gas carries it onto a capillary column. The column is heated precisely (from 45 to 300 °C) at a controlled rate (6 °C per minute), resulting in separation of the various discrete organic components. As each compound exits the GC, it enters the flame-ionization detector, where a flame ionizes the compound, causing an electrical current to flow in a circuit. The resulting current is proportional to the mass of the ionized compound (H.R. Feltz, U.S. Geological Survey, written communication, 1985).

The estimated overall concentration is calculated relative to the response of the compound perdeuteronaphthalene (which is an internal standard added to each sample just prior to analysis), and is reported as micrograms of equivalent perdeuteronaphthalene per liter of sample. The number of organic compounds detected is determined by the number of peaks on the chromatogram that (1) have an area greater than 10 percent of the added internal standard and (2) are not detected in a blank (deionized water that is treated as a sample in all aspects). This method gives a cost-effective indication of overall organic contamination, providing direction for selective analysis by the more expensive gas-chromatographic/mass-spectrometric technique that is necessary to identify specific organic compounds.

Water samples collected from 10 wells selected as a representative subset of the monitoring network, were submitted for laboratory analysis to determine concentrations of dissolved uranium, dissolved radium-226, and dissolved radon-222. Exposure to naturally occurring radionuclides of the uranium-238 decay series, including radon-222 and radium-226, is believed to represent a significant threat to public health (Hobbs and McClellan, 1980, p. 518-522).

WATER-QUALITY DATA

This report presents the data collected from November 1985 through September 1986. Physical and chemical data are given in tables 5-9 (see section titled "Data Tabulations"), and a statistical summary, by constituent, of water-quality data collected at all wells in the monitoring network, is presented in table 10 (p. 52). Measurements below detection limits were not included when summary statistics were calculated; thus, for some constituents the estimated statistics may be skewed higher than the true population statistics.

Table 4 lists background information on constituents and properties of water, including standards and criteria for water use.

TABLE 4.--Background information on constituents and properties of water

[Modified from Nowlin (1982, table 2). Abbreviations: NBCHPS, Nevada Bureau of Consumer Health Protection Services (1980); EPA, U.S. Environmental Protection Agency; µg/L, micrograms per liter; mg/kg, milligrams per kilogram; mg/L, milligrams per liter; mL, milliliter; pCi/L, picocuries per liter; °C, degrees Celsius; --, no data available]

Constituent or property	Source or cause of occurrence	Normal range of values in natural waters	Standards or criteria for water use[1]	Remarks
Specific conductance	Capability of water to conduct electric current at specified temperature of 25 °C. Presence of charged ionic species dissolved in water makes solution conductive, whereas pure liquid water (without dissolved ions) has very low electrical conductance. As ion concentrations increase, conductance of solution increases; therefore, specific conductance is indication of ion concentrations (Hem, 1985, p. 66).	Generally less than 1,000 microsiemens per centimeter at 25 °C for potable water (Hem, 1985, p. 67).	No enforceable standard.	Provides field estimate of ion concentration and quality control for associated laboratory analysis.
pH	A measure of acidity (pH value less than 7.0) or alkalinity (pH greater than 7.0) of water, which is based on effective concentration (also called "activity") of dissolved hydrogen ions. Primary source of hydrogen ions in most natural ground-water systems is from reaction of water with carbon dioxide that is produced by soil micro-organisms; this reaction forms dissolved bicarbonate and hydrogen ions (Hem, 1985, p. 61-63).	The pH of pure water at 25 °C is 7.00 (which is termed a neutral pH). Typical ground-water values range from about 6.0 to about 8.5 (Hem, 1985, p. 63-64).	Secondary standard: range of acceptable pH is from 6.5 to 8.5 (NBCHPS).	Toxicity of certain compounds (such as hydrogen cyanide or ammonia), solubility of metal compounds, and corrosiveness of water are affected by pH (EPA, 1976, p. 178-179). The pH is also a controlling factor in geochemical equilibrium.
Hardness (as $CaCO_3$)	Derived principally from dissolved calcium and magnesium.	Commonly 200 to 300 mg/L in carbonate ground water.	No enforceable standard.	Consumes soap and detergents before lather will form, resulting in soap curds depositing on sinks and bathtubs. Hard water forms scales in pipes, boilers, and water heaters. Water-hardness classification: 0-60 mg/L, soft; 61-120 mg/L, moderately hard; 121-180 mg/L, hard; more than 180 mg/L, very hard. Soft water is corrosive to metal pipes and fixtures.
Calcium (Ca) and magnesium (Mg)	Dissolved from rocks and soils, especially those containing limestone, dolomite, and gypsum.	Calcium: 1 to more than 1,000 mg/L. Magnesium: Normally much less than calcium and usually less than sodium (Hem, 1985, p. 89-100).	Secondary standards for magnesium: 125 mg/L unless alternative supply unavailable, then 150 mg/L (NBCHPS).	Impart hardness and scale-forming properties to water (see hardness). High concentrations unsuitable for laundries, steam plants, textile processing, dyeing, and electroplating. Small amounts desirable to prevent corrosion.

Sodium (Na) and potassium (K)	Dissolved from most rocks and soils. High concentrations may be found in natural brines, industrial waste, and sewage.	Sodium: Generally 1 to 1,000 mg/L. Potassium: Commonly 0.1 to 0.5 times sodium; generally less than 10 mg/L (Hem, 1985, p. 100-105).	No enforceable standard.	Concentrations greater than 50 mg/L may cause foaming in boilers. Combine with chloride to impart salty taste. Sodium may contribute to hypertension and cardiovascular diseases. Sodium may be objectionable in irrigation water at concentrations that depend on type of crop and soil.
Bicarbonate (HCO_3) and carbonate (CO_3)	Dissolved from most rocks and soils by carbon dioxide reacting with carbonate minerals such as limestone and dolomite. Carbonate ion can exist only if the pH is 8.3 or more.	Bicarbonate: Generally less than 200 mg/L in surface water and 500 mg/L in ground water. Carbonate: Generally less than 10 mg/L (Hem, 1985, p. 105-109).	No enforceable standard.	Increases alkalinity and, usually, pH of water. In combination with calcium and magnesium, causes scales in pipes and, upon heating, may release corrosive carbon dioxide.
Sulfate (SO_4)	Dissolved from rocks and soils containing gypsum and sulfide or sulfate minerals. Commonly associated with coal deposits, metallic ore deposits, and geothermal areas. May be derived from industrial wastes and atmospheric pollution.	Generally ranges from 1 to 1,000 mg/L (Hem, 1985, p. 116-117).	Secondary standards: 250 mg/L unless alternate supply unavailable, then 500 mg/L (NBCHPS).	Forms boiler scale in combination with calcium. Causes bitter taste when combined in high concentrations with other ions and may have laxative effects when ingested in higher concentrations than an individual is accustomed to. Combines with hydrogen ions in low-pH water to form sulfuric acid.
Chloride (Cl)	Dissolved in differing amounts from all rocks and soils. High concentrations may be derived from marine and desert evaporites and brines. Commonly present in sewage and industrial wastes. May be derived from salts used for control of ice on streets and highways.	Commonly less than 100 mg/L in potable water (Hem, 1985, p. 117-120).	Secondary standards: 250 mg/L unless alternate supply unavailable, then 400 mg/L (NBCHPS).	May contribute to corrosiveness of water. Imparts salty taste in concentrations as low as 100 mg/L. The chloride ion is very stable in ground water and is often used as a tracer of the movement of wastes in aquifers.
Fluoride (F)	Dissolved in small amounts from most rocks and soils. Added to many public water supplies to inhibit tooth decay.	Commonly less than 1.0 mg/L in potable natural water (Hem, 1985, p. 120-123).	Primary standard, 4.0 mg/L; secondary standard, 2.0 mg/L (EPA, 1986).	Concentrations between 0.6 and 1.7 mg/L may have beneficial effects on the structure and resistance to decay of children's teeth. Concentrations in excess of 6.0 mg/L may cause mottling and disfiguration of teeth (Committee on Water Quality Criteria, 1973, p. 66).
Silica (SiO_2)	Dissolved in most natural water in hydrated form [$Si(OH)_4$] from rocks and soils containing minerals such as quartz, kaolinite, or potassium feldspar (Hem, 1985, p. 69-73).	Commonly 1 to 30 mg/L with concentrations up to 100 mg/L occurring frequently (Hem, 1985, p. 73).	No enforceable standard.	Silica solubility is controlled by temperature and pH, and changes in these properties may cause precipitation of silicate minerals from solution.
Dissolved solids	Sum of all minerals dissolved in water. Concentrations may be increased by industrial wastes or sewage.	Ground water is generally in the range of 25 to 1,000 mg/L (Hem, 1985, p. 31).	Secondary standards: 500 mg/L unless alternate supply not available, then 1,000 mg/L (NBCHPS).	Specific effects upon water uses depend upon individual constituents present.

TABLE 4.--Background information on constituents and properties of water--Continued

Constituent or property	Source or cause of occurrence	Normal range of values in natural waters	Standards or criteria for water use[1]	Remarks
Turbidity	Semiquantitative measure of light scattering due to suspended inorganic and organic particles, precipitates, colloids, and phytoplankton. May be derived from soil erosion, algal blooms, industrial wastes, sewage, or chemical reactions, such as oxidation of dissolved iron.	--	Secondary standard: 1 to 5 standard turbidity units, depending upon population served by water-supply system (NBCHPS).	Esthetically objectionable in drinking water.
Nitrogen (N)	Derived from atmosphere by nitrogen fixation or leached from decaying organic matter, fertilizer, sewage, or industrial, agricultural, and domestic wastes. Nitrogen generally occurs in ground water as nitrate (NO_3), nitrite (NO_2), ammonium (NH_4), ammonia (NH_3), and organic nitrogen. Cyanide (CN) may also be introduced to ground water through improper waste disposal (Hem, 1985, p. 124-126).	Nitrate, less than 10 mg/L; nitrite, ammonium, ammonia, and organic nitrogen, all less than 1 mg/L (Hem, 1985, p. 124-126).	Primary standard: Nitrate, 10 mg/L as N or 44 mg/L as NO_3; no current standards for other nitrogen species (NBCHPS).	Nitrate concentrations in excess of 10 mg/L (as N) may cause methemoglobinemia (infant cyanosis, or "blue-baby" syndrome). Nitrogen is also an essential nutrient which may promote plant and algal growth in lakes and streams. High concentrations of of dissolved nitrogen may indicate contamination from agricultural, domestic, or industrial wastes, or from fertilizer.
Phosphorus (P), phosphate (PO_4)	Derived from phosphate minerals (notably apatite) common in many rocks and soils. May be present in sewage from human or animal wastes and from additives to synthetic detergents.	--	No enforceable standard. Criterion for freshwater aquatic life: 0.025 to 0.05 mg/L as P (EPA, 1986b).	Encourages growth of nuisance algae in lakes and streams where phosphorus is a limiting nutrient.
Dissolved organic carbon (DOC)	Dissolved in moderate amounts from land-surface organic matter and from fossilized organic matter (kerogen; Thurman, 1985, p. 14-15).	From 0.2 to 15 mg/L; commonly less than 2 mg/L (Thurman, 1985, p. 8-9).	No enforceable standard.	Normal concentrations of dissolved organic carbon play significant role in aqueous geochemistry and can facilitate the movement of charged molecules and ions through an aquifer. High concentrations may indicate contamination from landfill leachate.
Arsenic (As)	Associated with volcanic minerals and metallic ore deposits. Common in thermal ground water.	--	Primary standard: 50 µg/L (NBCHPS).	Trivalent arsenic (arsenite) is more toxic than pentavalent arsenic (arsenate). Epidemiologic studies by U.S. Public Health Service suggest that elevated concentrations in drinking water may be related to increased incidence of skin cancer (Hammond and Beliles, 1980, p. 437-438).

