QUALITY OF WATER IN THE ALLUVIAL AQUIFER, AMERICAN BOTTOMS, EAST ST. LOUIS, ILLINOIS

By David C. Voelker

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ILLUSTRATIONS

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FACTORS FOR CONVERTING INCH-POUND UNITS TO
INTERNATIONAL SYSTEM OF METRIC UNITS (SI)

Multiply inch-pound unit	By	To obtain SI unit
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m^3/s)
micromho per centimeter at 25° Celsius (µmhos/cm at 25°C)	1.000	microsiemen per centimeter at 25° Celsius (µS/cm at 25°C)
degree Fahrenheit (°F)	°C = 5/9 (°F-32)	degree Celsius (°C)

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ABSTRACT

Ground-water levels in the American Bottoms region around East St. Louis, Illinois, have risen several feet since the early 1970's. Artificial dewatering of the aquifer by increased pumping is being investigated by the U.S. Army Corps of Engineers to alleviate economic and health concerns that have resulted from elevated ground-water levels. An evaluation of the ground-water quality is necessary for selecting a feasible dewatering scheme.

Analyses of water samples from 63 wells show that most constituent concentrations do not exceed State of Illinois water-quality standards. The waters are primarily of the calcium-magnesium-bicarbonate type with some calcium-sulfate type water. Iron concentrations ranged from less than 3 to 82,000 micrograms per liter, manganese from 5 to 5,300 micrograms per liter, and dissolved solids from 140 to 3,000 milligrams per liter. These three constituent concentrations exceeded Illinois' public water-supply, effluent, and general water-quality standards in 79, 92, and 67 percent of the samples, respectively. Concentrations of nitrite + nitrate nitrogen, fluoride, mercury, zinc, lead, and sulfate also exceeded Illinois water-quality standards in a few samples from individual wells. With the exception of one sample containing 0.01 micrograms per liter of Dieldrin, concentrations of organic pesticides, polychlorinated biphenyls, and polychlorinated naphthalenes were below analytical detection limits in the 15 samples analyzed for these constituents.

Water-quality samples were collected during two different hydrologic conditions to see if constituent concentrations changed with changes in ground-water levels. Chemical constituent concentrations did not change significantly with changes in water levels.

INTRODUCTION

The American Bottoms is one of the most favorable ground-water areas in Illinois (fig. 1) and has provided large quantities of water for more than 60 years (Schicht, 1965). Prior to the development of the East St. Louis area, the water table was very near the land surface and there were many shallow lakes, ponds, swamps, and poorly drained areas. The abundance of ground water and its proximity to railroads and the Mississippi River prompted development of the region. Major industries, including steel manufacturing, oil refining, chemical manufacturing, and meat packing were established in the Bottoms prior to the 1950's. Development in the area provided for better drainage which lowered the ground-water levels an estimated 2 to 12 feet (Bruin and Smith, 1953). It was during this period of lower ground-water levels that much of the present infrastructure, residential housing, and commercial development was built.

Wehrmann (1979) reports that estimated pumpage from wells increased from 2.1 Mgal/d (million gallons per day) in 1900 to 111 Mgal/d in 1956. An extended dry period from 1952 to 1956 decreased ground-water reserves and forced several industries to abandon wells or cut back on production. After 1956, many industries converted to surface-water sources (Wehrmann, 1979). Ground-water pumpage declined sharply to 91.0 Mgal/d in 1958, and gradually increased to 99.4 Mgal/d in 1961 (Schicht and Jones, 1962; Emmons, 1979). Pumpage further decreased to 79.5 Mgal/d in 1971 as some industries practiced ground-water conservation, while others shut down completely. Since 1971, ground-water use has continued to decline (Emmons, 1979), again resulting in increased water-level elevations. Water-level fluctuations reflecting these changes in water use are discussed in more detail by Schicht (1965), Reitz (1968), Baker (1972), Emmons (1979), and Wehrmann (1979).

A second factor in the rise of ground-water levels has been a rise in the level of the Mississippi River. Schicht and Jones (1962) concluded that ground-water levels, especially those near the river, are affected by changes in river stages. Increased precipitation, along with rises in the Mississippi River stage due to the construction of the Chain of Rocks Canal, and abnormally high river stages in 1972 and 1973, all contributed to significant and prolonged rises in ground-water levels throughout the American Bottoms (Schicht, 1977).

The high water levels that have resulted from the reduction in pumpage and increase in Mississippi River stages have caused several problems throughout the American Bottoms. The U.S. Army Corps of Engineers, St. Louis District (1979), outlined these problem areas, and later, the U.S. Army Corps of Engineers (written commun., 1982) indicated those areas where additional problems are anticipated (fig. 2). There have been sewer failures, with the resultant potential for ground-water contamination and health hazards, flooded basements, structural damage to foundations of homes and businesses, and the necessity to construct an extensive dewatering system along a major highway system.

Aside from the economic importance of the high water levels, there are also public health concerns due to infiltration from sewer line breaks as well as from landfills in the area. Of 32 landfills located within the American Bottoms, 13 are used for disposal of industrial wastes. The potential for ground-water contamination from landfills is high because the aquifer materials are composed mostly of sand and gravel and are easily infiltrated by surface contaminants.

The U.S. Army Corps of Engineers is evaluating means of reducing damages caused by high ground-water levels in the American Bottoms. One alternative being considered is to lower water levels by increasing pumpage (U.S. Army

Corps of Engineers, St. Louis District, 1979). This alternative requires an evaluation of the suitability of the discharged ground water for irrigation, industrial water supply, public water supply, or discharge into streams.

Purpose and Scope

This report provides ground-water quality data for the American Bottoms to evaluate conditions that may affect or be used to evaluate dewatering schemes, including: (1) A determination of ground-water quality, (2) comparison of ground-water quality to Illinois water-quality standards and criteria (Illinois Pollution Control Board, 1977), (3) identification of areas of anomalously high chemical-constituent concentrations, and (4) determination of the suitability of discharged ground water for irrigation, industrial water supply, and public water supply. Water levels were measured to gain insight into possible changes in ground-water constituent concentrations with fluctuations in ground-water levels. Water samples were first collected in September-October 1982, followed by a second period of sampling in December 1982.

Description of Study Area

The American Bottoms region is located in southwestern Illinois on the flood plain of the Mississippi River around East St. Louis, between the communities of Alton and Dupo (fig. 1). The Mississippi River flows southward along the western boundary. Bluffs form the eastern boundary and rise 150 to 200 feet above the valley bottom. The area encompasses 175 square miles, is 30 miles long, and has a maximum width of 11 miles. It includes portions of Madison, St. Clair, and Monroe Counties. Major cities are East St. Louis, Granite City, Wood River, and Alton. The area is heavily populated and industrialized largely due to its proximity to transportation provided by the Mississippi River and one of the Nation's largest railroad centers.

Bergstrom and Walker (1956) described the geology of the American Bottoms and related the geology of the water-yielding deposits to ground-water reserves. The topography is that of nearly level flood plain which has a slight slope to the south. Alluvial deposits in the Bottoms average 115 feet thick, and have a maximum thickness of 180 feet (Searcy and others, 1952). The alluvial deposits are underlain by Pennsylvanian bedrock in the eastern sections of the study area and by the Mississippian bedrock in the central and western sections. Bedrock contours indicate only slightly more relief than the surface.

Large supplies of ground water in the American Bottoms are withdrawn primarily from valley fill made of permeable sands and gravels (Wehrmann, 1979). Ground water in the American Bottoms is mostly found under semiconfined conditions, but may also be under water-table conditions. Semiconfined conditions are present where fine-grained deposits overlie coarser deposits and valley-train deposits. Water-table conditions are present where fine-grained deposits are missing and the upper surface of the zone of saturation is in coarse deposits (Schicht, 1965).

Well-Numbering System

The well numbering system of the U.S. Geological Survey is based on the grid system of latitude and longitude. The system provides the geographic location of the well and a unique number for each well. The number consists of 15 digits. The first 6 digits denote the degrees, minutes, and seconds of latitude, the next 7 digits denote degrees, minutes, and seconds of longitude, and the last 2 digits (assigned sequentially) identify the wells within a 1-second grid.

A map-index numbering system has also been used for ease in referencing each well with corresponding data. The 63 wells were numbered consecutively by ascending U.S. Geological Survey number. Table 1 contains a complete list of map index and U.S. Geological Survey numbers.

Acknowledgments

The U.S. Army Corps of Engineers provided technical assistance in outlining areas of potential damage caused by high ground-water levels. The Illinois State Water Survey supplied well records and assistance in locating wells throughout the study area. Many well owners and municipal and industrial well operators allowed access to their wells for collection of samples and provided well and water-level information. The Illinois Environmental Protection Agency assisted with the initial reconnaissance and overview of the study area and later helped with data collection. The Southwestern Illinois Metropolitan Planning Commission provided information during our initial reconnaissance work.

METHODS OF STUDY

Data Collection

Wells were selected to provide areal coverage and accessibility for sample collection. Most wells were selected in areas with high ground-water level problems, as outlined by the U.S. Army Corps of Engineers. The 63 wells selected for the initial sampling appear in figure 3.

Wells from which water was sampled ranged from privately-owned driven pipes, from 14 feet deep, to industrial or public utility production wells up to 125 feet deep. Figure 4 shows the depth of wells, and table 1 includes additional information on primary use of the well and type of pump used for sampling.

Water samples were collected during two periods to represent different hydrologic conditions within the time constraints of the project. Different conditions were desirable to assess the response of constituent concentrations to changes in ground-water levels.

Water was pumped from each well for sufficient time to ensure that the sample was representative of the aquifer. After three consecutive readings of temperature, pH, and specific conductance showed that these properties had stabilized, the sample was collected. Filtering, preservation, and analyses of all samples were done according to standard U.S. Geological Survey procedures (Goerlitz and Brown, 1972; Skougstad and others, 1979).

Data Analysis

Water samples from the initial sampling were analyzed for color, hardness, calcium, magnesium, sodium, potassium, alkalinity, sulfate, chloride, fluoride, dissolved solids-residue on evaporation at 180°C, nitrite + nitrate nitrogen, total phosphorus, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, zinc, and dissolved organic carbon. The constituent concentrations from the first samples were examined in terms of State of Illinois water-quality standards and criteria for public and industrial water supplies, irrigational use, and for discharge into streams, with special emphasis on dissolved organic carbon, nitrite + nitrate nitrogen, metals, and dissolved solids-residue on evaporation at 180°C. Thirty wells in which one or more constituent concentrations exceeded a standard or criteria were sampled a second time. Of the 30 sites sampled twice, 15 were sampled for analysis of polychlorinated biphenyls, polychlorinated naphthalenes, and organic pesticides.

All constituent concentrations were then compared to Illinois' water-quality standards to determine the areal distribution of constituents in exceedance of the standards. These were then plotted on maps depicting the American Bottoms region. A comparison of constituent concentrations by depth was also made.

Statistical testing of the distribution of constituent concentrations throughout the American Bottoms was done using the SAS Univariate procedure (SAS Institute, Inc., 1979). Distribution of sample concentrations along the cumulative normal distribution of data were used to indicate ambient constituent concentrations.

WATER QUALITY IN THE ALLUVIAL AQUIFER

Table 2 shows observed minimum, maximum, and mean values by sampling date for some of the primary constituents. Two summaries are included for the analyses of samples collected in September-October 1982. One summary includes all 63 samples and one includes only samples from the 30 wells also sampled in December 1982. A third summary represents the 30 wells sampled in December 1982. Illinois public water-supply, effluent, and general water-quality standards also are shown where applicable.

It should be noted that constituents were analyzed for dissolved concentrations while some of the standards are for total concentrations. These are indicated in table 2. At only one site (USGS No. 383454090053901, map index number 10) was there particulate material sufficient to warrant analyses for total constituent concentrations. Concentrations of the total constituents in samples from this well were generally an order of magnitude greater than the dissolved constituents. All of the chemical analyses are compiled in table 5.