Barium (Ba)	Dissolved in small amounts from rocks and soils containing soluble barium salts. Higher concentrations have been reported associated with certain oil-field waters and other brines. Common minerals are barite and witherite (Hem, 1985, p. 135-137). Uses: metallurgy, paint, glass, electronics, and medicine.	Reported median concentration in public water supplies: 43 µg/L (Hem, 1985, p. 137).	Primary standard: 1,000 µg/L (NBCHPS).	May affect the central nervous system and gastrointestinal system and may act as muscle stimulant, especially of heart muscle (EPA, 1986b).
Boron (B)	Dissolved in small to moderate amounts from soils and rocks containing sodium or calcium borate salts. Higher concentrations have been associated with volcanic areas and geothermal spring water (Hem, 1985, p. 129). Uses: fire retardants, glass, leather tanning and finishing, cosmetics, photography, metallurgy, and high-energy rocket fuels.	Commonly a few tenths of a milligram per liter (Hem, 1985, p. 129).	Criterion: 750 µg/L for long-term irrigation of sensitive crops (EPA, 1986b).	Essential element for plant growth, but sensitive crops have shown toxic effects at concentrations less than 1,000 µg/L. There is no evidence that it is required by animals (EPA, 1986b).
Cadmium (Cd)	Dissolved in small amounts from rocks and soils containing minerals such as sphalerite, commonly associated with zinc and copper ores. High concentrations may be found in landfill leachate (Hem 1985, p. 142). Uses: electroplating, paint, printing inks, plastics, electrical batteries, and fluorescent and video tubes.	Commonly less than 10 µg/L (Hem, 1985, p. 142).	Primary standard: 10 µg/L (NBCHPS). Criteria: 10 µg/L for irrigation water; for aquatic life, criterion is related to water-hardness concentration (EPA, 1986b).	Causes deterioration of bones in humans. Irrigation-water criteria established on basis of human toxicity and tendency of accumulation in plants. Acute toxicity to aquatic life is buffered by hardness and salinity.
Chromium (Cr)	Dissolved in very small amounts from rocks and soils containing minerals, such as chromite, and is found in greater relative abundance in magnesium- and iron-rich igneous rocks. High concentrations may indicate contamination from waste-disposal leachate (Hem, 1985, p. 138). Ground-water pollution from industrial application of chromium has occurred in many places. Plating processes are the primary industrial application of chromium.	Commonly less than 10 µg/L (Hem, 1985, p. 138).	Primary standard: 50 µg/L (NBCHPS).	Trivalent chromium is essential element in animal metabolism of glucose and lipids. Occupational exposure to hexavalent chromium compounds causes dermatitis, penetrating ulcers on hands and forearms, perforation of nasal septum, and inflamation of larynx and liver. Epidemiological studies estimate relative risk of chromate plant workers for respiratory cancer is 20 times greater than that of general population. Laboratory mice, given 5 mg/L hexavalent chromium in drinking water, had slightly higher incidence of malignant tumors than controls did (Hammond and Beliles, 1980, p. 441-442).

TABLE 4.--Background information on constituents and properties of water--Continued

Constituent or property	Source or cause of occurrence	Normal range of values in natural waters	Standards or criteria for water use[1]	Remarks
Copper (Cu)	Dissolved in small amounts from rocks and soils containing minerals such as chalcopyrite and chalcocite. Also leached from water pipes and plumbing fixtures by water with less than neutral pH (Hem, 1985, p. 141). High concentrations are associated with acid drainage from mines.	Commonly less than 10 µg/L (Hem, 1985, p. 141).	Secondary standard: 1,000 µg/L. Criteria: 500 µg/L for livestock water; 200 µg/L for long-term irrigation (EPA, 1986b).	Copper is essential to plant and animal metabolism, but range between deficiency and toxicity is low for organisms such as algae, fungi, some invertebrates, and fish, which lack effective barriers to control absorption. Monogastric mammals, including humans, are less sensitive to copper than rumanants, and excessive copper exposure in normal persons is not thought to result in chronic disease. Acute poisoning resulting from excessive ingestion of copper salts may cause death (Hammond and Beliles, 1980, p. 443).
Iron (Fe)	Dissolved from iron-bearing minerals present in most rocks and soils. Found in some industrial wastes, and can be corroded from pipes, well casings, pumps, and other equipment. Also can be concentrated in wells and springs by certain bacteria.	Concentrations in ground water as high as 1,000 to 10,000 µg/L may be common in some aquifers. Areal distribution is commonly erratic (Hem, 1985, p. 83).	Secondary standards: 300 µg/L unless alternate supply is unavailable, then 600 µg/L (NBCHPS).	Oxidizes to reddish-brown sediment. Stains utensils, enamelware, clothing, and plumbing fixtures. May cause taste and odor problems objectionable for food and beverage processing.
Lead (Pb)	Dissolved in small amounts from soils and rocks containing minerals such as galena (principal ore of lead). Lead minerals are most abundant in sedimentary rock. "Leaded" gasoline and lead water pipes also can increase concentrations of lead (Hem, 1985, p. 143-144). Uses: paints, batteries, and in sport-hunting and fishing industry.	Less than 10 µg/L in potable water (Hem, 1985, p. 143-144).	Primary standard: 50 µg/L (NBCHPS).	Lead adversely affects the central nervous system, peripheral nerves, kidney, and hematopoietic system. Chronic or subchronic exposure to high concentrations of inorganic lead may lead to commonly fatal condition referred to as lead encephalopathy, whereas toxic effects of alkyl lead compounds on central nervous system result in hallucinations, delusions, and excitement, progressing to delirium in fatal cases. Other effects of lead exposure include colic, chromosomal aberrations, and abnormal sperm morphology. Inhalation is principal mode of exposure. (Hammond and Beliles, 1980, p. 418-421)
Manganese (Mn)	Dissolved from some rocks, soils, and lake-bottom sediments. Generally associated with iron; often associated with acid drainage from mines (Hem, 1985, p. 86).	Generally less than 1,000 µg/L; usually less than iron (Hem, 1985, p. 89).	Secondary standards: 50 µg/L unless alternate supply is unavailable, then 100 µg/L (NBCHPS).	Oxidizes to dark brown or black sediment. Problems similar to those of iron.

Mercury (Hg)	Dissolved in very small amounts from soils and rocks containing minerals such as cinnabar (principal ore of mercury). Use as amalgam for gold and silver extraction may have increased its abundance in vicinity of pre-1900 mining operations. Other uses: electrical, electrolytic preparation of chlorine and caustic soda, thermometers, pharmaceuticals, dentistry, and as agricultural and industrial biocide.	Less than 1.0 µg/L in potable water (Hem, 1985, p. 142-143).	Primary standard: 2 µg/L (NBCHPS).	Mercury is highly poisonous element that is known to accumulate in aquatic organisms. Adverse effects of mercury are principally manifested in kidney and central nervous system. Neurotoxicity of mercury poisoning occurs due to disruption of integrity of blood-brain barrier, inhibition of protein synthesis, and blocked synaptic and neuromuscular transmission. Mercury nephrotoxicity results only from exposure to inorganic mercury, and pathogenetic mechanism is not well understood. Other effects include: stomatitis, gingivitis, and inflammation of intestinal mucosa (Hammond and Beliles, 1980, p. 424-426). Also accumulates in organs of animals and humans.
Selenium (Se)	Dissolved in very small amounts from rocks and soils containing minerals such as clausthalite, ferroselite, or challomenite (Fairbridge, 1972, p. 1080). Also may be leached from soils containing detritus of selenium-accumulating vegetation (organic selenium) or selenium salts [for example, ferric selenite or calcium selenate (Wigget and Alfors, 1986, p. 105)].	Rarely exceeds 1 µg/L in potable water. Up to 3,000 µg/L in drainage water from seleniferous irrigated soils (Hem, 1985, p. 145-146).	Primary standard: 10 µgg/L (NBCHPS).	Selenium is essential nutrient for animals, and its deficiency in livestock diet is common. However, when intake becomes excessive, selenium toxicity ("blind staggers") can result.
Silver (Ag)	Dissolved in small amounts from rocks and soils containing minerals such as argentite or cerargyrite (Fairbridge, 1972, p. 1092). Limited solubility and distribution of silver suggests its occurrence in ground water may indicate contamination from silver mining/milling operations or improper disposal of photographic-processing wastes. Uses: jewelry and coinage, photography, and electronics; silver iodide has been used in "cloud seeding" for weather modification (Hem, 1985, p. 141).	Much less than 10 µg/L in most natural water (Hem, 1985, p. 141).	Primary standard: 50 µg/L (NBCHPS).	Elemental silver is not considered toxic (although it does cause skin discoloration--argyria), but most silver salts are toxic due to associated anions.
Zinc (Zn)	Dissolved in small amounts from rocks or soils containing minerals such as sphalerite, willemite, or zinc-rich magnetite (Fairbridge, 1972, p. 1293). Uses: metallurgy, paint, rubber, and paper products.	Less than 100 µg/L in potable water (Hem, 1985, p. 142).	Secondary standard: 5,000 µg/L (NBCHPS).	Zinc is considered essential element to plant and animal life, but water is not normally a significant dietary source. Human dwarfism and lack of sexual development have been related to zinc deficiency. Consumption of acidic food or beverages from galvanized containers has caused accidental poisoning, with symptoms such as fever, vomiting, stomach cramps, and diarrhea (Hammond and Beliles, 1980, p. 460-462).

TABLE 4.--Background information on constituents and properties of water--Continued

Constituent or property	Source or cause of occurrence	Normal range of values in natural waters	Standards or criteria for water use[1]	Remarks
Radium-226 (^{226}Ra)	Dissolved in very small amounts from rocks and soils containing minerals such as uranite or carnotite in which uranium-238 has been replaced by radium-226 through natural radioactive decay. Radium-226 (half-life: 1,620 years) is lost from solution by continued radioactive decay to daughter-product, radon-222 gas (Hem, 1985, p. 148-149).	Recent EPA survey of 59,812 public water-supply systems Nationwide resulted in a range for radium-226 from less than 1 pCi/L to more than 40 pCi/L. Approximately 1 percent (less than 500 supplies) exceeded 5 pCi/L (Cothern and Lappenbusch, 1984, p. 503).	Primary standard, radium-226 plus radium-228 combined: 5 pCi/L (NBCHPS).	Human health effects have been investigated extensively concerning individuals involved in luminous-dial industry (radium-dial painters) and individuals who received radium as therapeutic nostrum during early 1900’s. Because radium is metabolic analog of calcium, it is deposited in skeleton, where it serves as source of alpha radiation to bone and contiguous tissue (Hobbs and McClellan, 1980, p. 529).
Radon-222 (^{222}Rn)	Derived as water-soluble, alpha-emitting noble gas from radioactive decay of radium-226. Radon-222 is lost from solution by release to atmosphere and by radioactive decay (radon-222 half-life, 3.82 days; Hem, 1985, p. 149). Radon may enter buildings through cracked basements or foundation blocks, and it may be released from domestic water (Hiltebrand and others, 1987, p. 522).	Recent USEPA survey of 2,500 public drinking-water supply systems in the contiguous USA resulted in a mean radon-222 value of 340 pCi/L and a range from less than 500 pCi/L to more than 10,000 pCi/L (Horton, 1983, p. 10).	No enforceable standard.	Radon-222 poses no threat in open air, but may accumulate to hazardous levels if it seeps into enclosed spaces. EPA recently estimated that one in eight American homes has radon levels equal in risk to smoking half a pack of cigarettes a day and considers radon as the leading cause of lung cancer among nonsmokers (EPA, 1986a). Relatively simple technologies currently are available to mitigate risk of radon gas. Impacts of ingestion of radon in water are unknown.
Uranium (U)	Dissolved in small amounts from rocks and soils containing minerals such as uranite or carnotite (Fairbridge, 1972, p. 1216). Uranium-238 is predominant isotope of natural uranium and is starting point in radioactive-decay series that includes radium-226 and radon-222 and ends with stable lead-206 isotope (Hem, 1985, p. 148).	Generally less than 10 µg/L in most natural water (Hem, 1985, p. 148).	No enforceable standard.	Natural uranium (predominantly uranium-238 plus small amounts of uranium-235 and uranium-234) commonly is not drinking-water health concern due to its low solubility. Soluble forms are reported to exhibit toxicity to kidneys through chemical action rather than radiation (Hobbs and McClellan, 1980, p. 521).
Organic compounds	More than 300 specific organic compounds have been identified in drinking-water supplies in United States. Sources include industrial and municipal discharges, runoff, and natural decomposition of vegetative and animal matter (EPA, 1977, p. 87).	--	Few standards established.	Most specific organic compounds in drinking water have not been identified and their analysis commonly is difficult. Most identified organic compounds have not been bioassayed, but some that have been identified in drinking water in small amounts are toxicants, carcinogens, mutagens, and teratogens, as indicated by bioassay experiments conducted at high dosages (EPA, 1977, p. 84-102).

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[1] Primary drinking-water standards specify maximum contaminant levels that are health-related and Federally mandated; secondary drinking-water standards are based on aesthetic qualities and are enforceable by the State of Nevada (Jeffrey A. Fontaine, Nevada Bureau of Consumer Health Protection Agency Services, oral communication, 1989). Criteria are recommended limits for specific water uses, based on current scientific knowledge. Some standards and criteria for trace elements are expressed in milligrams per liter in the cited references; these values are herein converted to micrograms per liter to maintain consistency with units of measure used in the accompanying water-quality data tabulations.

Primary drinking-water standards were exceeded for arsenic (50 μg/L) at one observation well, for fluoride (4.0 mg/L) at one observation well, and for nitrate-nitrogen (10 mg/L) at one domestic well. Secondary drinking-water standards were exceeded as follows: pH (6.5-8.5 units) at one public-supply well and one domestic well, sulfate (250 mg/L) at one observation well, dissolved solids (500 mg/L) at two observation wells, iron (600 μg/L) at one observation well, and manganese (50 μg/L) at three observation wells and one public-supply well. Seven wells (two domestic and five observation) had overall concentrations of unidentified organic compounds greater than 10 μg/L relative to the internal standard compound perdeuteronapthalene. Locations where primary drinking-water regulations and secondary drinking-water regulations have been exceeded are illustrated in figures 3 and 4, respectively, and locations where organic compounds were detected are shown in figure 5.

Regarding water-quality data listed for site 4 (tables 5-8), about 1,700 gallons of hydrochloric acid was added to the well during the first week of February 1986 to improve its yield. Between that time and the collection of the first water-quality sample from site 4 (on February 28, 1986), an estimated 2 million gallons of water was withdrawn from the well (Carl Bricker, Gardnerville Ranchos General Improvement District, oral communication, 1986).

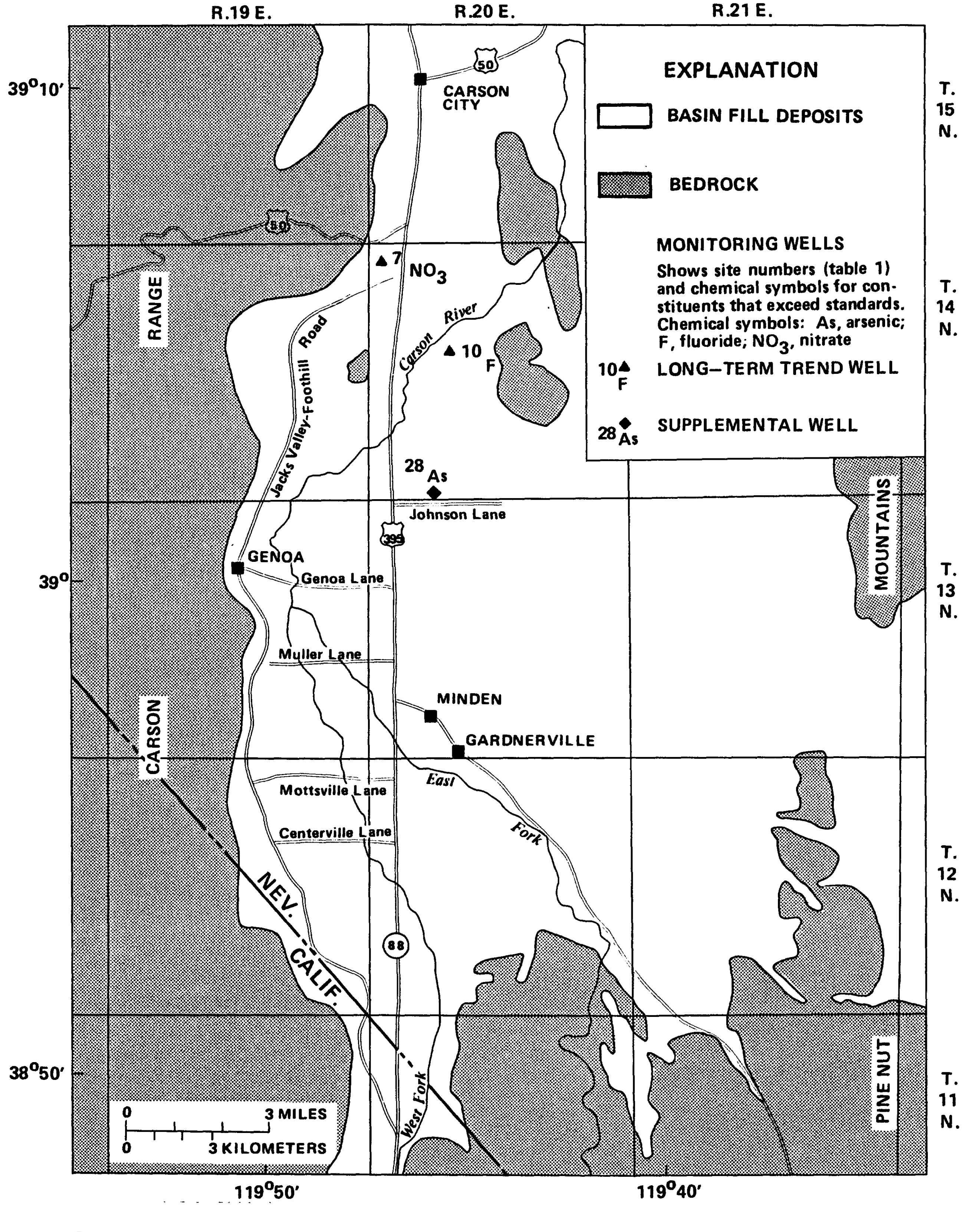

FIGURE 3.--Monitoring wells in Carson Valley where primary drinking-water standards were exceeded for indicated constituent. Note: no standards were exceeded in Topaz Lake area monitoring wells.

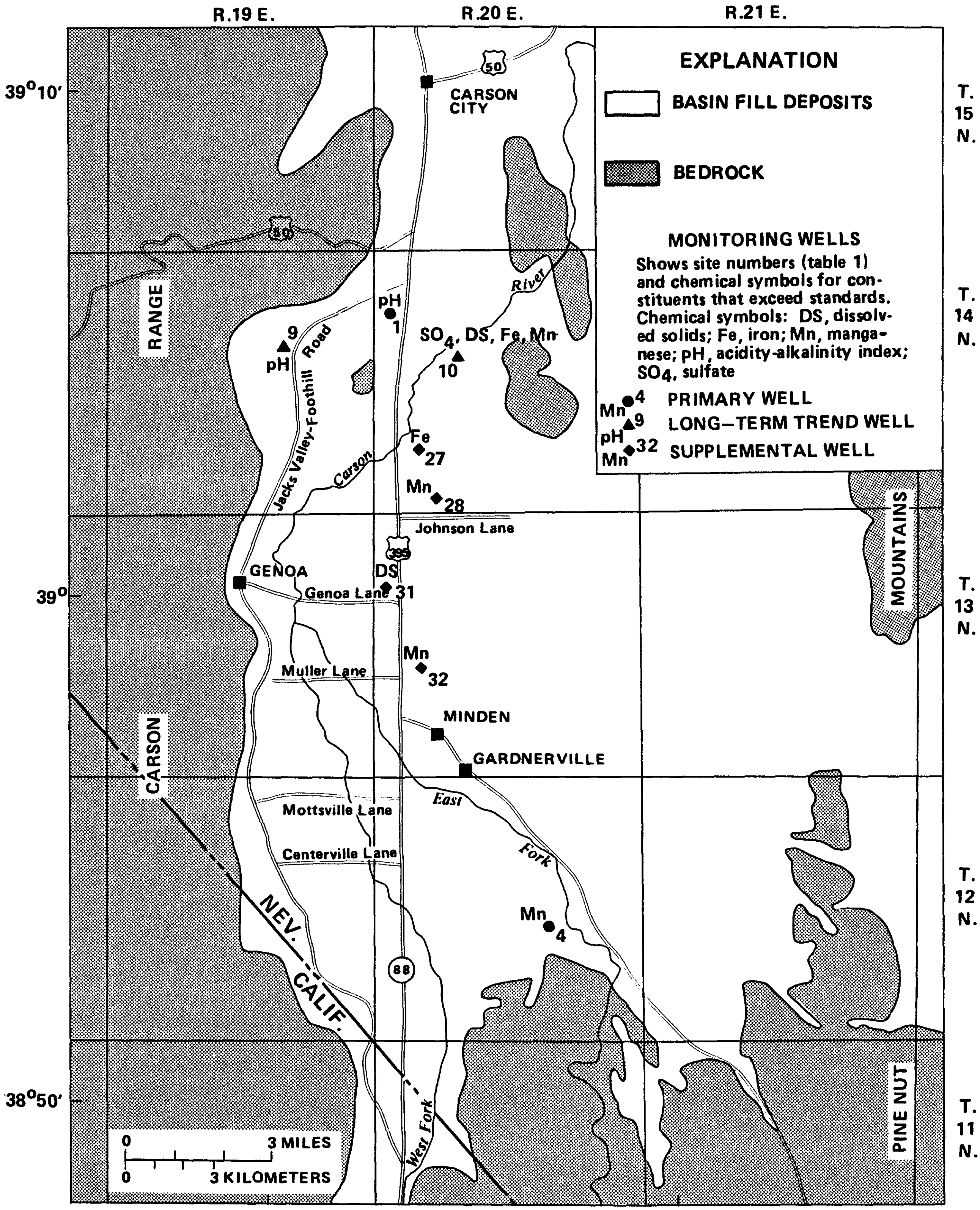

FIGURE 4.--Monitoring wells in Carson Valley where secondary drinking-water standards were exceeded for indicated constituent. Note: no standards were exceeded in Topaz Lake area monitoring wells.