Ground-water levels near the Mississippi River generally fluctuate in response to river stage. Typically, this would result in highest ground-water levels in May or June, and lowest levels in December. During the first sampling period in late September and early October, ground-water levels were at or near the highest levels for 1982, as shown by records kept by various well owners. Precipitation in the American Bottoms, as reported by the National Weather Service, totaled about 4 inches in the first 12 days of December prior to sampling and produced a nearly immediate rise in ground-water levels, as shown by water-level records. Measurements made during the second sampling period in December confirmed a general rise in water levels (fig. 5) from those measured during the September-October sampling.

Although there was a general rise in water levels from the September to December sampling periods, water levels generally were high for the area during both sampling periods. Not all constituent concentrations responded similarly to the general rise in water levels (table 2). Some minor concentration changes were observed, yet they were essentially unchanged between the sampling periods.

Constituent concentrations were also compared between deep and shallow wells. This was done by plotting the constituent concentrations versus depth of well. These observations did not indicate any significant change in water quality with depth.

Most constituents were measured in concentrations lower than the Illinois water-quality standards (table 3). Those constituent concentrations that exceeded the Illinois water-quality standards are listed in table 4. The number of wells in which constituent concentrations exceeded a standard are listed under that standard.

Ground water in the American Bottoms is moderate to very hard, ranging from 95 to 2,100 mg/L (milligrams per liter) hardness as $CaCO_3$. Sulfate concentrations ranged from 8 to 1,700 mg/L. Bruin and Smith (1953) defined the sulfate to hardness relationship as hardness = 1.1 x (SO_4) + 300 $\pm$ 70. This relation was fairly consistent with the exception of some sites in the northern part of the study area. Ground water generally is of the calcium-magnesium-bicarbonate type, but there is also some calcium-sulfate water. All analyses are listed in table 5.

Organic pesticides, polychlorinated biphenyls, and polychlorinated naphthalenes were analyzed in 15 samples collected during the December sampling. In one sample, the concentration of Dieldrin was 0.01 µg/L (micrograms per liter). No other organic constituents had concentrations at or above the detection limits of the analytical methods. Analytical detection limits are below the water-quality standards for all of the measured constituents.

Constituents with concentrations that exceed water-quality standards were mapped for discussion of the suitability of the ground water for discharge into surface waters or for such beneficial uses as irrigation and industrial or public water supplies. Figure 6 shows the wells in which concentrations of fluoride, nitrite + nitrate nitrogen, lead, sulfate, zinc, or mercury exceeded water-quality standards.

Illinois water-quality standards are written for nitrate-nitrogen and nitrite-nitrogen, however, analytical methods determine nitrite + nitrate nitrogen. For our analysis and comparison with the State water-quality standards, it was assumed that the nitrite + nitrate concentrations are primarily as nitrate-nitrogen. Nitrite + nitrate nitrogen concentrations exceeded Illinois' public water-supply standard for nitrate-nitrogen in 4 of the 63 wells. All four sites (map index numbers 12, 32, 39, and 46) were shallow driven wells, 25, 26, 28, and 49 feet deep, respectively.

Flouride concentrations exceeded the general water-quality standard of 1.4 mg/L in one well (map index number 14) and was near the standard in a second well (map index number 28). Both wells were drilled 100 to 120 feet into the alluvium. More than 98 percent of the samples were below the water-quality standard, ranging in concentrations from less than 0.1 to 0.6 mg/L.

Concentrations of lead were below analytical detection limits in 95 percent of the samples. In three wells (map index numbers 7, 18, and 32), dissolved lead concentrations exceeded the total-lead standards for public water supply (0.05 mg/L) and were equal to the total-lead standards for general and effluent water quality (0.1 mg/L). The three wells are several miles apart, yet all are in the southern part of the study area. The elevated concentrations of lead appear to be site specific, as wells in their vicinity do not contain concentrations in excess of the standards. The three wells are 14, 26, and 60 feet in depth.

Effluent and general water-quality standards for zinc (1.0 mg/L) were exceeded in five wells. Four of these wells are less than 35 feet deep and the fifth well is 120 feet deep. The high zinc concentrations were analyzed from samples in five wells (map index numbers 4, 7, 8, 15, and 22) which are located in the southeastern section of the study area.

The concentration of mercury in a sample from one well (map index number 18) was the only occurrence where mercury standards were exceeded. The 0.8 μg/L concentration exceeded both effluent and general water-quality standards for mercury (0.5 μg/L). The well from which the sample was collected is 60 feet deep.

Sulfate concentrations in the southwestern part of the American Bottoms are generally higher than elsewhere in the Bottoms. Eleven percent of all samples had concentrations that approached or exceeded the public water-supply standard (250 mg/L) (fig. 7). Anomalous sulfate concentrations more than double the standard are present in the southwestern part of the area near wells with concentrations less than 50 percent of the standard. Six percent of the sulfate concentrations exceeded the general water-quality standard of 500 mg/L. A normal probability distribution indicates ambient sulfate concentrations may reach approximately 600 mg/L in the American Bottoms.

Concentrations of three constituents--dissolved solids (residue on evaporation at 180°C), dissolved iron, and dissolved manganese--exceeded public water-supply standards for total concentrations in 67, 79, and 92 percent, respectively, of the wells sampled (fig. 8).

Dissolved Solids

Dissolved-solids concentrations (residue on evaporation at 180°C) ranged from 140 to 3,000 mg/L. The mean concentration was 661 mg/L for the initial sampling of 63 wells. Of the 30 wells sampled twice, the mean concentration of dissolved solids was 813 mg/L in the first sampling period, and 794 mg/L for the second sampling period. An upper limit of 500 mg/L is the public water-supply standard for Illinois. The distribution of wells in which sample concentrations exceeded this standard was widespread (fig. 9). A t-test analysis showed that the general increase in ground-water levels did not significantly decrease the mean concentration of dissolved solids in the American Bottoms.

Statistical analysis indicates that 67 percent of the dissolved-solids concentrations were greater than the public water-supply water-quality standards, whereas 11 percent exceeded the general water-quality standards (1,000 mg/L). However, a probability distribution suggests that ambient concentrations of dissolved solids in the American Bottoms may be high as 1,300 mg/L.

Iron

Concentrations of iron affect domestic and industrial water use. When exposed to air, iron oxidizes and precipitates. The precipitate can produce sludge deposits that require disposal, and even in low concentrations, the precipitate can cause reddish-brown stains. Seventy-nine percent of the water samples exceeded the Illinois public water-supply standard (300 µg/L), 76 percent exceeded the effluent standard (500 µg/L), and 75 percent exceeded the general standard (1,000 µg/L) for iron.

Dissolved-iron concentrations ranged from less than 3 to 82,000 µg/L. The mean concentration for the 63 wells sampled in September-October was 8,400 µg/L, and the median concentration for that period was 6,500 µg/L. The 30 wells sampled twice had mean concentrations of 11,100 µg/L in September-October and 10,900 µg/L in December. The general increase in ground-water levels between sampling rounds was associated with a mean decrease of 200 µg/L in dissolved-iron concentrations but t-tests show this decrease is not statistically significant. Concentrations in shallow (less than 55 feet deep) wells ranged from less than 3 to 13,000 µg/L. Concentrations in wells greater than 55 feet deep ranged from 10 to 82,000 µg/L. Deep wells underlain by Pennsylvanian rock generally had much lower concentrations (10 to 14,000 µg/L) than those underlain by Mississippian formations (400 to 82,000 µg/L) (fig. 10).

Although the data were not evenly distributed, statistical analysis of concentration data from all 63 wells indicates that ambient iron concentrations in ground water in the American Bottoms may be as high as 45,000 μg/L.

Manganese

Water samples from 58 of the 63 wells had concentrations of manganese in excess of 50 μg/L, the Illinois public water-supply standard, whereas only 6 samples had concentrations that exceeded the effluent and general water-quality standards. Concentrations of manganese ranged from less than 10 to 4,700 μg/L during the September-October sampling round. The mean sample concentration from the December sampling was 730 μg/L, a slight increase from the 660 μg/L mean concentration of those same wells from the September-October sampling period.

Manganese is similar to iron in its chemical behavior and occurrence in water. The concentration of manganese was greater in deeper wells than in shallower wells. Manganese concentrations in samples from wells underlain by Pennsylvanian-age rocks were also lower than those underlain by Misssissippian-age formations (fig. 11), but these differences were not as pronounced as with iron concentrations.

The dissolved manganese concentrations exceeded Illinois public water-supply standards for total manganese in 92 percent of the wells sampled.

RELATION OF WATER QUALITY TO WATER USE

Although Illinois has no specific water-quality standards for industrial and irrigation uses, it does prescribe general water-quality standards. The general standards are designed to protect the State's water for aquatic life, agricultural uses, primary and secondary contact uses, industrial uses, and to ensure the aesthetic quality of the State's aquatic environment (Illinois Environmental Protection Agency, 1980). Figure 12 shows those wells in which one or more constituents exceed Illinois general water-quality standards. The potential for use of these waters in industry and agriculture would require that the quality of the source water be adequate for the intended use. McKee and Wolf (1963) compiled water-quality criteria for public, industrial, and irrigation supplies, which may be used as a guide for evaluating water supplies for specific uses.

Figure 13 shows those wells in which constituents exceeded Illinois public water-supply standards. The public water-supply standards are in addition to the general standards described previously. Public water-supply standards are designated for any point at which water is withdrawn for treatment and distribution as a potable supply or for food processing. Waters to be used for human consumption, either directly or through processing of food products, must meet these standards.

The State of Illinois effluent standards prescribe the maximum concentrations of various constituents that may be discharged to the waters of the State. Five constituents--iron, lead, manganese, mercury, and zinc--exceeded these standards in 48, 3, 6, 1, and 5 wells, respectively. Figure 14 shows those wells in which these standards were exceeded. Should a dewatering scheme include wells high in these constituents, compliance with effluent standards shall be necessary if the water is to be discharged into a surface-water body.

Although pumpage is decreasing, ground water in the American Bottoms is presently widely used, and the potential for continued development is evident. Continued or expanded use will necessitate compliance with the general, public water-supply, or effluent standards, dependent on ultimate use of the resource. As such, a specific treatment scheme for the pumped ground water cannot be made until a particular plan for dewatering is determined.

SUMMARY AND CONCLUSIONS

The American Bottoms in southwestern Illinois has had elevated ground-water levels since the 1970's. Decreasing use of the ground-water resource, increased precipitation, and elevated stages in the Mississippi River have contributed to sustained high ground-water levels which have resulted in flooded basements, property damage, and several sewer-line breaks. A dewatering system has already been installed along portions of an interstate highway in this area.

The U.S. Army Corps of Engineers is examining the feasibility of reducing these damages by a partial dewatering of the aquifer. Ground-water quality data were collected to evaluate conditions which may affect implementation of a dewatering scheme. Water samples were collected from 63 wells that penetrate the sand and gravel deposits to depths of from 14 to 125 feet. The 63 wells were initially sampled in September-October 1982, when ground-water levels appeared to be at their highest for the year. Analysis of the September-October data, with emphasis on organic carbon, nitrite + nitrate nitrogen, metals, and dissolved solids, was the basis for selecting 30 of the sites to be sampled a second time.

Water samples from 30 of the original 63 wells were collected again in December 1982, shortly after a period of heavy precipitation that produced generally higher ground-water levels than during the September-October period. Changes in constituent concentrations could not be correlated to changes in ground-water levels from September through December 1982.