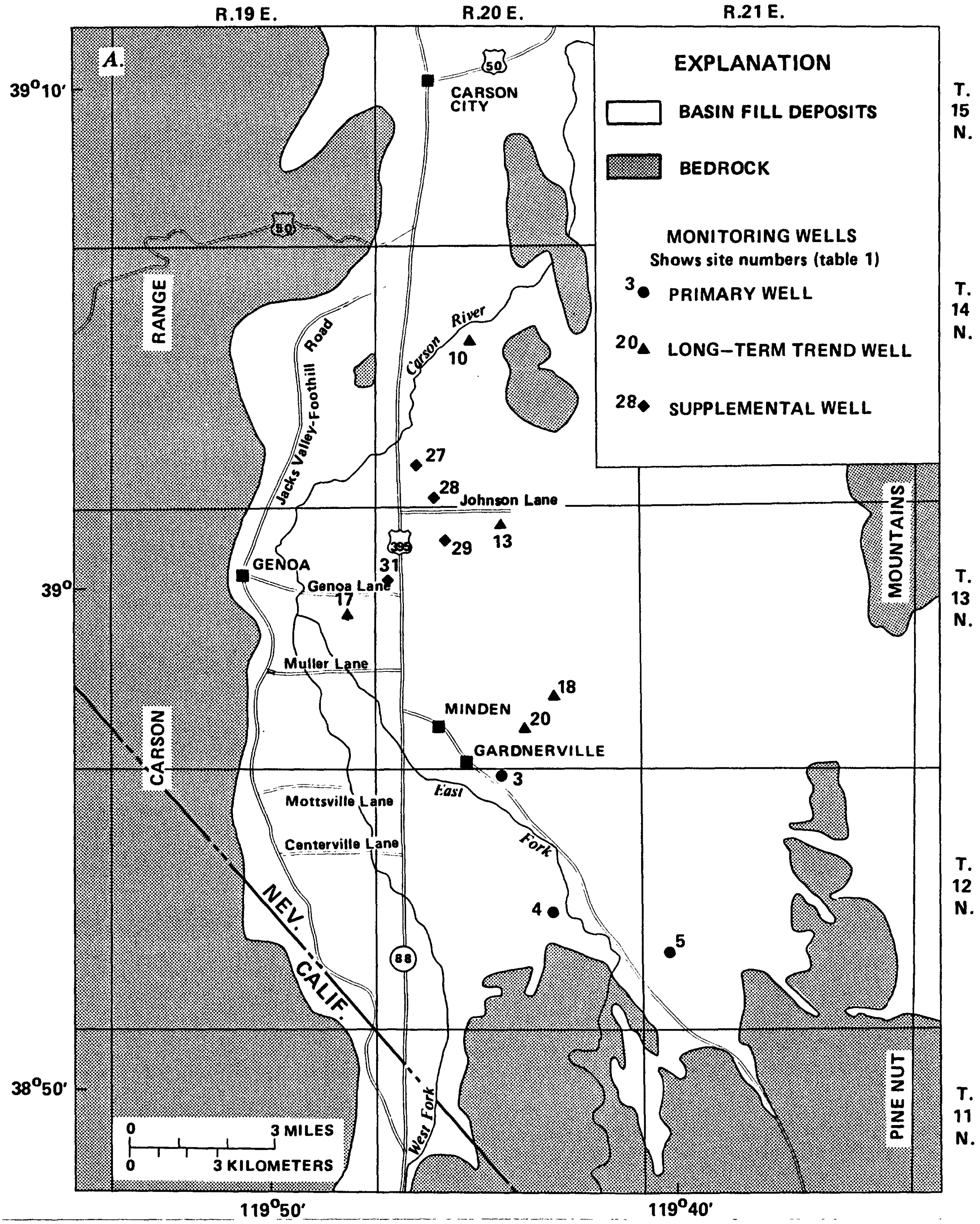

FIGURE 5.--Monitoring wells where organic compounds were detected (but not individually identified) by gas-chromatography and flame-ionization analysis in *(A)* Carson Valley and *(B)* Topaz Lake area.

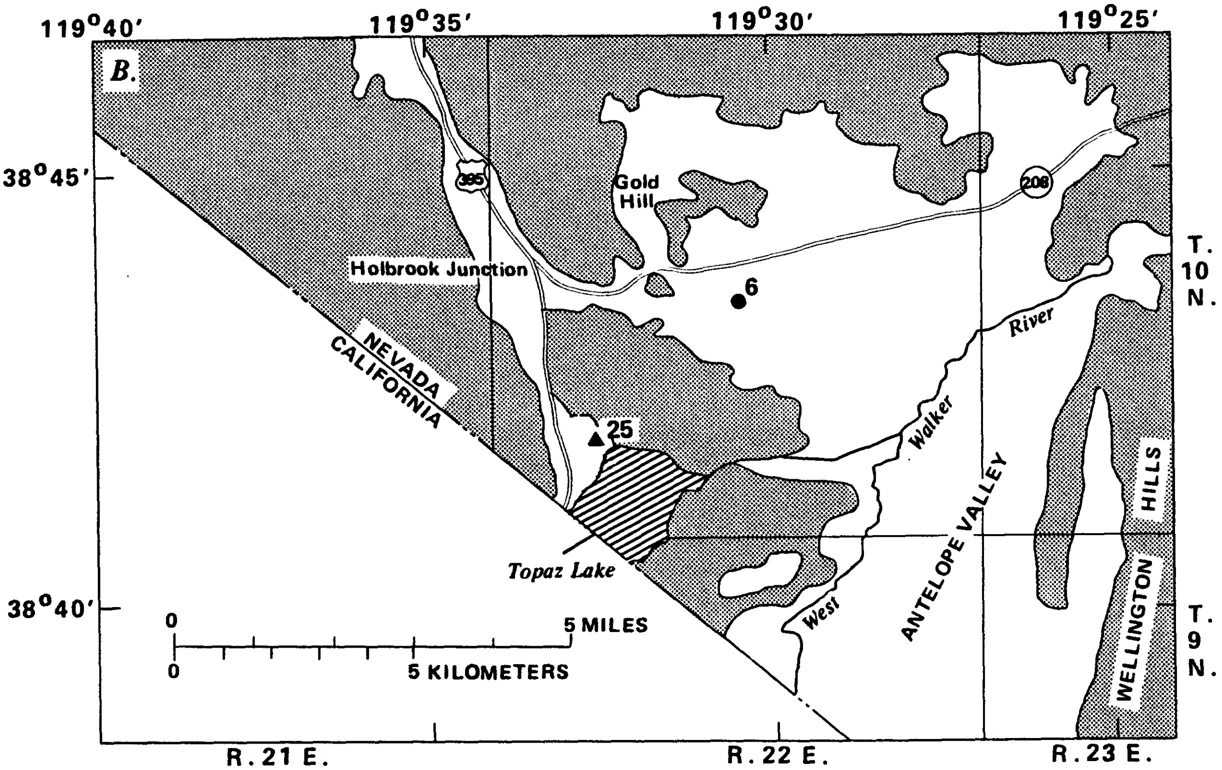

FIGURE 5.--Continued.

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DATA
TABULATIONS

TABLE 5.--Data on physical properties and major chemical constituents

[Abbreviations: DEG C, degrees Celsius; IT, incremental titration; MG/L, milligrams per liter; NTU, nephelometric turbidity units; UG/L, micrograms per liter; US/CM, microsiemens per centimeter at 25 °C; <, less than; --, data not available]

SITE NUMBER (figure 2)	DATE	TIME	FIELD SPECIFIC CONDUCTANCE (US/CM)	FIELD pH (STANDARD UNITS)	WATER TEMPERATURE (DEG C)	TOTAL HARDNESS (MG/L AS $CACO_3$)	HARDNESS, NONCARBONATE (MG/L AS $CACO_3$)	CALCIUM, DISSOLVED (MG/L AS CA)
1	12-19-85	1515	290	8.5	18.5	38	0	13
	01-31-86	1600	310	8.6	18.5	45	0	15
	03-17-86	1550	295	8.7	18.5	51	0	17
	05-09-86	0930	215	9.1	18.5	21	0	7.9
	08-06-86	1415	280	9.1	19.5	19	0	7.1
	09-04-86	1505	250	9.0	19.5	21	0	7.8
2	11-18-85	1510	210	8.2	13.0	71	0	22
	01-27-86	1440	195	8.0	13.0	75	0	23
	03-17-86	1150	195	8.5	13.0	71	0	22
	05-14-86	1440	195	8.4	13.5	65	0	20
3	11-18-85	1315	435	7.0	12.0	170	0	47
	01-28-86	1415	385	7.1	12.0	170	1	45
	03-17-86	1400	440	7.3	12.0	180	9	47
	05-16-86	1040	410	7.1	12.5	160	0	44
	07-31-86	1220	430	7.2	12.0	210	0	56
	09-04-86	1050	425	7.2	12.0	160	1	44
4	02-28-86	0950	400	6.8	12.0	150	82	40
	05-15-86	1610	360	6.8	12.5	120	61	32
	07-30-86	1300	205	7.1	12.0	82	8	22
	09-03-86	1430	220	7.3	12.0	83	5	22
5	11-19-85	1145	400	7.7	21.5	86	0	28
	01-29-86	1115	395	7.7	21.0	90	0	29
	03-19-86	1400	385	8.0	21.5	87	0	28
	05-15-86	1040	400	8.0	22.0	81	0	26
	07-30-86	1000	410	8.1	21.0	86	0	28
	09-03-86	1245	395	8.0	21.5	84	0	27
6	11-15-85	1035	540	7.4	15.0	240	47	70
	01-27-86	0930	505	7.4	14.5	240	47	70
	03-19-86	1100	490	7.5	15.5	220	50	65
	05-12-86	1040	495	7.7	15.5	210	44	64
	08-04-86	1010	490	7.7	15.0	220	48	65
	09-03-86	1015	495	7.6	15.5	230	48	67

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE, IT-FIELD (MG/L AS HCO_3)	CARBONATE, IT-FIELD (MG/L AS CO_3)	ALKALINITY, CARBONATE, IT-FIELD (MG/L AS $CACO_3$)
1	12-19-85	1.4	47	0.6	123	2	102
	01-31-86	1.8	44	.9	123	4	107
	03-17-86	2.0	45	.9	124	5	110
	05-09-86	.4	46	.6	101	9	86
	08-06-86	.2	47	.6	85	10	87
	09-04-86	.3	48	.7	95	7	90
2	11-18-85	3.9	13	2.3	95	0	78
	01-27-86	4.3	13	2.3	106	0	87
	03-17-86	3.8	13	2.3	87	3	76
	05-14-86	3.6	13	2.3	92	0	76
3	11-18-85	13	21	3.0	210	0	180
	01-28-86	13	21	3.0	201	0	165
	03-17-86	14	22	3.2	203	0	166
	05-16-86	13	20	3.0	206	0	169
	07-31-86	16	25	3.2	255	0	209
	09-04-86	13	22	2.8	199	0	163
4	02-28-86	11	15	2.3	77	0	63
	05-15-86	9.8	17	2.3	72	0	59
	07-30-86	6.6	14	1.9	90	0	74
	09-03-86	6.7	14	1.8	95	0	78
5	11-19-85	4.0	47	2.4	150	0	120
	01-29-86	4.2	48	2.4	156	0	128
	03-19-86	4.1	47	2.5	143	0	117
	05-15-86	3.9	45	2.4	142	0	116
	07-30-86	4.0	48	2.5	150	0	123
	09-03-86	4.0	47	2.3	146	0	120
6	11-15-85	15	19	1.2	230	0	190
	01-27-86	16	19	1.1	237	0	194
	03-19-86	14	19	1.1	207	0	170
	05-12-86	13	19	1.1	206	0	169
	08-04-86	14	20	1.0	210	0	172
	09-03-86	15	20	1.1	221	0	181

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	SULFATE, DISSOLVED (MG/L AS SO_4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO_2)	SOLIDS, RESIDUE AT 180 DEG C, DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	TURBIDITY (NTU)
1	12-19-85	15	10	0.4	23	166	180	1.7
	01-31-86	15	13	.4	24	179	180	.6
	03-17-86	16	12	.4	24	181	190	.8
	05-09-86	16	12	.3	19	157	170	.8
	08-06-86	16	10	.4	18	161	160	1.0
	09-04-86	16	10	.4	19	161	160	—
2	11-18-85	19	4.7	<.1	30	127	140	.7
	01-27-86	11	4.6	<.1	30	137	140	.8
	03-17-86	14	4.6	.1	29	130	140	.6
	05-14-86	16	4.5	.1	30	129	140	1.0
3	11-18-85	31	11	<.1	31	250	260	.5
	01-28-86	22	9.9	<.1	31	242	250	.3
	03-17-86	29	10	<.1	31	258	260	.4
	05-16-86	32	13	.1	30	254	260	1.0
	07-31-86	33	8.3	<.1	31	306	300	.5
	09-04-86	33	9.3	<.1	31	240	250	—
4	02-28-86	18	71	.2	32	264	230	1.5
	05-15-86	34	46	.3	43	255	220	3.0
	07-30-86	24	6.2	<.1	34	165	150	1.0
	09-03-86	24	6.3	.1	33	151	150	—
5	11-19-85	32	15	<.1	31	245	230	.5
	01-29-86	20	13	.1	31	252	240	4.4
	03-19-86	23	14	.2	31	236	220	.3
	05-15-86	32	14	.1	31	243	220	1.0
	07-30-86	35	15	<.1	30	262	240	.6
	09-03-86	35	13	.1	30	240	230	—
6	11-15-85	79	3.4	.1	25	316	330	.8
	01-27-86	80	3.6	.1	25	327	330	.3
	03-19-86	77	3.1	.1	25	303	310	.5
	05-12-86	80	3.3	.1	25	308	310	.5
	08-04-86	75	3.2	.1	25	323	310	.6
	09-03-86	88	4.0	.1	25	300	330	—

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	TIME	FIELD SPECIFIC CONDUCTANCE (US/CM)	FIELD pH (STANDARD UNITS)	WATER TEMPERATURE (DEG C)	TOTAL HARDNESS (MG/L AS $CACO_3$)	HARDNESS, NONCARBONATE (MG/L AS $CACO_3$)	CALCIUM, DISSOLVED (MG/L AS CA)
7	12-03-85	1415	735	6.9	13.0	230	55	75
	02-27-86	0945	685	7.2	12.5	240	77	77
	05-09-86	1240	810	7.1	13.0	250	81	80
	08-11-86	1010	750	7.3	12.5	240	76	77
8	12-03-85	1215	255	7.8	12.5	50	0	17
	02-26-86	1505	245	8.1	13.0	51	0	17
	05-09-86	1450	265	8.2	13.5	50	0	17
	08-19-86	1240	255	8.1	14.5	50	0	17
9	11-22-85	0950	120	8.6	13.5	33	0	13
	02-27-86	1230	125	8.7	14.5	33	0	13
	05-09-86	1600	125	8.8	15.0	33	0	13
	08-12-86	1440	115	8.7	14.5	--	--	13
10	12-09-85	1210	2850	6.6	13.0	500	350	190
	02-10-86	1200	2800	6.8	13.0	500	360	190
	05-19-86	1150	3000	6.7	13.5	520	390	200
	08-13-86	1020	2950	6.8	13.0	570	440	220
11	11-20-85	1445	480	7.7	15.0	99	0	34
	02-26-86	1215	470	7.9	15.0	110	0	36
	05-20-86	1430	470	8.0	15.0	100	0	34
	08-13-86	1200	475	8.0	15.0	100	0	34
12	11-22-85	1245	350	7.4	15.5	53	0	14
	02-12-86	1400	355	7.8	15.5	54	0	14
	05-20-86	1230	355	7.7	16.0	53	0	14
	08-13-86	1400	350	7.8	15.5	54	0	14
13	11-22-85	1515	360	7.8	20.5	35	0	9.2
	02-12-86	1200	350	8.0	20.0	35	0	9.3
	05-20-86	1000	370	8.0	21.0	36	0	9.5
	08-27-86	1040	355	8.0	21.0	37	0	9.7
14	11-25-85	1335	300	6.9	11.0	130	0	43
	02-06-86	1030	290	7.3	11.0	120	0	39
	05-13-86	1200	310	7.3	11.0	120	0	40
	08-18-86	1345	305	7.2	11.0	130	0	41

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE, IT-FIELD (MG/L AS HCO_3)	CARBONATE, IT-FIELD (MG/L AS CO_3)	ALKALINITY, CARBONATE, IT-FIELD (MG/L AS $CACO_3$)
7	12-03-85	11	52	1.9	217	0	178
	02-27-86	12	54	2.2	201	0	165
	05-09-86	12	53	2.3	205	0	168
	08-11-86	12	56	2.2	203	0	166
8	12-03-85	1.9	33	1.4	107	0	88
	02-26-86	2.0	33	1.6	104	0	85
	05-09-86	1.9	33	1.6	106	0	87
	08-19-86	1.8	33	1.6	105	0	86
9	11-22-85	.1	14	.9	70	0	58
	02-27-86	.1	14	.8	62	6	61
	05-09-86	.1	14	.9	66	2	58
	08-12-86	<.01	14	1.0	67	4	61
10	12-09-85	6.0	450	5.2	180	0	148
	02-10-86	5.0	470	5.6	162	0	133
	05-19-86	5.0	490	6.0	154	0	126
	08-13-86	5.0	510	6.0	159	0	130
11	11-20-85	3.5	58	3.8	190	0	160
	02-26-86	4.0	64	3.6	182	0	149
	05-20-86	3.6	59	3.8	178	0	146
	08-13-86	3.6	61	4.0	176	0	144
12	11-22-85	4.4	53	3.2	130	0	110
	02-12-86	4.6	54	3.5	128	0	105
	05-20-86	4.4	53	3.5	134	0	110
	08-13-86	4.7	54	3.7	131	0	107
13	11-22-85	3.0	60	4.0	140	0	120
	02-12-86	2.9	61	4.4	141	0	116
	05-20-86	2.9	58	4.4	140	0	115
	08-27-86	3.0	58	4.5	140	0	115
14	11-25-85	5.9	15	2.8	180	0	150
	02-06-86	5.2	14	2.9	180	0	148
	05-13-86	5.6	15	2.9	183	0	150
	08-18-86	5.6	15	2.9	183	0	150

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	SULFATE, DIS-SOLVED (MG/L AS SO_4)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL)	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SIO_2)	SOLIDS, RESIDUE AT 180 DEG C, DIS-SOLVED (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	TUR-BID-ITY (NTU)
7	12-03-85	32	58	0.6	54	472	390	0.6
	02-27-86	34	59	.6	57	491	390	3.5
	05-09-86	42	69	.5	55	507	410	.6
	08-11-86	44	69	.7	55	519	420	.5
8	12-03-85	13	11	1.6	33	159	170	.4
	02-26-86	16	13	1.7	35	155	170	1.0
	05-09-86	20	13	1.4	33	167	170	.6
	08-19-86	19	12	1.4	31	168	170	.6
9	11-22-85	.8	1.0	.1	17	82	81	.7
	02-27-86	.9	1.1	<.1	18	85	91	.4
	05-09-86	.7	1.3	<.1	17	81	84	.8
	08-12-86	1.1	1.0	<.1	17	78	--	--
10	12-09-85	1400	97	--	54	--	2300	84
	02-10-86	1300	93	5.2	53	2310	2200	95
	05-19-86	1300	110	5.4	58	2390	2300	60
	08-13-86	1400	150	5.2	56	2430	2400	120
11	11-20-85	69	16	1.6	57	321	340	1.6
	02-26-86	72	13	1.9	63	337	350	.5
	05-20-86	70	13	1.8	60	338	330	.6
	08-13-86	81	12	1.7	58	337	340	.3
12	11-22-85	47	11	1.6	64	266	270	1.0
	02-12-86	43	10	1.6	65	258	260	1.3
	05-20-86	45	11	1.7	65	268	260	.5
	08-13-86	50	13	1.5	63	277	270	.2
13	11-22-85	33	9.4	1.5	78	264	270	1.0
	02-12-86	31	9.7	1.6	80	276	270	.3
	05-20-86	36	9.5	1.6	78	271	270	1.0
	08-27-86	34	8.9	1.5	75	262	260	--
14	11-25-85	11	1.2	.2	22	174	190	1.2
	02-06-86	11	1.2	.1	20	174	180	1.4
	05-13-86	11	1.0	.1	22	184	190	1.0
	08-18-86	12	1.3	.2	22	186	190	1.1

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	TIME	FIELD SPECIFIC CONDUCTANCE (US/CM)	FIELD pH (STANDARD UNITS)	WATER TEMPERATURE (DEG C)	TOTAL HARDNESS (MG/L AS $CACO_3$)	HARDNESS, NONCARBONATE (MG/L AS $CACO_3$)	CALCIUM, DISSOLVED (MG/L AS CA)
15	11-20-85	1235	375	7.8	14.5	93	10	34
	02-10-86	1430	310	8.1	14.0	83	5	30
	05-13-86	1610	290	8.2	14.5	72	5	27
16	11-27-85	1245	220	7.4	12.5	88	0	26
	02-06-86	1235	210	7.6	12.5	88	0	26
	05-13-86	1350	225	7.6	12.5	88	0	26
	08-18-86	1140	215	7.4	12.5	90	0	27
17	11-25-85	1030	150	7.9	16.0	37	0	10
	02-06-86	1435	195	8.1	15.5	51	0	14
	05-13-86	1010	215	8.2	15.5	54	0	15
	08-18-86	1000	185	8.0	15.5	47	0	13
18	11-26-85	1605	330	7.5	15.5	110	0	31
	02-25-86	1530	315	7.7	15.5	120	0	31
	05-19-86	1510	320	7.6	16.0	110	0	29
	08-26-86	1050	325	7.8	15.5	110	0	30
19	12-10-85	1305	485	7.7	11.0	220	0	60
	02-11-86	1250	465	8.0	11.5	220	0	62
	05-14-86	1240	505	7.9	12.0	210	0	60
	08-12-86	1250	440	8.0	12.5	220	0	62
20	11-13-85	1400	325	7.6	14.0	110	0	33
	02-07-86	1315	310	7.8	13.0	110	0	32
	05-16-86	1240	315	7.8	14.5	100	0	30
	08-21-86	1535	325	7.7	14.5	120	0	35
21	11-20-85	1030	265	7.7	15.0	100	2	31
	02-07-86	1040	285	8.0	13.0	110	1	33
	05-15-86	1410	285	8.0	14.0	100	0	31
	08-21-86	1340	265	8.0	15.5	100	0	31
22	11-26-85	1325	200	6.7	14.0	83	1	24
	02-11-86	1500	210	7.0	13.5	81	0	19
	05-14-86	1630	225	7.0	13.5	85	0	20
	08-21-86	1000	205	7.1	14.0	80	0	19

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE, IT-FIELD (MG/L AS HCO_3)	CARBONATE, IT-FIELD (MG/L AS CO_3)	ALKALINITY, CARBONATE, IT-FIELD (MG/L AS $CACO_3$)
15	11-20-85	2.0	35	3.4	100	0	83
	02-10-86	1.9	30	3.2	95	0	78
	05-13-86	1.1	24	3.2	81	0	67
16	11-27-85	5.7	10	1.5	132	0	108
	02-06-86	5.5	9.7	1.3	130	0	107
	05-13-86	5.6	10	1.3	127	0	104
	08-18-86	5.6	10	1.2	126	0	103
17	11-25-85	3.0	15	4.2	74	0	61
	02-06-86	3.8	17	4.4	89	0	73
	05-13-86	4.1	17	4.4	90	0	74
	08-18-86	3.6	16	4.4	85	0	70
18	11-26-85	9.1	25	3.1	160	0	130
	02-25-86	9.3	26	3.3	159	0	130
	05-19-86	9.0	24	3.2	160	0	131
	08-26-86	8.9	25	3.2	160	0	131
19	12-10-85	16	20	3.4	280	0	230
	02-11-86	15	19	3.6	281	0	230
	05-14-86	15	18	3.6	281	0	230
	08-12-86	15	19	3.5	283	0	232
20	11-13-85	7.8	25	1.8	180	0	150
	02-07-86	7.2	23	1.6	167	0	137
	05-16-86	7.0	21	1.7	162	0	133
	08-21-86	8.1	23	1.7	187	0	153
21	11-20-85	6.0	14	2.4	130	0	100
	02-07-86	6.2	15	2.4	130	0	107
	05-15-86	6.0	15	2.4	127	0	104
	08-21-86	5.8	14	2.3	127	0	104
22	11-26-85	5.7	15	2.5	100	0	82
	02-11-86	8.1	9.6	2.6	104	0	85
	05-14-86	8.6	9.5	2.7	110	0	90
	08-21-86	7.9	9.4	2.5	103	0	84

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	SULFATE, DISSOLVED (MG/L AS SO_4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO_2)	SOLIDS, RESIDUE AT 180 DEG C, DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	TURBIDITY (NTU)
15	11-20-85	70	20	0.4	51	277	270	0.5
	02-10-86	53	14	.5	53	228	230	.7
	05-13-86	43	13	.5	54	205	210	.6
16	11-27-85	3.4	1.6	<.1	23	132	140	1.0
	02-06-86	2.7	2.1	<.1	22	126	130	.8
	05-13-86	2.2	2.9	<.1	23	133	130	.5
	08-18-86	5.2	2.1	<.1	23	136	140	2.7
17	11-25-85	14	2.8	.4	49	138	140	.5
	02-06-86	14	4.3	.3	48	143	150	.5
	05-13-86	14	4.0	.3	49	151	150	.6
	08-18-86	15	3.7	.3	49	146	150	.2
18	11-26-85	34	6.8	.2	50	224	240	1.0
	02-25-86	23	7.7	.2	53	231	230	.4
	05-19-86	30	7.7	.2	51	238	230	1.0
	08-26-86	29	7.1	.3	49	214	230	—
19	12-10-85	14	5.8	.1	31	286	290	1.3
	02-11-86	15	5.6	<.1	31	285	290	.6
	05-14-86	18	5.6	<.1	31	292	290	.8
	08-12-86	20	5.6	<.1	32	302	300	—
20	11-13-85	17	4.0	.2	36	208	210	.8
	02-07-86	15	4.3	.2	36	193	200	.4
	05-16-86	18	4.1	.2	37	197	200	.5
	08-21-86	16	3.7	.3	36	206	220	—
21	11-20-85	22	11	<.1	30	180	180	1.1
	02-07-86	16	8.8	<.1	31	174	180	.4
	05-15-86	21	8.7	.2	32	180	180	1.0
	08-21-86	21	8.3	<.1	30	172	170	—
22	11-26-85	12	4.3	<.1	33	144	150	1.5
	02-11-86	11	5.2	<.1	45	148	150	.9
	05-14-86	12	6.0	.1	47	162	160	.6
	08-21-86	10	4.2	.1	45	153	150	—