Most ground-water constituent concentrations in the American Bottoms were below Illinois water-quality standards. The ground water is generally of the calcium-magnesium-bicarbonate type, but some calcium-sulfate waters are present. Water samples from 15 wells contained no concentrations of organic pesticides, polychlorinated biphenyls, and polychlorinated naphthalenes greater than the analytical detection limits, except for one sample in which the Dieldrin concentration was analyzed at 0.01 μg/L (the analytical detection limit). Concentrations of sulfate, fluoride, dissolved solids, nitrite + nitrate nitrogen, iron, lead, manganese, mercury, and zinc, exceeded Illinois water-quality standards. Concentrations of fluoride, nitrite + nitrate nitrogen, lead, zinc, mercury, and sulfates exceeded one or more State standards in from one to nine of the 63 wells sampled. These wells were all located in the southern part of the American Bottoms.

Concentrations of dissolved solids, manganese, and iron exceeded Illinois public water-supply standards in 67, 92, and 79 percent of the samples, respectively. Statistical analyses of the data indicate, however, that the high concentrations generally are within a baseline range of concentrations in the American Bottoms.

Dewatering schemes probably will not limit beneficial uses of ground water for public, industrial, and irrigation supplies. Treatment processes can increase the suitability of this resource for the public and private sector. No general treatment scheme can be adapted to all wells in the American Bottoms, because treatment needs are site specific and are related to the intended use of the water.

REFERENCES

Baker, W. H., Jr., 1972, Groundwater levels and pumpage in the East St. Louis Area, Illinois, 1967-1971: Illinois State Water Survey Circular 112, 29 p.

Bergstrom, R. E., and Walker, T. R., 1956, Ground-water geology of the East St. Louis area, Illinois: Illinois State Geological Survey Report of Investigation 191, 33 p.

Bruin, Jack, and Smith, H. F., 1953, Preliminary investigation of groundwater resources in the American Bottoms in Madison and St. Clair Counties, Illinois: Illinois State Water Survey Report of Investigation 17, 28 p.

Emmons, J. T., 1979, Groundwater levels and pumpage in the East St. Louis area, Illinois, 1972-1977: Illinois State Water Survey Circular 134, 23 p.

Goerlitz, D. F., and Brown, E., 1972, Methods for analysis of organic substances in water, Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A3, 40 p.

Illinois Environmental Protection Agency, 1980, Illinois Water Quality Inventory Report, 1978-79, Volume I: State of Illinois Environmental Protection Agency, Springfield, Ill. Appendix F.

Illinois Pollution Control Board, 1977, Illinois Pollution Control Board rules and regulations, Chapter 3, Water pollution: Springfield, Ill., 54 p.

McKee, J. E., and Wolf, H. W., 1963, Water quality criteria: Publication No. 3-A, California State Water Resources Control Board, 548 p.

Reitz, G. E., Jr., 1968, Groundwater levels and pumpage in the East St. Louis area, Illinois, 1962-1966: Illinois State Water Survey Circular 95, 30 p.

SAS Institute, Inc., 1979, SAS User's Guide, 1979 Edition: Raleigh, North Carolina, 494 p.

Schicht, R. J., 1965, Ground-water development in East St. Louis area, Illinois: Illinois State Water Survey Report of Investigation 51, 70 p.

----- 1977, The effect of precipitation scavenging of airborne and surface pollutants on surface and groundwater quality in urban areas--Final Report - Part 1 Groundwater studies: Illinois State Water Survey, 50 p.

Schicht, R. J., and Jones, E. G., 1962, Ground-water levels and pumpage in East St. Louis area, Illinois, 1890-1961: Illinois State Water Survey Report of Investigation 44, 39 p.

Searcy, J. K., Baker, R. C., and Durum, W. H., 1952, Water resources of the St. Louis area, Missouri and Illinois: U.S. Geological Survey Circular 216, 55 p.

Skougstad, M. W., Fishman, M. J., Friedman, L. C., Erdmann, D. E., and Duncan, S. S., 1979, Methods for determination of inorganic substances in water and fluvial sediments: Techniques of Water-Resources Investigations of the U.S. Geological Survey, Book 5, Chapter A1, 626 p.

U.S. Army Corps of Engineers, St. Louis District, 1979, Reconnaissance report, American Bottoms groundwater study: Water Resources Investigation, 81 p.

Wehrmann, H. A., 1979, Groundwater conditions in the Cahokia Canal Drainage area: Illinois State Water Survey, 85 p.

FIGURES 1-14; TABLES 1-5

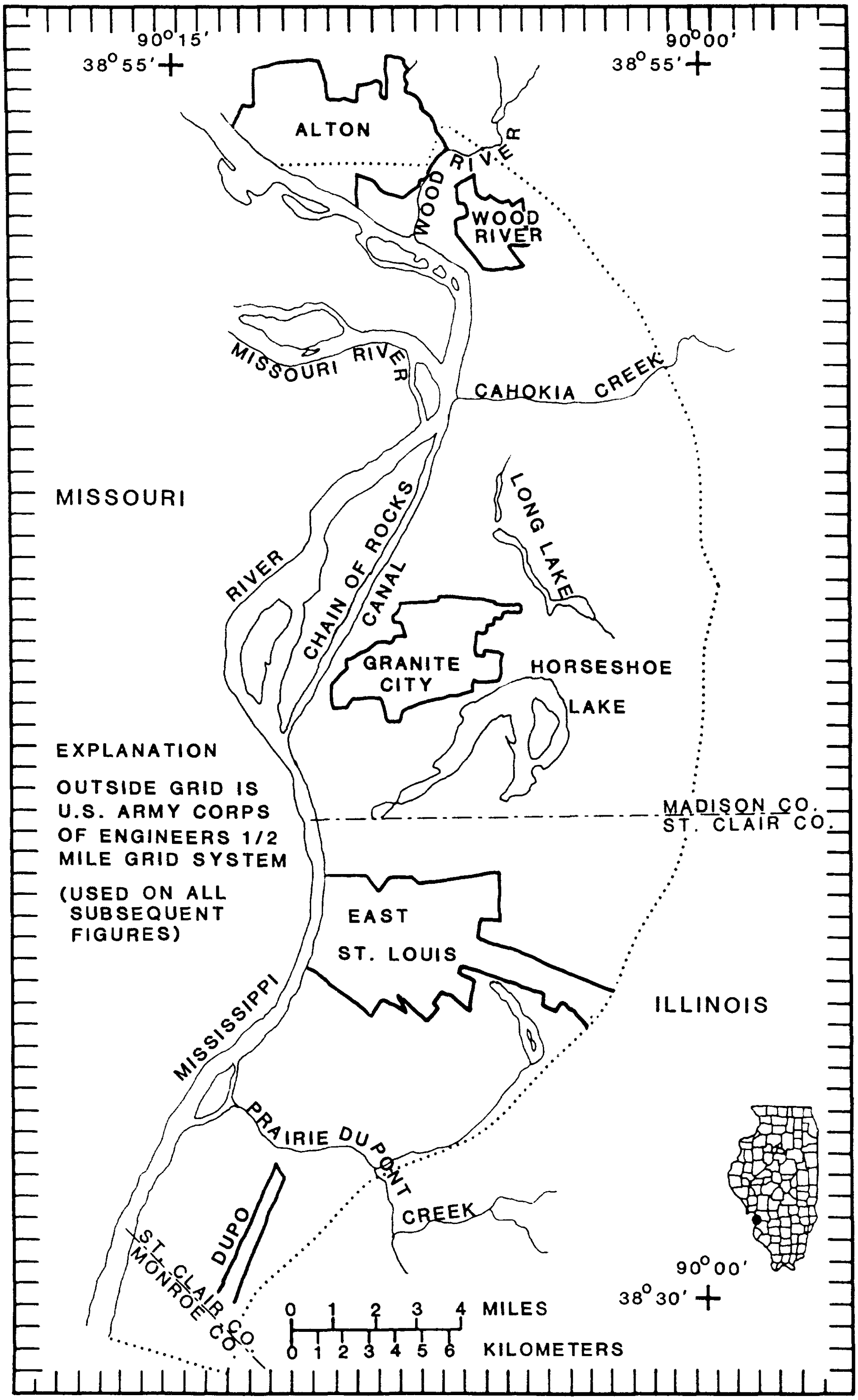

Figure 1.--Location of the American Bottoms.

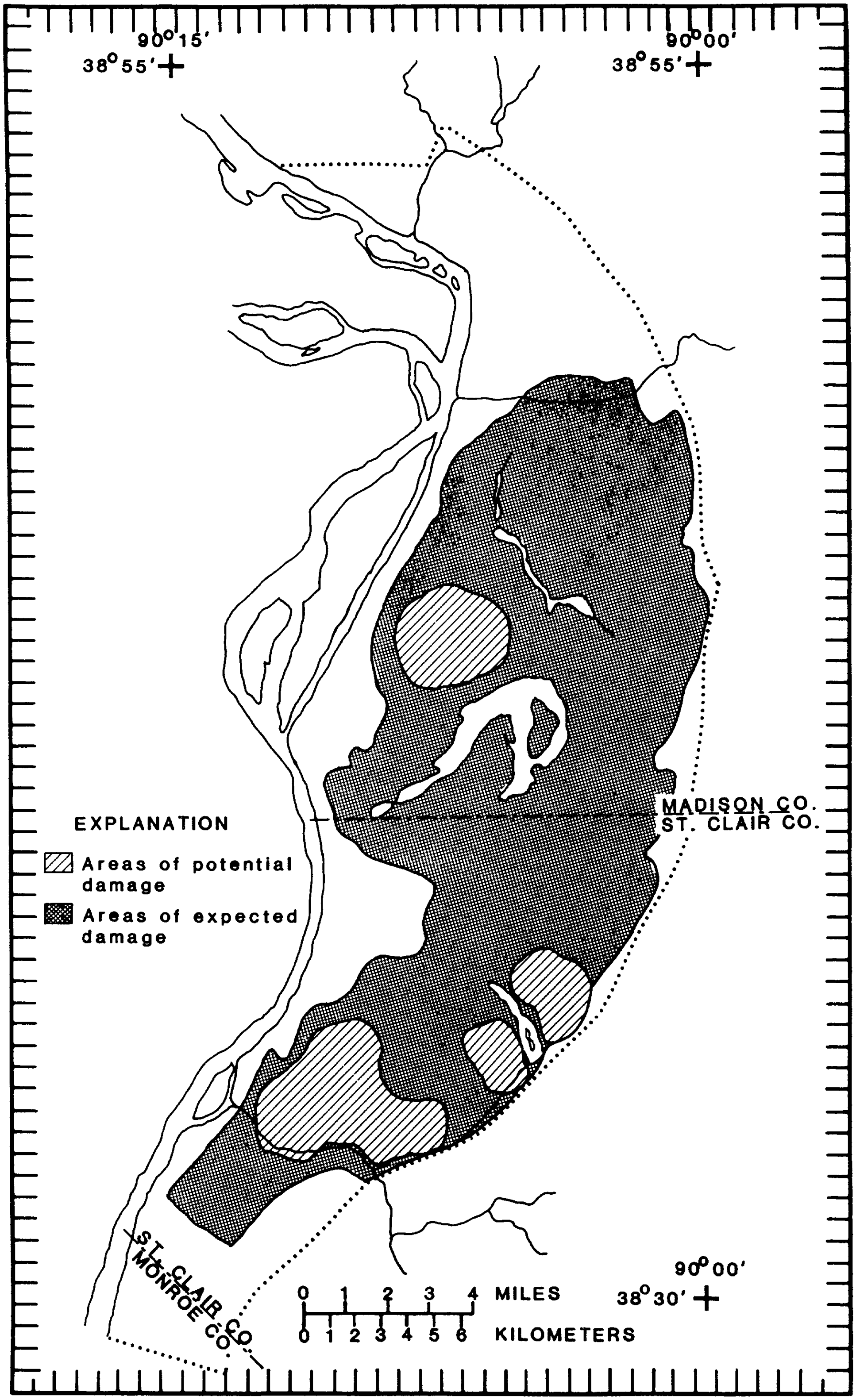

Figure 2.--Potential damage areas due to high ground-water levels.