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	TIME	FIELD SPECIFIC CONDUCTANCE (US/CM)	FIELD pH (STANDARD UNITS)	WATER TEMPERATURE (DEG C)	TOTAL HARDNESS (MG/L AS $CACO_3$)	HARDNESS, NONCARBONATE (MG/L AS $CACO_3$)	CALCIUM, DISSOLVED (MG/L AS CA)
23	11-19-85	1420	560	7.7	13.5	230	27	71
	02-25-86	1240	530	8.0	14.0	240	41	74
	05-15-86	1200	580	7.9	14.0	240	42	74
	08-21-86	1210	535	8.0	13.5	230	42	72
24	11-14-85	1510	110	7.3	15.0	15	0	5.3
	02-25-86	1015	105	7.5	14.5	14	0	5.0
	05-14-86	1745	115	7.7	14.0	15	0	5.2
	08-12-86	1000	105	7.8	14.5	15	0	5.2
25	11-14-85	1215	485	7.1	17.0	220	63	63
	02-24-86	1200	540	7.3	16.5	220	56	60
	05-12-86	1235	525	7.2	17.0	210	49	59
	08-01-86	1100	510	7.2	16.5	220	58	61
26	11-15-85	1335	550	6.8	14.5	230	25	61
	02-24-86	1400	440	7.1	14.5	190	11	48
	05-12-86	1430	435	7.1	15.0	180	0	47
	08-01-86	1310	445	7.1	14.5	210	13	54
27	09-02-86	1545	425	7.6	15.0	130	0	41
28	08-26-86	1305	585	7.9	14.0	--	--	--
	08-26-86	1400	585	7.9	13.0	94	0	24
29	08-19-86	1525	605	6.8	17.0	--	--	--
30	08-19-86	1430	205	8.5	18.5	23	0	8.2
31	09-04-86	1340	875	7.4	13.0	340	83	100
32	09-05-86	1445	645	7.4	13.5	240	0	66
33	11-26-85	1055	235	7.7	13.5	81	0	23

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	MAGNESIUM, DISSOLVED (MG/L AS MG)	SODIUM, DISSOLVED (MG/L AS NA)	POTASSIUM, DISSOLVED (MG/L AS K)	BICARBONATE, IT-FIELD (MG/L AS HCO_3)	CARBONATE, IT-FIELD (MG/L AS CO_3)	ALKALINITY, CARBONATE, IT-FIELD (MG/L AS $CACO_3$)
23	11-19-85	12	24	2.6	240	0	200
	02-25-86	14	26	2.6	245	0	201
	05-15-86	13	25	2.7	239	0	196
	08-21-86	13	23	2.5	233	0	191
24	11-14-85	.5	18	1.0	33	0	27
	02-25-86	.5	17	.9	37	0	30
	05-14-86	.4	16	.8	36	0	30
	08-12-86	.4	17	.9	39	0	32
25	11-14-85	16	23	1.6	200	0	160
	02-24-86	16	23	1.7	195	0	160
	05-12-86	15	22	1.7	195	0	160
	08-01-86	16	23	1.6	195	0	160
26	11-15-85	20	15	6.0	260	0	210
	02-24-86	17	13	5.6	218	0	179
	05-12-86	16	13	5.6	223	0	183
	08-01-86	18	13	5.8	239	0	196
27	09-02-86	7.4	35	5.5	177	0	145
28	08-26-86	--	--	--	225	0	184
	08-26-86	8.2	110	2.5	225	0	184
29	08-19-86	--	--	--	--	--	--
30	08-19-86	.5	31	2.6	76	4	68
31	09-04-86	23	61	4.7	320	0	262
32	09-05-86	19	65	3.3	412	0	338
33	11-26-85	5.6	15	2.4	100	0	87

TABLE 5.--Data on physical properties and major chemical constituents--Continued

SITE NUMBER (figure 2)	DATE	SULFATE, DISSOLVED (MG/L AS SO_4)	CHLORIDE, DISSOLVED (MG/L AS CL)	FLUORIDE, DISSOLVED (MG/L AS F)	SILICA, DISSOLVED (MG/L AS SIO_2)	SOLIDS, RESIDUE AT 180 DEG C, DISSOLVED (MG/L)	SOLIDS, SUM OF CONSTITUENTS, DISSOLVED (MG/L)	TURBIDITY (NTU)
23	11-19-85	66	22	<0.1	29	348	360	0.6
	02-25-86	66	22	<.1	32	360	360	.3
	05-15-86	65	20	<.1	32	362	350	1.0
	08-21-86	63	16	<.1	30	330	330	--
24	11-14-85	20	1.1	.8	21	82	84	.8
	02-25-86	15	1.3	.8	23	83	82	2.7
	05-14-86	19	1.1	.8	21	87	82	1.0
	08-12-86	20	1.1	.8	20	83	85	.2
25	11-14-85	89	4.4	.1	39	332	330	.5
	02-24-86	89	4.5	.1	40	338	330	1.0
	05-12-86	88	4.9	<.1	38	341	320	.8
	08-01-86	86	4.5	.2	39	352	330	--
26	11-15-85	15	18	<.1	51	316	310	7.1
	02-24-86	11	13	<.1	51	269	270	2.0
	05-12-86	12	13	<.1	50	271	270	1.0
	08-01-86	12	11	<.1	50	311	280	1.0
27	09-02-86	62	11	.4	48	288	300	--
28	08-26-86	--	--	--	--	--	--	--
	08-26-86	120	14	.8	53	440	440	--
29	08-19-86	--	--	--	--	--	--	--
30	08-19-86	21	4.9	1.0	55	166	170	.2
31	09-04-86	150	63	.2	54	532	620	--
32	09-05-86	46	8.3	.2	55	476	470	--
33	11-26-85	23	5.6	.2	33	152	160	.5

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon

[Abbreviations: MG/L, milligrams per liter; "--," data not available; "<," less than]

SITE NUMBER (figure 2)	DATE	TIME	NITROGEN, DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA, DISSOLVED (MG/L AS N)	NITROGEN, ORGANIC, DISSOLVED (MG/L AS N)
1	12-19-85	1515	1.4	0.01	<0.2
	01-31-86	1600	1.4	<.01	—
	03-17-86	1550	1.7	<.01	.2
	05-09-86	0930	1.2	<.01	.2
	08-06-86	1415	1.3	.02	.3
	09-04-86	1505	1.4	<.01	.3
2	11-18-85	1510	.5	.01	.2
	01-27-86	1440	.6	.01	.2
	03-17-86	1150	.6	<.01	.3
	05-14-86	1440	—	<.01	<.2
3	11-18-85	1315	1.5	.02	.3
	01-28-86	1415	1.4	.03	.3
	03-17-86	1400	1.4	<.01	.2
	05-16-86	1040	1.4	<.01	.3
	07-31-86	1220	1.5	<.01	<.2
	09-04-86	1050	1.4	<.01	.3
4	02-28-86	0950	1.8	.03	.4
	05-15-86	1610	3.9	.27	.2
	07-30-86	1300	1.5	.02	.3
	09-03-86	1430	1.6	<.01	.5
5	11-19-85	1145	5.5	.01	1.1
	01-29-86	1115	5.3	.01	.8
	03-19-86	1400	4.9	<.01	.5
	05-15-86	1040	4.5	<.01	.2
	07-30-86	1000	4.8	<.01	.4
	09-03-86	1245	4.4	<.01	.4
6	11-15-85	1035	.8	.04	.3
	01-27-86	0930	.9	.03	.3
	03-19-86	1100	.5	<.01	<.2
	05-12-86	1040	--	<.01	.2
	08-04-86	1010	.6	.02	<.2
	09-03-86	1015	.9	.01	.2

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	NITROGEN, NITRITE, DISSOLVED (MG/L AS N)	NITROGEN, NITRATE, DISSOLVED (MG/L AS N)	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)	CARBON, ORGANIC, DISSOLVED (MG/L AS C)
1	12-19-85	<0.01	1.4	<0.01	<0.01	1.1
	01-31-86	<.01	1.4	—	—	.9
	03-17-86	<.01	1.5	—	—	.6
	05-09-86	<.01	1.0	—	—	.6
	08-06-86	<.01	1.0	—	—	.7
	09-04-86	<.01	1.1	—	—	.2
2	11-18-85	<.01	.32	.02	.02	.5
	01-27-86	.02	.35	—	—	.4
	03-17-86	<.01	.30	—	—	.7
	05-14-86	<.01	.25	—	—	.2
3	11-18-85	<.01	1.2	.02	.02	1.4
	01-28-86	.01	1.1	—	—	.8
	03-17-86	<.01	1.2	—	—	.8
	05-16-86	<.01	1.2	—	—	.3
	07-31-86	<.01	1.5	—	—	.6
	09-04-86	<.01	1.1	—	—	.3
4	02-28-86	<.01	1.4	—	—	.7
	05-15-86	.01	3.4	—	—	.7
	07-30-86	<.01	1.2	—	—	.5
	09-03-86	<.01	1.1	—	—	.3
5	11-19-85	<.01	4.4	.14	.02	.6
	01-29-86	.01	4.5	—	—	.5
	03-19-86	<.01	4.4	—	—	.5
	05-15-86	<.01	4.3	—	—	.5
	07-30-86	<.01	4.4	—	—	.6
	09-03-86	<.01	4.0	—	—	.5
6	11-15-85	<.01	.53	.04	.05	.6
	01-27-86	.02	.54	—	—	.7
	03-19-86	<.01	.48	—	—	.6
	05-12-86	<.01	<.10	—	—	.7
	08-04-86	<.01	.60	—	—	.8
	09-03-86	<.01	.69	—	—	.2

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	TIME	NITROGEN, DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA, DISSOLVED (MG/L AS N)	NITROGEN, ORGANIC, DISSOLVED (MG/L AS N)
7	12-03-85	1415	20	0.02	0.3
	02-27-86	0945	21	.03	.2
	05-09-86	1240	21	<.01	.4
	08-11-86	1010	20	<.03	.8
8	12-03-85	1215	.2	<.01	<.2
	02-26-86	1505	.6	.02	.4
	05-09-86	1450	.6	.01	.2
	08-19-86	1240	.4	.02	<.2
9	11-22-85	0950	1.0	.02	<.2
	02-27-86	1230	1.3	<.01	.3
	05-09-86	1600	1.1	<.01	.2
	08-12-86	1440	1.2	.01	.2
10	12-09-85	1210	.4	.21	.2
	02-10-86	1200	.4	.16	.2
	05-19-86	1150	.3	.19	.1
	08-13-86	1020	.3	.20	.1
11	11-20-85	1445	.5	.02	<.2
	02-26-86	1215	1.1	<.01	.5
	05-20-86	1430	.8	<.01	.2
	08-13-86	1200	.6	.02	<.2
12	11-22-85	1245	1.3	.03	.4
	02-12-86	1400	1.3	.01	.4
	05-20-86	1230	1.1	<.01	.2
	08-13-86	1400	1.0	<.01	<.2
13	11-22-85	1515	1.7	.02	.3
	02-12-86	1200	1.7	.02	.3
	05-20-86	1000	1.8	<.01	.3
	08-27-86	1040	2.2	.03	.7
14	11-25-85	1335	.2	.02	<.2
	02-06-86	1030	.6	.03	.4
	05-13-86	1200	.2	<.01	<.2
	08-18-86	1345	.2	.01	<.2