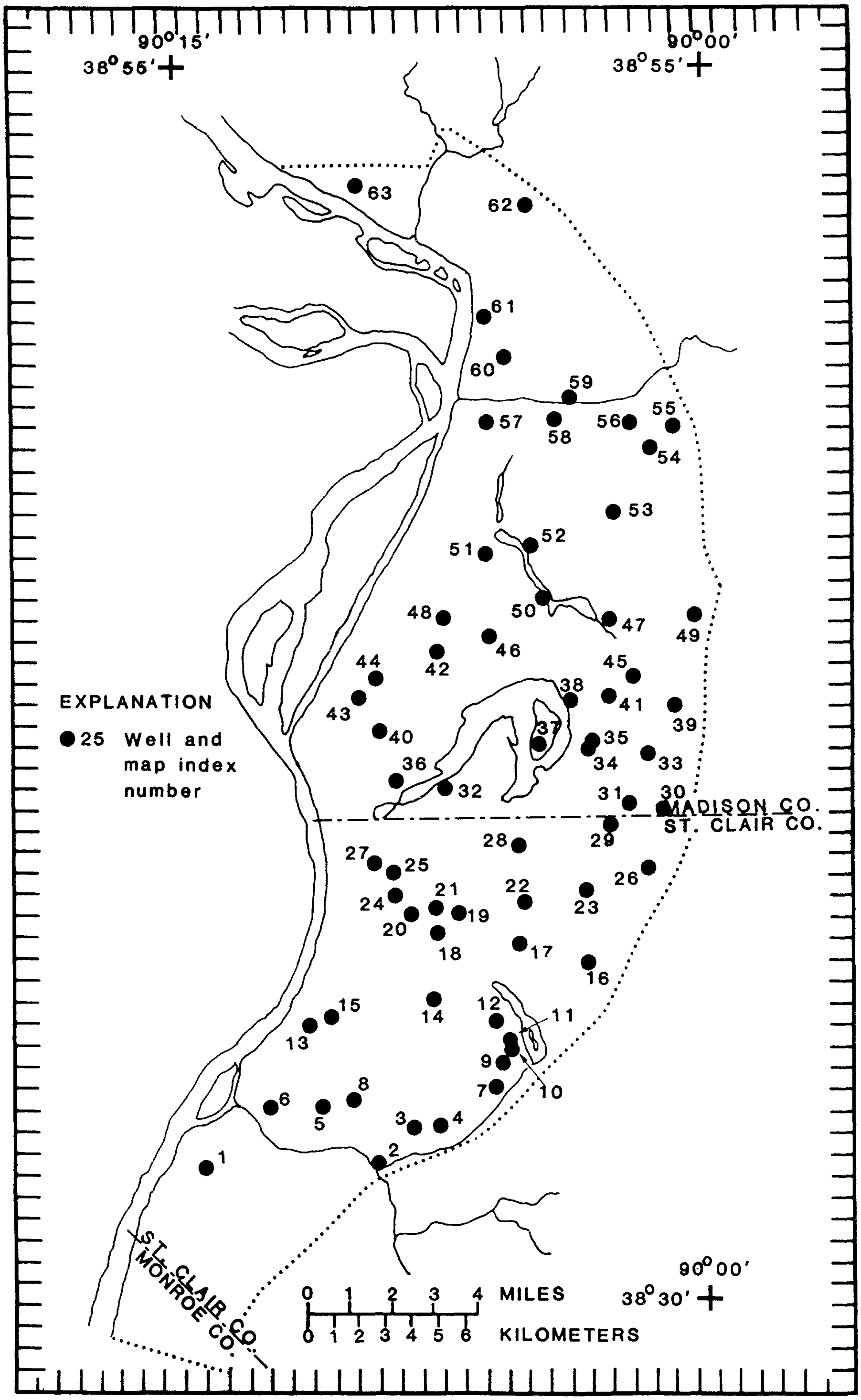

Figure 3.--Well locations in the American Bottoms.

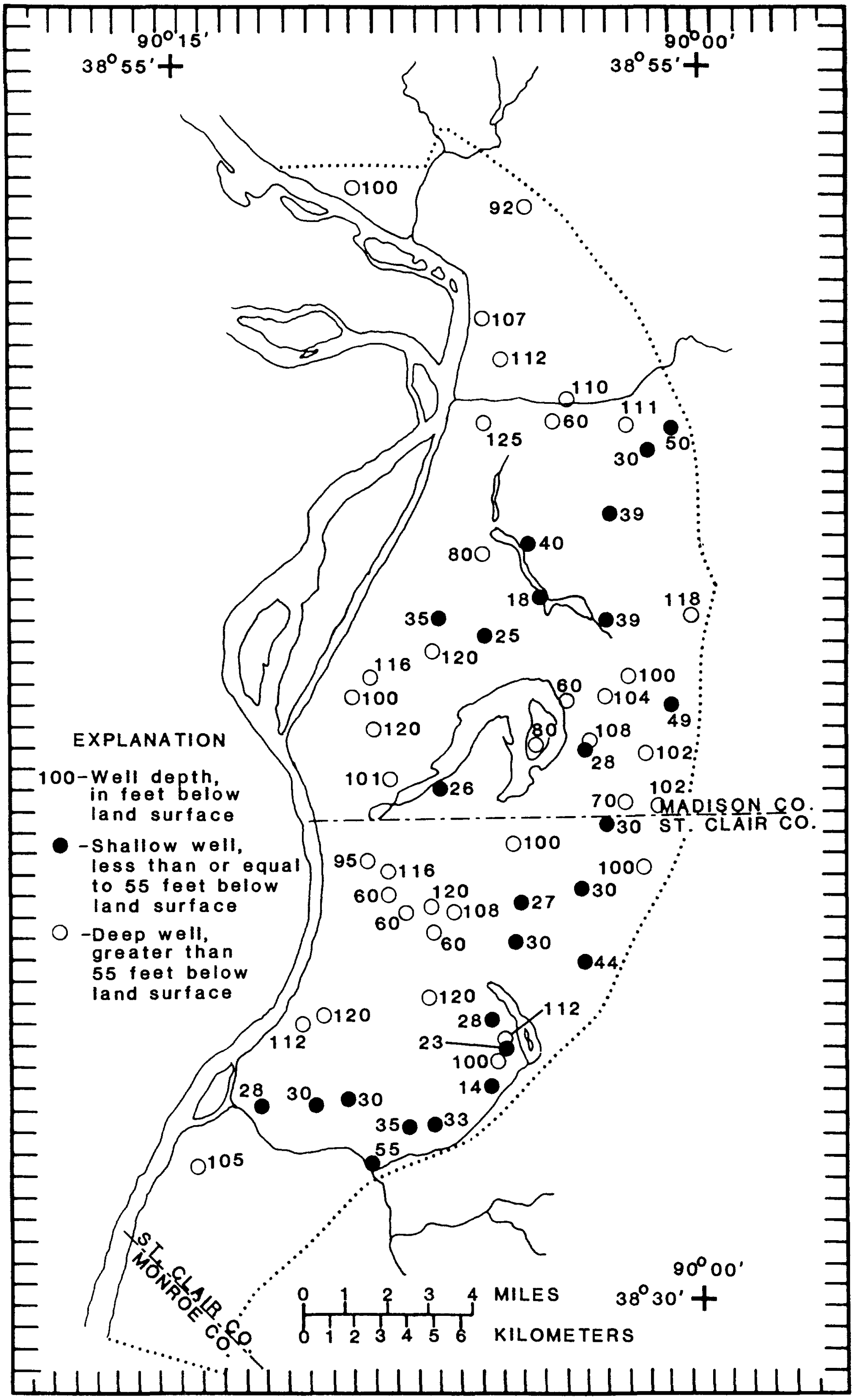

Figure 4.--Depth of wells, in feet, in the American Bottoms.

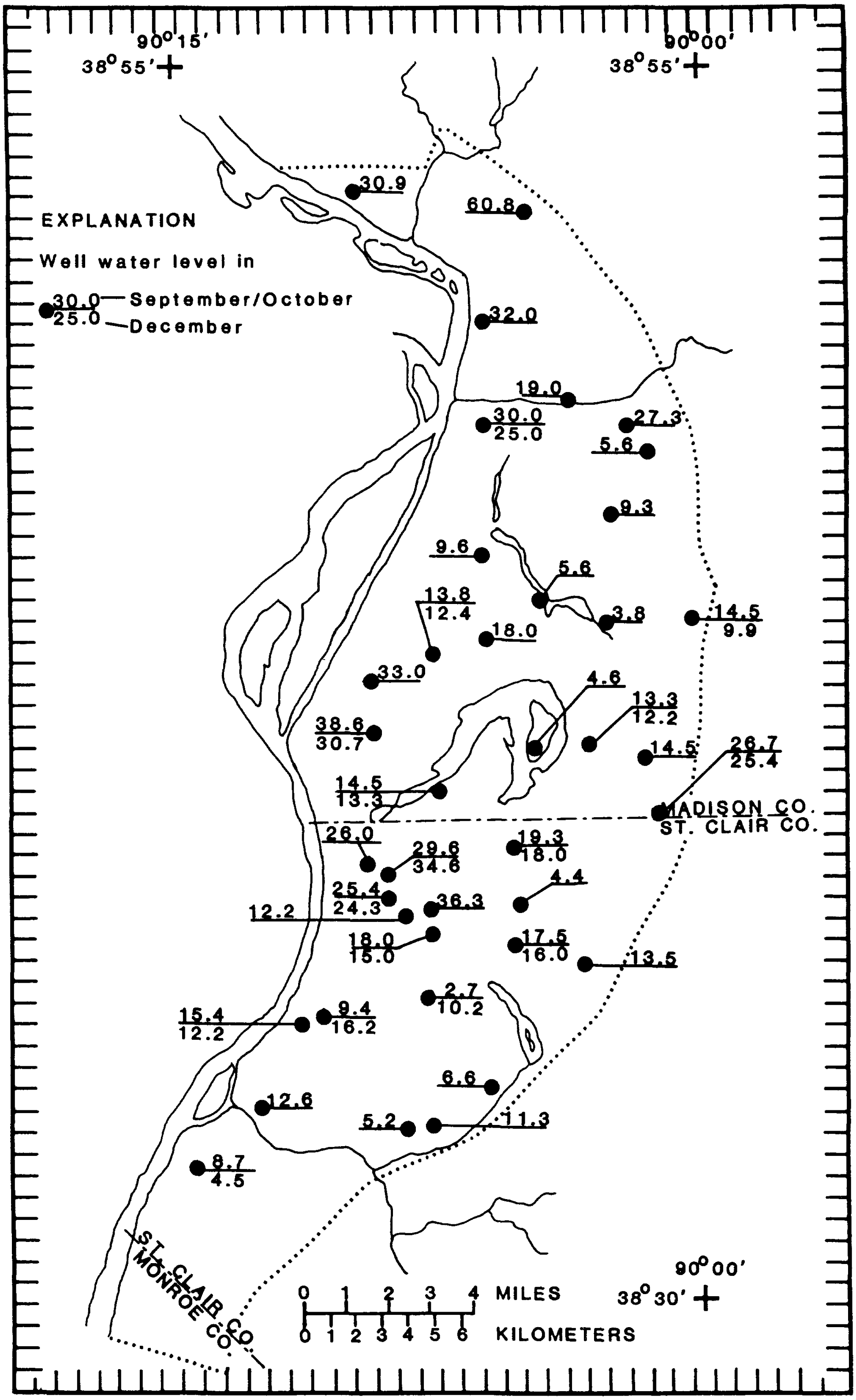

Figure 5.--Depth to water surface, in feet below land surface, in the American Bottoms.

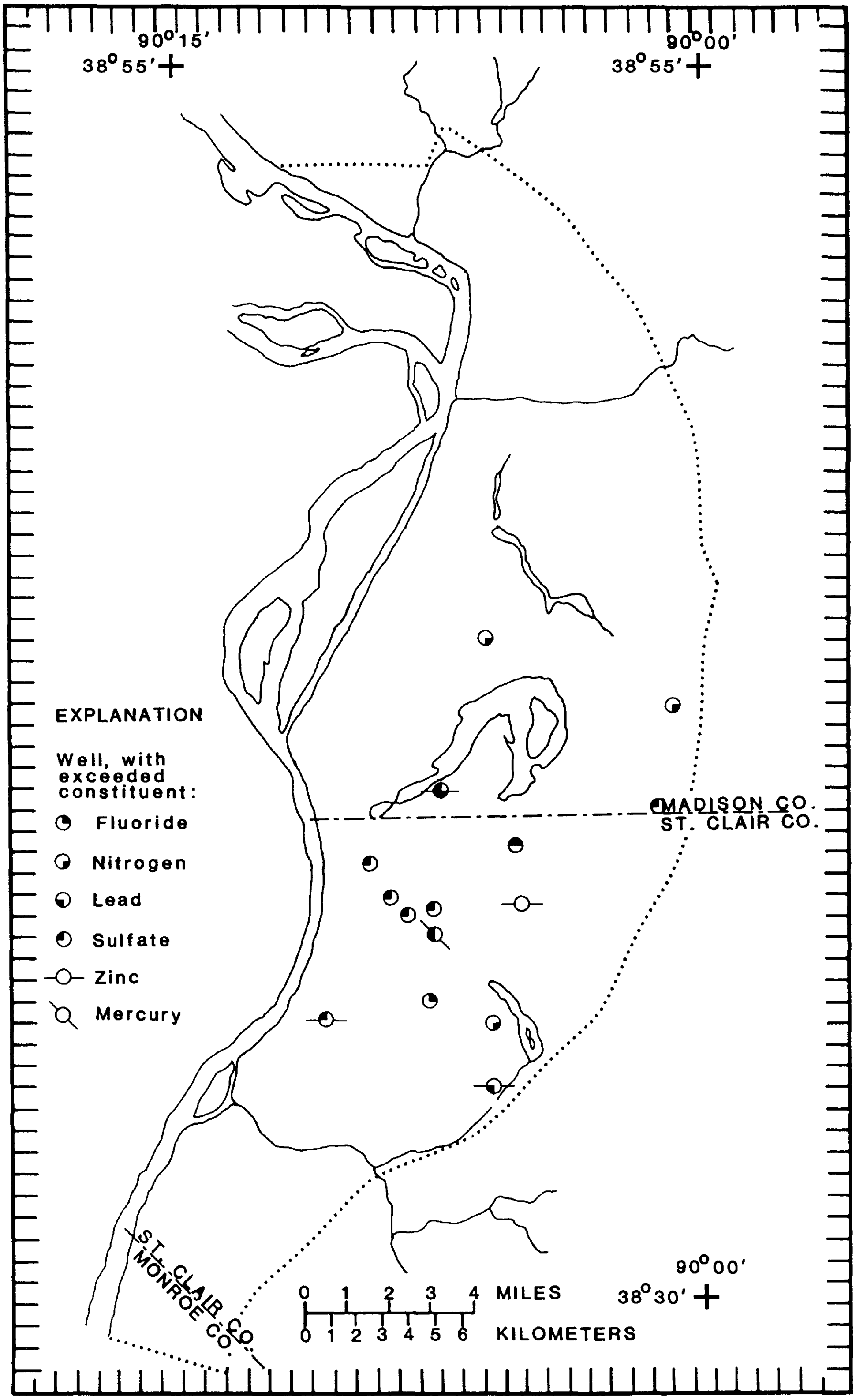

Figure 6.--Wells in which concentrations of fluoride, nitrate + nitrite nitrogen, lead, sulfate, zinc, or mercury exceed Illinois water-quality standards.

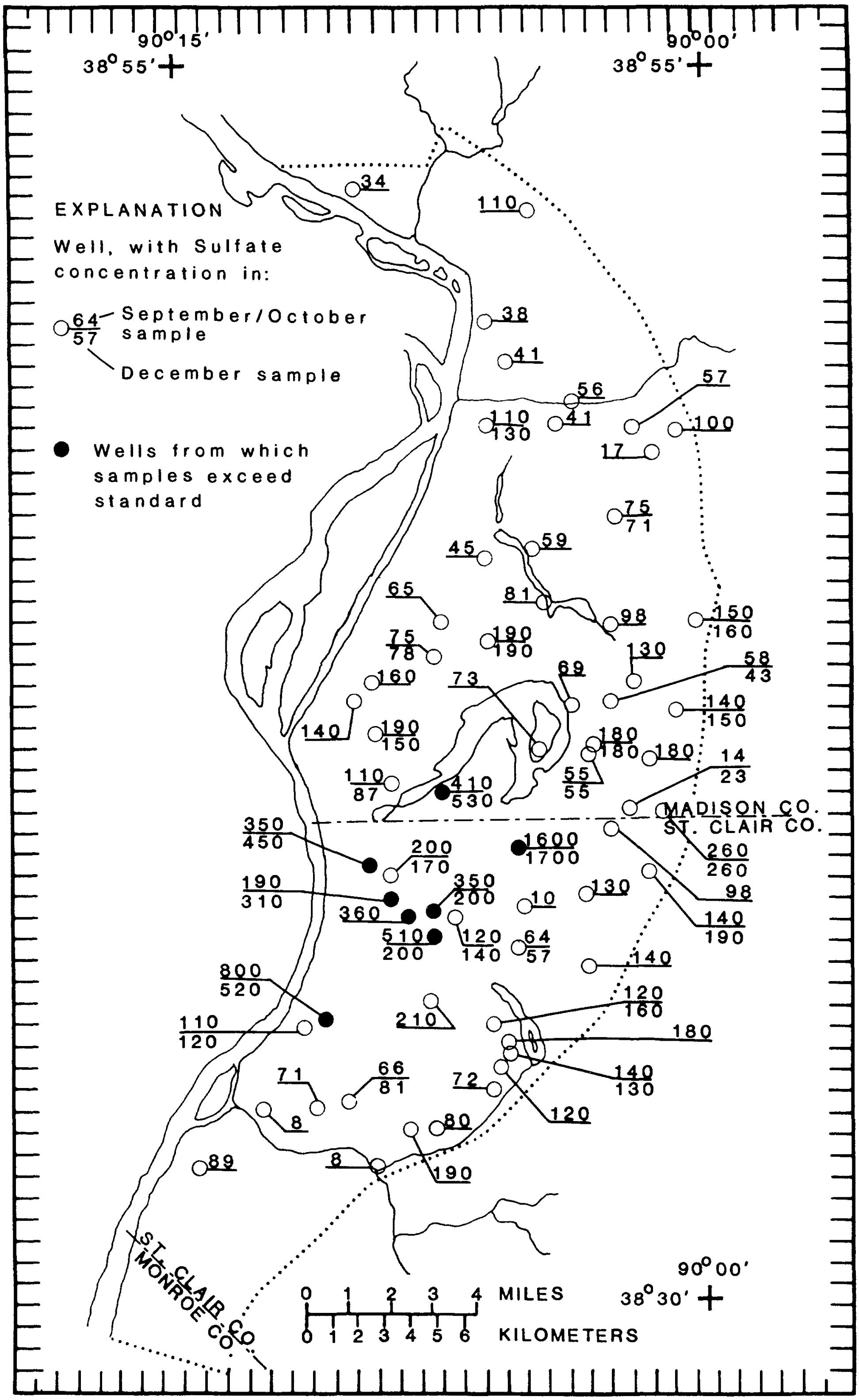

Figure 7.--Areal distribution of sulfate; concentrations in milligrams per liter.

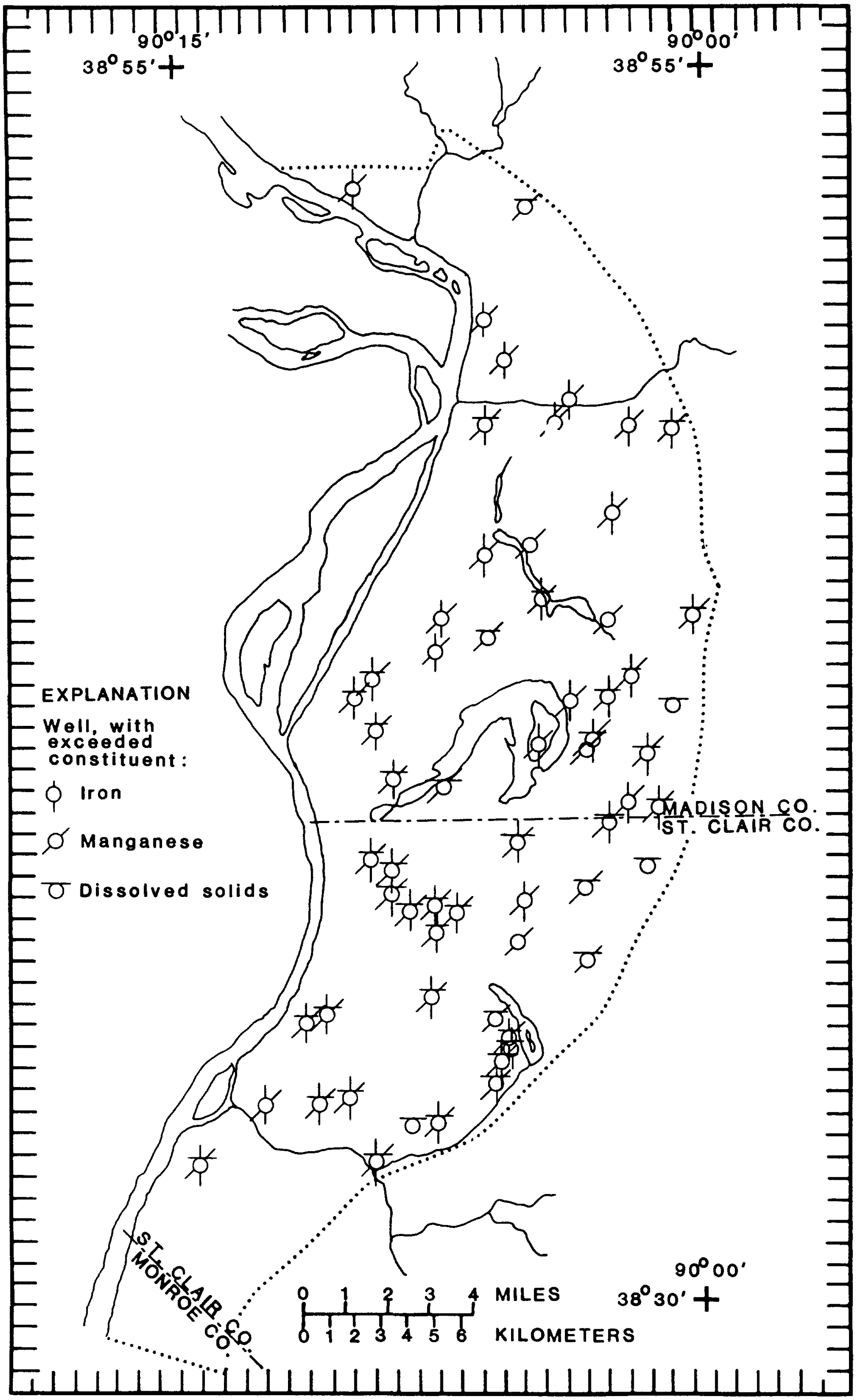

Figure 8.--Wells in which concentrations of iron, manganese, or dissolved solids exceed Illinois water-quality standards.