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	NITROGEN, NITRITE, DISSOLVED (MG/L AS N)	NITROGEN, NITRATE, DISSOLVED (MG/L AS N)	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)	CARBON, ORGANIC, DISSOLVED (MG/L AS C)
7	12-03-85	<0.01	20	0.05	0.05	2.6
	02-27-86	<.01	21	—	—	2.2
	05-09-86	<.01	21	—	—	2.4
	08-11-86	<.01	19	—	—	2.4
8	12-03-85	.01	.21	.05	.05	.5
	02-26-86	<.01	.24	—	—	.4
	05-09-86	<.01	.40	—	—	.7
	08-19-86	<.01	.43	—	—	.7
9	11-22-85	<.01	1.0	.06	.01	.9
	02-27-86	<.01	1.0	—	—	.5
	05-09-86	<.01	.93	—	—	.7
	08-12-86	<.01	1.0	—	—	.5
10	12-09-85	<.01	<.10	.14	.06	2.4
	02-10-86	<.01	<.10	—	—	2.2
	05-19-86	<.01	<.10	—	—	2.5
	08-13-86	<.01	<.10	—	—	3.0
11	11-20-85	<.01	.54	.02	.03	.4
	02-26-86	<.01	.64	—	—	.6
	05-20-86	<.01	.58	—	—	.3
	08-13-86	<.01	.62	—	—	.6
12	11-22-85	.01	.90	.24	.04	.5
	02-12-86	<.01	.90	—	—	.4
	05-20-86	<.01	.90	—	—	.3
	08-13-86	<.01	.97	—	—	.4
13	11-22-85	.01	1.4	.26	.02	.8
	02-12-86	<.01	1.4	—	—	.5
	05-20-86	<.01	1.5	—	—	.2
	08-27-86	<.01	1.5	—	—	.4
14	11-25-85	.01	.21	.09	.02	.7
	02-06-86	<.01	.21	—	—	.7
	05-13-86	<.01	.21	—	—	.6
	08-18-86	<.01	.19	—	—	.8

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	TIME	NITROGEN, DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA, DISSOLVED (MG/L AS N)	NITROGEN, ORGANIC, DISSOLVED (MG/L AS N)
15	11-20-85	1235	0.2	0.04	0.2
	02-10-86	1430	.3	.05	.2
	05-13-86	1610	.2	.03	.2
16	11-27-85	1245	1.8	.02	.3
	02-06-86	1235	2.0	.02	.5
	05-13-86	1350	1.7	<.01	.2
	08-18-86	1140	1.7	.02	.3
17	11-25-85	1030	.3	.14	.1
	02-06-86	1435	.6	.12	.2
	05-13-86	1010	.6	.09	.1
	08-18-86	1000	.5	.14	.1
18	11-26-85	1605	.9	.02	.3
	02-25-86	1530	.7	.02	.2
	05-19-86	1510	1.0	.01	.3
	08-26-86	1050	.7	.02	<.2
19	12-10-85	1305	2.3	.01	.2
	02-11-86	1250	2.5	.01	.5
	05-14-86	1240	2.7	<.01	.6
	08-12-86	1250	2.8	.02	.8
20	11-13-85	1400	.7	.01	.2
	02-07-86	1315	.9	.04	.4
	05-16-86	1240	.5	<.01	<.2
	08-21-86	1535	.8	<.01	.2
21	11-20-85	1030	1.4	.01	.4
	02-07-86	1040	1.4	.02	.3
	05-15-86	1410	1.2	<.01	.2
	08-21-86	1340	1.2	.01	.2
22	11-26-85	1325	1.5	.03	.3
	02-11-86	1500	1.6	.03	.6
	05-14-86	1630	1.6	.01	.2
	08-21-86	1000	1.5	<.01	.2

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	NITROGEN, NITRITE, DISSOLVED (MG/L AS N)	NITROGEN, NITRATE, DISSOLVED (MG/L AS N)	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)	CARBON, ORGANIC, DISSOLVED (MG/L AS C)
15	11-20-85	<0.01	<0.10	0.02	0.03	0.8
	02-10-86	<.01	<.10	—	—	.6
	05-13-86	<.01	<.10	—	—	.6
16	11-27-85	<.01	1.5	.07	.06	.8
	02-06-86	<.01	1.5	—	—	.5
	05-13-86	<.01	1.5	—	—	.7
	08-18-86	<.01	1.4	—	—	.4
17	11-25-85	.01	.13	.27	.12	.8
	02-06-86	.03	.29	—	—	1.1
	05-13-86	.03	.35	—	—	.9
	08-18-86	.03	.25	—	—	.5
18	11-26-85	<.01	.61	.06	.06	.7
	02-25-86	<.01	.54	—	—	.7
	05-19-86	<.01	.67	—	—	.4
	08-26-86	<.01	.71	—	—	.5
19	12-10-85	<.01	2.1	.03	.04	.8
	02-11-86	<.01	2.0	—	—	.5
	05-14-86	<.01	2.1	—	—	.3
	08-12-86	<.01	1.0	—	—	1.2
20	11-13-85	<.01	.52	.15	.14	.7
	02-07-86	<.01	.50	—	—	.7
	05-16-86	<.01	.49	—	—	.5
	08-21-86	<.01	.59	—	—	1.0
21	11-20-85	<.01	.98	.07	.07	.5
	02-07-86	<.01	1.1	—	—	1.0
	05-15-86	<.01	1.0	—	—	.3
	08-21-86	<.01	1.0	—	—	.4
22	11-26-85	<.01	1.2	.09	.09	1.2
	02-11-86	<.01	1.0	—	—	1.0
	05-14-86	<.01	1.4	—	—	.8
	08-21-86	<.01	1.3	—	—	.8

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	TIME	NITROGEN, DISSOLVED (MG/L AS N)	NITROGEN, AMMONIA, DISSOLVED (MG/L AS N)	NITROGEN, ORGANIC, DISSOLVED (MG/L AS N)
23	11-19-85	1420	3.3	0.03	0.3
	02-25-86	1240	3.6	.01	.5
	05-15-86	1200	3.2	.02	.3
	08-21-86	1210	3.3	.02	.4
24	11-14-85	1510	.3	.12	.2
	02-25-86	1015	.3	.13	.2
	05-14-86	1745	.3	.08	.2
	08-12-86	1000	.2	.05	.2
25	11-14-85	1215	3.4	.02	.5
	02-24-86	1200	3.3	.02	.3
	05-12-86	1235	3.2	< .01	.2
	08-01-86	1100	3.5	.01	.5
26	11-15-85	1335	6.6	.01	.7
	02-24-86	1400	4.3	.01	.3
	05-12-86	1430	4.5	< .01	.2
	08-01-86	1310	5.5	.02	.4
27	09-02-86	1545	.4	.22	.2
28	08-26-86	1400	.6	.44	.2
30	08-19-86	1430	<.2	.02	<.2
31	09-04-86	1340	2.3	1.2	.4
32	09-05-86	1445	2.1	.02	1.1
33	11-26-85	1055	.5	.02	.2

TABLE 6.--Data on dissolved nitrogen, phosphorus, and organic carbon--Continued

SITE NUMBER (figure 2)	DATE	NITROGEN, NITRITE, DISSOLVED (MG/L AS N)	NITROGEN, NITRATE, DISSOLVED (MG/L AS N)	PHOSPHORUS, DISSOLVED (MG/L AS P)	PHOSPHORUS, ORTHO, DISSOLVED (MG/L AS P)	CARBON, ORGANIC, DISSOLVED (MG/L AS C)
23	11-19-85	0.01	3.0	0.05	0.05	0.8
	02-25-86	<.01	3.1	—	—	1.1
	05-15-86	<.01	2.9	—	—	.8
	08-21-86	<.01	2.9	—	—	1.0
24	11-14-85	<.01	<.10	.02	.01	.6
	02-25-86	<.01	<.10	—	—	.6
	05-14-86	<.01	<.10	—	—	.3
	08-12-86	<.01	<.10	—	—	.5
25	11-14-85	<.01	2.9	.13	.12	.4
	02-24-86	<.01	3.0	—	—	.6
	05-12-86	<.01	3.0	—	—	.5
	08-01-86	<.01	3.0	—	—	.5
26	11-15-85	<.01	5.9	.08	.08	.5
	02-24-86	<.01	4.0	—	—	.7
	05-12-86	<.01	4.3	—	—	.7
	08-01-86	<.01	5.1	—	—	.5
27	09-02-86	<.01	<.10	—	—	1.5
28	08-26-86	<.01	<.10	—	—	4.4
30	08-19-86	<.01	<.10	—	—	.3
31	09-04-86	.05	.62	—	—	6.3
32	09-05-86	.06	.93	—	—	3.4
33	11-26-85	<.01	.28	.03	.03	.9

TABLE 7.--Data on trace elements

[Abbreviations: UG/L, micrograms per liter; "--," data not available; "<," less than]

SITE NUMBER (figure 2)	DATE	TIME	ARSENIC, DISSOLVED (UG/L AS AS)	BARIUM, DISSOLVED (UG/L AS BA)	BORON, DISSOLVED (UG/L AS B)	CADMIUM, DISSOLVED (UG/L AS CD)	CHROMIUM, DISSOLVED (UG/L AS CR)	COPPER, DISSOLVED (UG/L AS CU)
1	12-19-85	1515	5	40	120	<1	<10	10
	01-31-86	1600	5	41	--	<1	20	<10
	03-17-86	1550	5	49	110	<1	<10	<10
	05-09-86	0930	12	28	120	<1	<10	<10
	08-06-86	1415	12	14	130	<1	<10	<10
	09-04-86	1505	12	16	120	<1	<10	<10
2	11-18-85	1510	10	66	170	<1	<10	<10
	01-27-86	1440	9	71	--	<1	<10	<10
	03-17-86	1150	10	63	160	<1	<10	<10
	05-14-86	1440	11	60	160	<1	<10	<10
3	11-18-85	1315	2	140	220	2	<10	<10
	01-28-86	1415	2	130	--	<1	10	<10
	03-17-86	1400	2	140	210	<1	<10	<10
	05-16-86	1040	2	130	210	<1	<10	<10
	07-31-86	1220	1	150	230	<1	<10	<10
	09-04-86	1050	2	130	210	<1	<10	<10
4	02-28-86	0950	<1	290	--	<1	<10	<10
	05-15-86	1610	2	99	150	<1	<10	<10
	07-30-86	1300	2	62	170	<1	<10	<10
	09-03-86	1430	2	62	170	1	<10	<10
5	11-19-85	1145	14	100	40	<1	<10	<10
	01-29-86	1115	12	100	--	<1	<10	<10
	03-19-86	1400	15	100	40	<1	<10	<10
	05-15-86	1040	16	95	50	<1	<10	<10
	07-30-86	1000	14	99	40	<1	<10	<10
	09-03-86	1245	14	93	40	1	<10	<10
6	11-15-85	1035	<1	83	<20	<1	<10	<10
	01-27-86	0930	<1	83	--	<1	<10	<10
	03-19-86	1100	<1	83	<20	<1	<10	10
	05-12-86	1040	<1	77	20	<1	<10	<10
	08-04-86	1010	<1	71	20	<1	<10	<10
	09-03-86	1015	<1	74	20	1	<10	10