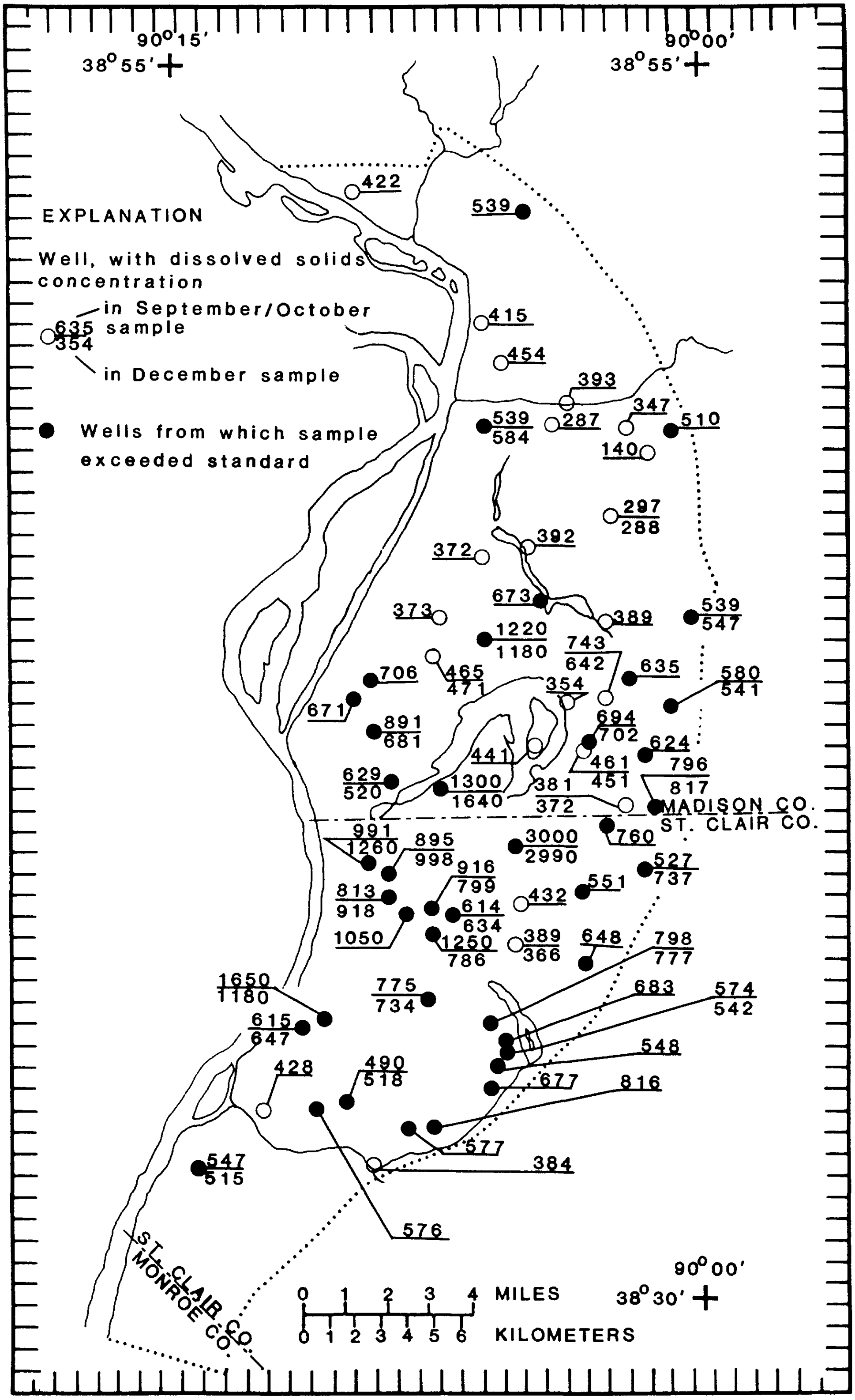

Figure 9.--Areal distribution of dissolved solids (residue on evaporation at 180°C); concentrations in milligrams per liter.

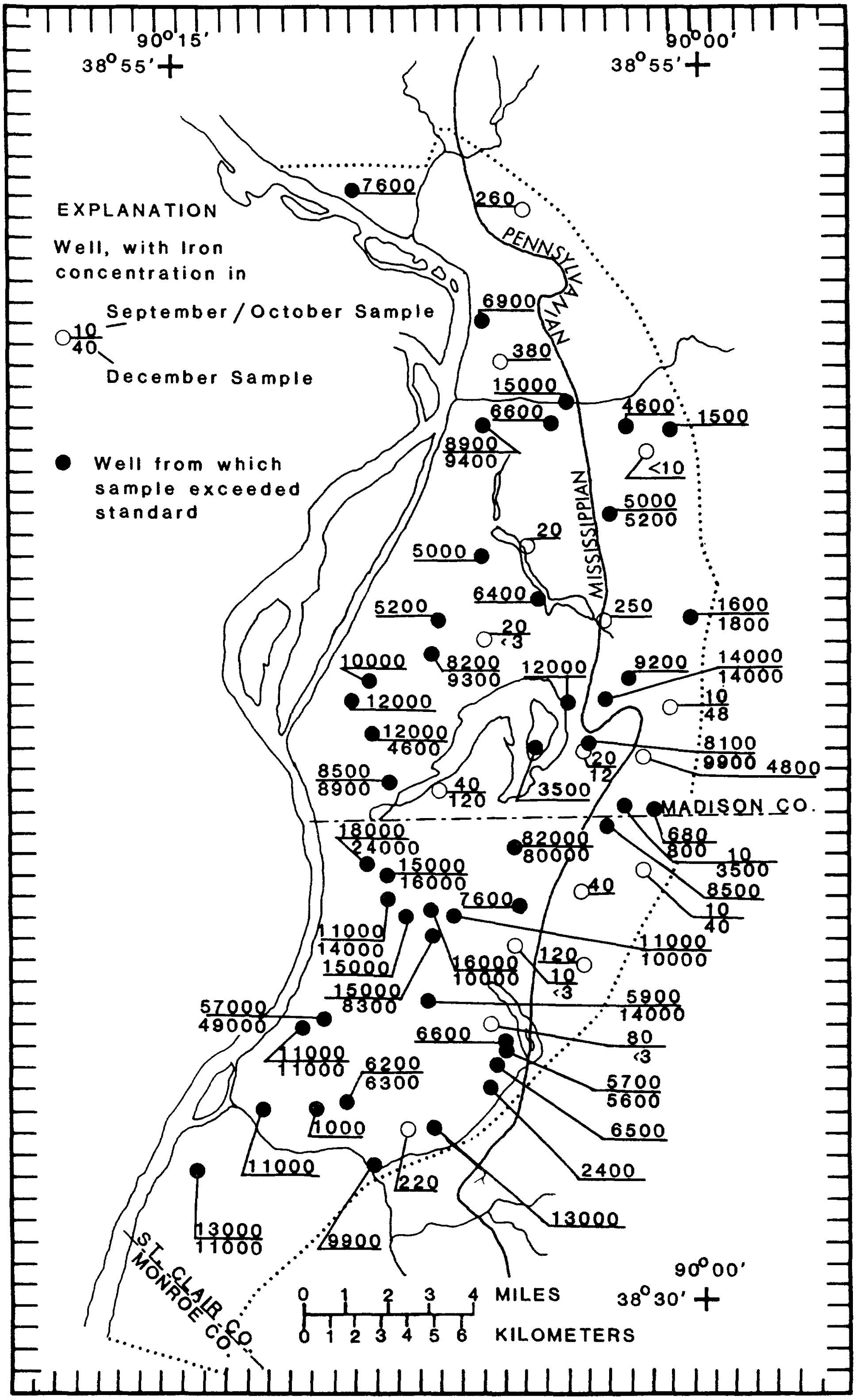

Figure 10.--Areal distribution of iron; concentrations in micrograms per liter.

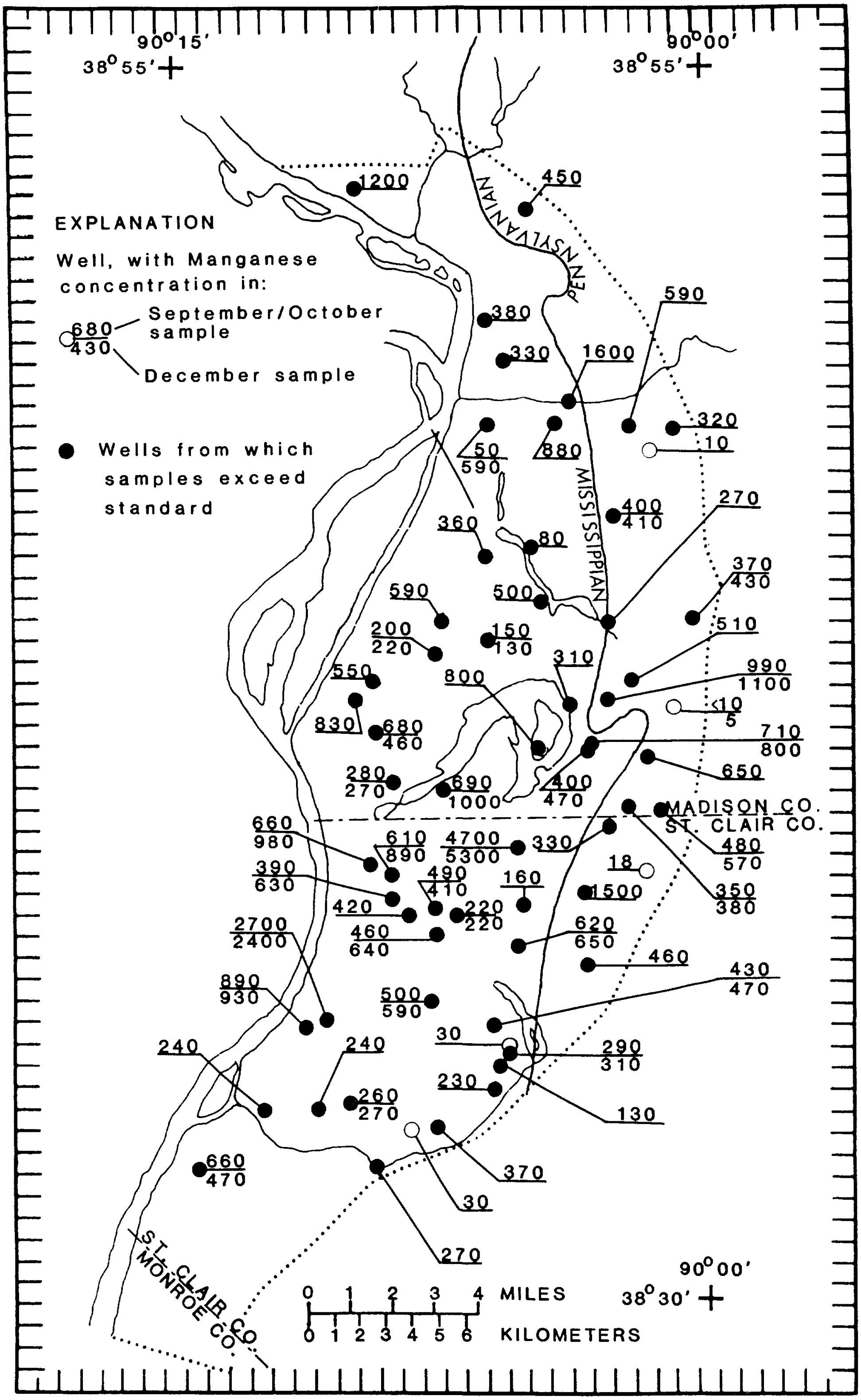

Figure 11.--Areal distribution of manganese; concentrations in micrograms per liter.