TABLE 7.--Data on trace elements--Continued

SITE NUMBER (figure 2)	DATE	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	MANGA- NESE, DIS- SOLVED (UG/L AS MN)	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)
1	12-19-85	4	<10	<1	<0.1	<1	<1	16
	01-31-86	6	<10	<1	<.1	<1	<1	14
	03-17-86	8	<10	<1	<.1	1	<1	10
	05-09-86	<3	<10	<1	<.1	<1	<1	4
	08-06-86	9	<10	2	<.1	<1	<1	9
	09-04-86	6	<10	1	<.1	<1	<1	5
2	11-18-85	<3	<10	<1	<.1	<1	<1	<3
	01-27-86	<3	<10	<1	<.1	<1	<1	<3
	03-17-86	<3	<10	<1	<.1	1	<1	<3
	05-14-86	<3	<10	<1	<.1	<1	<1	<3
3	11-18-85	<3	<10	<1	<.1	<1	<1	11
	01-28-86	<3	<10	<1	<.1	<1	<1	10
	03-17-86	<3	10	<1	<.1	2	<1	4
	05-16-86	<3	<10	<1	<.1	<1	<1	5
	07-31-86	<3	<10	<1	<.1	<1	<1	<3
	09-04-86	<3	<10	1	<.1	<1	<1	5
4	02-28-86	230	<10	520	.1	<1	<1	20
	05-15-86	630	<10	250	<.1	<1	<1	5
	07-30-86	32	<10	13	<.1	<1	<1	4
	09-03-86	19	<10	7	<.1	<1	<1	20
5	11-19-85	8	<10	<1	<.1	2	<1	64
	01-29-86	13	<10	8	<.1	2	<1	170
	03-19-86	5	<10	<1	<.1	2	<1	41
	05-15-86	<3	<10	<1	<.1	2	<1	14
	07-30-86	14	<10	3	<.1	2	<1	66
	09-03-86	6	<10	2	<.1	2	<1	32
6	11-15-85	9	<10	<1	<.1	<1	<1	9
	01-27-86	8	<10	1	<.1	<1	<1	14
	03-19-86	9	<10	<1	<.1	2	1	11
	05-12-86	41	<10	<1	<.1	<1	<1	24
	08-04-86	7	<10	<1	<.1	<1	<1	<3
	09-03-86	6	<10	1	<.1	<1	<1	5

TABLE 7.--Data on trace elements--Continued

SITE NUMBER (figure 2)	DATE	TIME	ARSENIC, DIS-SOLVED (UG/L AS AS)	BARIUM, DIS-SOLVED (UG/L AS BA)	BORON, DIS-SOLVED (UG/L AS B)	CADMIUM, DIS-SOLVED (UG/L AS CD)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR)	COPPER, DIS-SOLVED (UG/L AS CU)
7	05-09-86	1240	4	130	170	<1	<10	<10
8	05-09-86	1450	3	26	220	<1	<10	<10
9	05-09-86	1600	<1	14	10	<1	<10	<10
10	05-19-86	1150	22	<100	2,400	10	<10	10
11	05-20-86	1430	18	48	210	<1	<10	<10
12	05-20-86	1230	23	40	150	<1	<10	10
13	05-20-86	1000	25	10	160	<1	<10	<10
14	05-13-86	1200	<1	28	20	<1	<10	<10
15	05-13-86	1610	29	48	160	<1	<10	<10
16	05-13-86	1350	<1	21	10	<1	<10	<10
17	05-13-86	1010	12	58	80	<1	<10	<10
18	05-19-86	1510	8	81	60	<1	<10	<10
19	05-14-86	1240	2	170	160	<1	<10	<10
20	05-16-86	1240	9	64	110	<1	<10	<10
21	05-15-86	1410	7	73	90	<1	<10	<10
22	05-14-86	1630	3	85	80	<1	<10	<10
23	05-15-86	1200	4	130	60	<1	<10	<10
24	05-14-86	1745	3	12	50	<1	<10	<10
25	05-12-86	1235	21	73	20	<1	<10	<10
26	05-12-86	1430	15	120	20	<1	<10	<10
27	09-02-86	1545	43	140	190	1	<10	<10
28	08-26-86	1400	55	56	260	<1	<10	<10
30	08-19-86	1430	38	24	170	<1	<10	<10
31	09-04-86	1340	21	97	290	1	<10	<10
32	09-05-86	1445	19	100	410	1	<10	<10
33	11-26-85	1055	6	63	180	<1	<10	10

TABLE 7.--Data on trace elements--Continued

SITE NUMBER (figure 2)	DATE	IRON, DIS-SOLVED (UG/L AS FE)	LEAD, DIS-SOLVED (UG/L AS PB)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	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)
7	05-09-86	<3	10	<1	<0.1	<1	<1	53
8	05-09-86	11	<10	<1	< .1	<1	<1	21
9	05-09-86	<3	<10	<1	< .1	<1	<1	4
10	05-19-86	11,000	<100	1,000	< .1	<1	<1	10
11	05-20-86	4	<10	<1	< .1	<1	<1	28
12	05-20-86	<3	<10	<1	< .1	<1	<1	32
13	05-20-86	6	<10	<1	< .1	<1	<1	23
14	05-13-86	19	<10	<1	< .1	1	<1	88
15	05-13-86	16	<10	36	< .1	<1	<1	8
16	05-13-86	18	<10	<1	< .1	<1	<1	23
17	05-13-86	48	<10	66	< .1	<1	<1	4
18	05-19-86	5	<10	<1	< .1	<1	<1	18
19	05-14-86	<3	<10	<1	< .1	<1	<1	66
20	05-16-86	<3	<10	<1	< .1	<1	<1	18
21	05-15-86	<3	<10	<1	< .1	<1	<1	25
22	05-14-86	5	<10	<1	< .1	<1	<1	99
23	05-15-86	<3	<10	<1	< .1	4	<1	13
24	05-14-86	65	<10	15	< .1	<1	<1	28
25	05-12-86	9	<10	<1	< .1	<1	<1	120
26	05-12-86	10	<10	3	< .1	<1	<1	380
27	09-02-86	870	<10	490	< .1	<1	<1	3
28	08-26-86	210	<10	570	< .1	<1	<1	<3
30	08-19-86	6	<10	3	< .1	<1	<1	10
31	09-04-86	190	<10	270	< .1	<1	<1	<3
32	09-05-86	250	<10	520	< .1	<1	<1	4
33	11-26-85	12	<10	4	< .1	<1	<1	<3

TABLE 8.--Data on organic compounds[1]

Site number (figure 2)[2]	Date	Estimated combined concentration of organic compounds (micrograms per liter)	Number of organic compounds detected
1	08-06-86	0	0
3	07-31-86	2	1
4	07-30-86	6	1
5	07-30-86	17	1
6	08-04-86	4	1
7	08-11-86	0	0
8	08-19-86	0	0
9	08-12-86	0	0
10*	08-13-86	17	2
11	08-13-86	0	0
12	08-13-86	0	0
13	08-27-86	4	1
14	08-18-86	0	0
16	08-18-86	0	0
17	08-18-86	3	1
18	08-26-86	3	1
19	08-12-86	0	0
20	08-21-86	3	1
21	08-21-86	0	0
22	08-21-86	0	0
23	08-21-86	0	0
24	08-12-86	0	0
25	08-01-86	19	1
26	08-01-86	0	0
27*	09-02-86	40	6
28*	08-26-86	19	5
29	08-19-86	180	47
30	08-19-86	0	0
31*	09-04-86	40	5
32*	09-05-86	0	0

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[1] Semiquantitative analysis by the U.S. Geological Survey National Water Quality Laboratory, Denver, Colo., determined by gas chromatograph using a flame-ionization detector. See text for details.

[2] Asterisk indicates that well-casing material is polyvinyl chloride (PVC), which can contribute organic compounds to water samples.

TABLE 9.--Data on dissolved radium-226, radon-222, and uranium

["--," no data available]

Site number (figure 2)	Date	Radium-226 (picocuries per liter)	Radon-222 (picocuries per liter)	Uranium (micrograms per liter)
1	08-06-86	0.05	610	3.0
5	07-30-86	.06	600	1.2
6	08-04-86	.06	340	.68
9	08-12-86	.04	900	--
13	08-27-86	.04	580	.94
14	08-18-86	.09	700	1.3
17	08-18-86	.07	550	2.7
18	08-26-86	--	670	--
24	08-12-86	.56	5,000	5.3
26	08-01-86	.10	840	1.2

TABLE 10.-Statistical summary of water-quality data[1]

[Abbreviations: mg/L, milligrams per liter; n.a., not applicable; NTU, nephelometric turbidity units; pCi/L, picocuries per liter; res. evap., residue remaining after evaporation at 180 °C; DS, dissolved solids; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius]

				Minimum		Msximum		Number of measurements	
Constituent or property	Mean value	Standard deviation	Median value	Value	Site number[2]	Value	Site number[2]	Used in calculations	Below detection limit[1]
Specific conductance (µS/cm)	450	485	355	105	24	3,000	10	119	0
pH (standard units)	n.a.	n.a.	7.7	6.6	10	9.1	1	119	0
Water temperature (°C)	15	2.6	14	11	14, 19	22	5	117	0
Turbidity (NTU)	4.5	18.1	.8	.2	17	120	10	99	0
Hardness (mg/L)	130	104	100	14	24	570	10	116	0
Calcium (mg/L)	40.4	37	31.0	5.0	24	220	10	117	0
Magnesium (mg/L)	7.5	5.4	5.7	.1	9	23	31	116	1
Sodium (mg/L)	44.3	84.3	23.0	9.4	22	510	10	117	0
Sodium (percent)	38	21	31	12	26	84	1	116	0
Sodium adsorption ratio	1.8	1.9	1.0	.4	26	10	10	116	0
Potassium (mg/L)	2.7	1	2.5	.6	1	6.0	26, 10	117	0
Bicarbonate (mg/L)	156	66	150	33	24	412	32	118	0
Carbonate (mg/L)	0.5	1.7	0	0	*	10	1	118	0
Alkalinity(CaCO3; mg/L)	129	53	122	27	24	338	32	118	0
Sulfate (mg/L)	78	242	23	.7	9	1,400	10	117	0
Chloride (mg/L)	14.9	23.5	8.8	1.0	9	150	10	117	0
Fluoride (mg/L)	.5	.9	.2	.1	*	5.4	10	83	34
Silica; mg/L)	39	15	33	17	9	80	13	117	0
DS (res. evap.; mg/L)	299	362	240	78	9	2,430	10	117	0
NO2-N (mg/L)	.02	.02	.01	.01	*	.06	32	16	101
NO2+NO3 (mg/L)	2.0	3.4	1.0	.1	17	21	7	102	15
NH4-N (mg/L)	.06	.15	.02	.01	*	1.2	31	81	36
NH4+organic-N (mg/L)	.4	.2	.3	.2	*	1.6	31	99	17
Nitrogen-N (mg/L)	1.9	1.6	1.4	.3	17	6.6	26	34	0
Phosphorus-P (mg/L)	.09	.08	.06	.02	*	.27	17	25	1
Orthophosphate-P (mg/L)	.05	.04	.05	.01	24, 9	.14	20	25	1
Arsenic (µg/L)	12	11	10	1	3	55	28	48	10
Barium (µg/L)	80	49	73	10	13	290	4	57	1
Boron (µg/L)	170	330	130	10	9, 6	2,400	10	51	1
Cadmium (µg/L)	2	3	1	1	*	10	10	8	50
Chromium (µg/L)	15	7	15	10	3	20	1	2	56
Copper (µg/L)	10	0	10	10	*	10	*	6	52
Iron (µg/L)	354	1,758	10	4	1	11,000	10	39	19
Lead (µg/L)	10	0	10	10	*	10	*	2	56
Manganese (µg/L)	165	272	8	1	*	1,000	10	23	35
Mercury (µg/L)	.1	0	.1	.1	*	.1	*	1	57
Selenium (µg/L)	2	.8	2	1	*	4	23	12	46
Silver (µg/L)	1	0	1	1	*	1	*	1	57
Zinc (µg/L)	34	60	14	3	27	380	26	49	9
Radium-226 (pCi/L)	.12	.17	.06	.04	9	.56	24	9	0
Radon (pCi/L)	1,080	1,393	642	339	6	5,020	24	10	0
Uranium (µg/L)	2.04	1.56	1.25	.68	6	5.3	24	8	0
Dissolved organic carbon (mg/L)	.9	.8	.6	.2	1	6.3	31	117	0

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[1] Measurements below detection limit were not included when summary statistics were calculated; thus, these statistical estimates may be skewed higher than the true population statistics for constituents and properties having values below detection limit.

[2] Asterisk indicates multiple occurrences of this value.

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