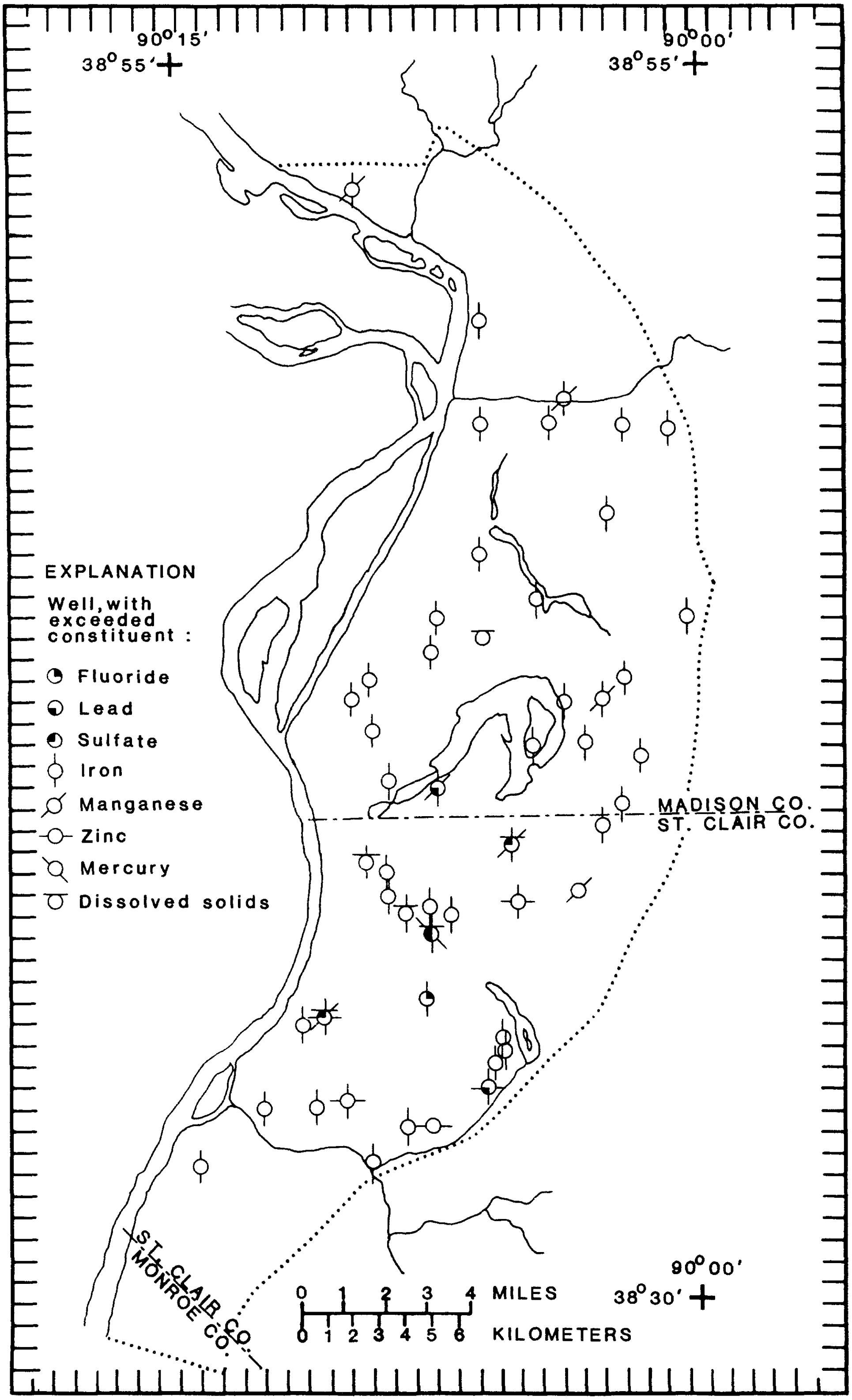

Figure 12.--Wells in which constituents exceed Illinois general water-quality standards.

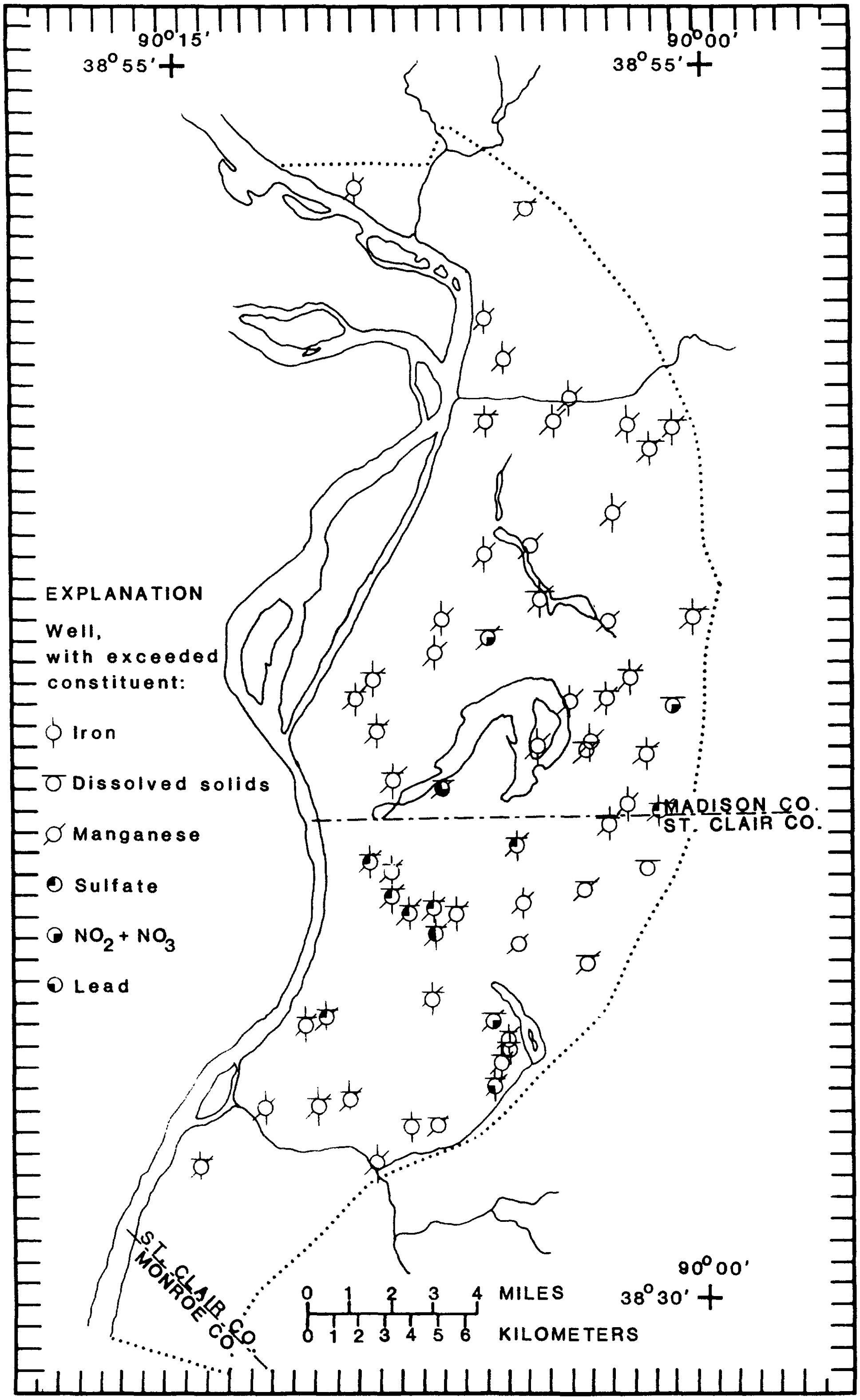

Figure 13.--Wells in which constituents exceed Illinois public water-supply standards.

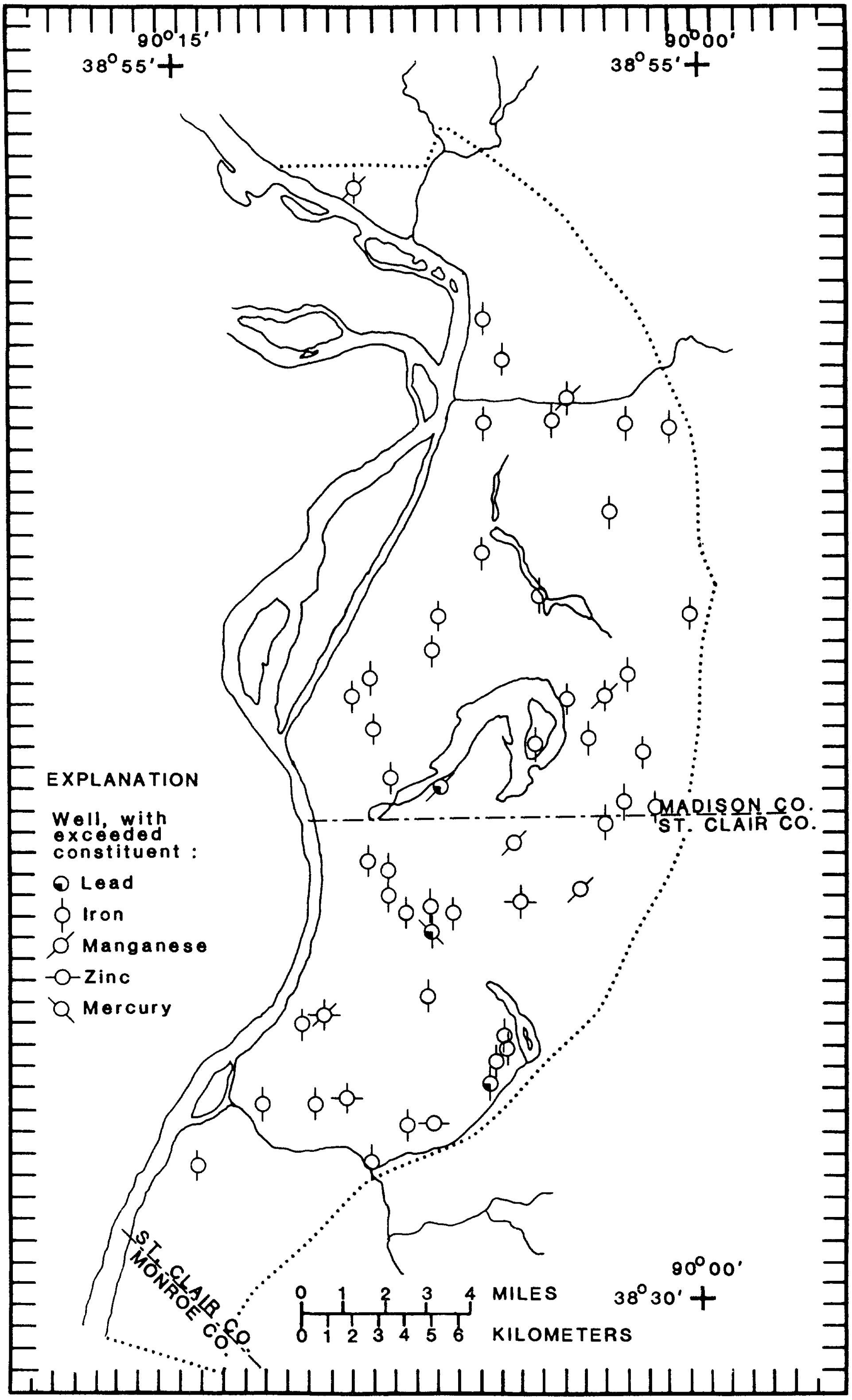

Figure 14.--Wells in which constituents exceed Illinois effluent water-quality standards.

Table 1.--Well information

[Map index number refers to location in fig. 3]

Map index number	USGS number	Depth in feet	Pump	Primary use of well
1	383210090132001	105	T	IR
2	383235090090901	55	J	PND
3	383318090081101	35	J	PND
4	383325090073901	33	N	PND
5	383341090104301	30	J	PND
6	383342090115601	28[a]	H	PND
7	383357090060901	14	N	PND
8	383357090094601	30[a]	J	PND
9	383442090055301	100[a]	T	PND
10	383454090053901	112	T	IR
11	383454090053902	23	J	PD
12	383515090055401	28	J	PD
13	383519090104701	112	T	I
14	383552090073501	120	T	I
15	383559090101501	120	T	I
16	383639090032801	44	J	PND
17	383709090052001	30	J	PD
18	383725090072301	60	T	PND
19	383740090065901	108	T	IR
20	383741090081701	60	T	PND
21	383747090073601	120	T	I
22	383750090050501	27	N	PND
23	383800090034401	30[a]	J	PD
24	383804090084601	60	T	PND
25	383820090082501	116	T	I
26	383837090015901	100	H	PD
27	383839090090501	95	T	PND
28	383847090053301	100[a]	T	I
29	383927090025201	30[a]	J	PND
30	383933090012201	102	T	PWS
31	383954090022101	70	T	PND
32	384017090072801	26	J	PD
33	384031090021201	102	T	IR
34	384055090032101	28	J	PD
35	384055090032102	108	J	IR

Table 1.--Well information--Continued

Map index number	USGS number	Depth in feet	Pump	Primary use of well
36	384055090083801	101	T	IR
37	384058090044901	80	H	PD
38	384147090040001	60[a]	J	PD
39	384151090012201	49	J	PND
40	384152090085001	120[a]	T	I
41	384158090025101	104	T	PD
42	384211090065501	120	T	IR
43	384215090093401	100[a]	T	PND
44	384225090090001	116	T	PND
45	384235090020901	100[a]	T	IR
46	384320090060901	25	J	PND
47	384340090024401	39	J	PND
48	384341090070601	35	J	PND
49	384350090005801	118	T	IR
50	384356090042001	18	J	PND
51	384454090060001	80[a]	T	IR
52	384510090045501	40	J	PD
53	384604090025201	39	J	PD
54	384646090014901	30	H	PND
55	384733090011801	50	T	PND
56	384746090022201	111	T	PWS
57	384750090055701	125	T	I
58	384756090040401	60	J	PND
59	384838090035801	110	T	PWS
60	384915090054101	112	T	PND
61	385000090055601	107	T	PWS
62	385211090045401	92	T	PWS
63	385255090093301	100	T	I

Explanation:

a - estimated depth
N - no pump on well, sampled using peristaltic pump
H - hand pump
T - turbine pump
J - jet pump
PND - private, nondrinking
PD - private, drinking
PWS - public water supply
I - industrial
IR - irrigation

Table 2.--Summary

	Conductance (μmhos)	Hardness (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Alkalinity (mg/L)	Sulfate (mg/L)
							September-63
Minimum	201	95	27	6.7	4.1	62	8.0
Mean	934	480	130	39	24	340	160
Maximum	3,180	2,100	500	200	110	560	1,600
							September-30
Minimum	442	210	55	18	6.5	130	14
Mean	1,110	570	150	47	31	350	240
Maximum	3,180	2,100	500	200	110	560	1,600
							December 30
Minimum	455	190	51	16	6.6	130	23
Mean	1,170	550	140	45	27	350	230
Maximum	3,300	1,900	490	160	70	560	1,700
							State of Illinois
Public Water Supply							250
Effluent							
General Water Quality							500

* Standard for nitrate-nitrogen.
[1] Illinois Pollution Control Board, 1977.
[2] Standard for total constituent although analyzed for dissolved constituent.

of chemical analyses

Chloride (mg/L)	Fluoride (mg/L)	Dissolved (mg/L)	NO_2+NO_3 Nitrogen (mg/L)	Total phosphate (mg/L)	Iron (μg/L)	Manganese (μg/L)	Mercury (μg/L)	Zinc (μg/L)
October samples samples								
1.1	0.1	140	<0.1	0.02	<10	<10	<0.1	10
32	.4	661	---	.37	8,400	560	---	260
170	3.0	3,000	31	1.5	82,000	4,700	0.4	2,900
October samples samples								
5.4	0.2	297	<0.1	0.04	10	10	<0.1	10
42	.4	813	---	.4	11,000	660	---	190
170	3.0	3,000	31	1.5	82,000	4,700	.4	2,700
samples samples								
2.9	0.2	288	<0.1	0.02	<3	5	<0.1	4
44	.5	794	---	.2	11,000	730	---	220
170	5.4	2,900	25	2.1	80,000	5,300	.8	2,200
water-quality standards[1]								
250		500	10*		[2]300	[2]50		
	[2]15				500	[2]1,000	[2]0.5	[2]1,000
500	[2]1.4	1,000			[2]1,000	[2]1,000	[2]0.5	[2]1,000

Table 3.--Water-quality standards for Illinois

[Illinois Pollution Control Board, 1977]

	Public water supply (mg/L)	Effluent (mg/L)	General[1] (mg/L)
Arsenic (total)	0.1	0.25	1.0
Cadmium (total)	.01	.15	.05
Chloride	250	--	500
Chromium (total)	.05	--	--
Chromium (total hexavalent)	--	.3	.05
Chromium (total trivalent)	--	1.0	1.0
Copper (total)	--	1.0	.02
Fluoride (dissolved)	--	--	1.4
Fluoride (total)	--	15	--
Iron (total)	.3	2.0	1.0
Iron (dissolved)	--	.5	--
Lead (total)	.05	.1	.1
Manganese (total)	.05	1.0	1.0
Mercury (total)	--	.0005	.0005
Nitrate-Nitrogen	10	--	--
Nitrite-Nitrogen	1	--	--
pH	--	range 5-10	--
Zinc (total)	--	1.0	--
Zinc (dissolved)	--	--	1.0
Sulfate	250	--	500
Total Dissolved Solids	500		1,000
Organics			
Pesticides			
Chlorinated Hydrocarbon Insecticides			
Aldrin	.001	--	--
Chlordane	.003	--	--
DDT	.05	--	--
Dieldrin	.001	--	--
Endrin	.0005	--	--
Heptachlor	.0001	--	--
Heptachlor Epoxide	.0001	--	--
Lindane	.005	--	--
Methoxychlor	.1	--	--
Toxaphene	.005	--	--

[1]General standards are designed to protect the State's water for aquatic life, agricultural use, primary and secondary contact use, most industrial uses, and to ensure the aesthetic quality of the State's aquatic environment.

Table 4.--Constituents that exceed Illinois water-quality standards

Constituent	Number of wells in which standard is exceeded		
	Public water-supply standards	Effluent standards	General[1] water-quality standards
Sulfate, dissolved (as SO_4)	9	--	4
Fluoride, dissolved (as F)	--	--	1
Solids, residue at 180°C, dissolved	42	--	7
Nitrogen, NO_2 + NO_3 dissolved (as N)*	4	--	--
Iron, dissolved (as Fe)	50	48	47
Lead, dissolved (as Pb)	3	--	--
Manganese, dissolved (as Mn)	58	6	6
Mercury (as Hg)	--	1	1
Zinc, dissolved (as Zn)	--	5	5

*Compared with standard for nitrate-nitrogen

[1]General standards are designed to protect the State's water for aquatic life, agricultural use, primary and secondary contact use, most industrial uses, and to ensure the aesthetic quality of the State's aquatic environment.

Table 5.--Data tables

Map index number	Station number	Date of sample	Time	Depth below land surface (water level) (feet)	Specific conductance (μmhos)	pH (standard units)	Temperature (deg C)	Color (platinum-cobalt units)	Hardness (mg/L as $CaCO_3$)	Hardness, noncarbonate (mg/L $CaCO_3$)
1	383210090132001	82-09-22	1100	8.70	905	6.6	14.5	1	410	17
		82-12-15	1230	4.50	839	6.7	14.0	6	410	41
2	383235090090901	82-09-22	1430	--	685	6.5	14.2	4	340	0
3	383318090081101	82-10-05	1645	5.20	801	6.8	15.5	9	470	39
4	383325090073901	82-10-05	1600	11.30	1040	7.2	15.0	6	630	177
5	383341090104301	82-10-06	1330	--	741	6.8	16.3	8	410	136
6	383342090115601	82-10-06	1145	12.60	642	6.6	14.6	18	390	0
7	383357090060901	82-09-30	1720	6.60	1040	6.8	15.4	6	510	0
8	383357090094601	82-10-05	1400	--	718	6.8	14.9	5	390	45
		82-12-15	1045	--	848	6.8	15.0	7	390	35
9	383442090055301	82-09-29	1100	--	804	6.9	14.7	5	410	107
10	383454090053901	82-09-22	1800	--	938	6.8	14.2	4	450	122
11	383454090053902	82-09-22	1830	--	834	7.0	15.7	<1	460	117
		82-12-15	1400	--	838	7.0	13.0	5	410	77
12	383515090055401	82-09-29	1215	--	1130	6.6	16.8	9	440	105
		82-12-15	1330	--	1180	6.5	13.5	7	440	105
13	383519090104701	82-10-05	1100	15.40	943	6.4	15.1	6	480	68
		82-12-15	0945	12.20	1050	6.6	15.0	7	470	44
14	383552090073501	82-09-30	1600	2.70	1070	7.0	15.4	9	470	59
		82-12-14	1130	10.20	1140	6.8	14.0	7	440	50
15	383559090101501	82-10-05	1200	9.40	2000	6.5	18.6	20	1100	536
		82-12-15	0900	16.20	1920	6.1	17.0	17	860	299
16	383639090032801	82-10-06	0900	13.50	862	6.7	13.7	6	530	155
17	383709090052001	82-10-04	1545	17.50	575	7.2	15.0	6	290	37
		82-12-14	1230	16.10	587	6.8	14.5	8	280	43
18	383725090072301	82-09-30	1100	18.00	1640	6.4	15.0	7	720	313
		82-12-14	0845	14.90	1180	6.8	15.0	6	560	127
19	383740090065901	82-09-30	1400	--	938	6.6	14.4	6	480	72
		82-12-14	1000	--	999	6.8	14.5	5	470	59
20	383741090081701	82-09-30	1230	12.20	1390	6.5	15.2	9	680	245
21	383747090073601	82-09-30	1500	36.30	1280	6.7	15.0	8	660	295
		82-12-14	1030	--	1190	7.1	14.5	6	530	148
22	383750090050501	82-09-23	1430	4.40	735	6.6	15.6	4	360	0
23	383800090034401	82-09-23	1600	--	822	6.6	15.5	3	350	56
24	383804090084601	82-09-30	1300	25.40	1100	6.5	14.5	7	540	170
		82-12-14	0930	24.30	1320	6.7	14.5	7	580	202
25	383820090082501	82-10-04	1130	29.60	1310	6.6	14.8	6	580	187
		82-12-13	1115	34.60	1530	6.5	14.5	8	610	184
26	383837090015901	82-10-04	1700	--	830	7.2	13.6	6	390	118
		82-12-14	1320	--	1100	6.9	13.0	4	480	165
27	383839090090501	82-10-01	0945	26.00	1360	6.5	13.9	6	740	333
		82-12-13	1615	--	1760	6.6	14.0	5	840	423
28	383847090053301	82-09-23	1115	19.30	3180	6.2	15.7	2	2100	1560
		82-12-16	1045	18.00	3300	5.9	15.0	6	1900	1380
29	383927090025201	82-09-23	1700	--	1110	6.8	15.8	2	510	75
30	383933090012201	82-09-23	0815	26.70	1090	6.7	13.4	4	560	226
		82-12-15	1545	25.40	1190	6.7	13.5	6	550	212
31	383954090022101	82-09-23	1000	--	641	6.9	14.3	3	320	0
		82-12-16	1445	--	634	6.9	14.0	6	320	0
32	384017090072801	82-10-04	1445	14.50	1740	6.9	15.8	9	1000	649

Table 5.--Data tables--Continued

Map index number	Station number	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)	Percent sodium	Sodium ad- sorp- tion ratio	Potas- sium, dis- solved (mg/L as K)	Alka- linity field (mg/L as $CaCO_3$)
1	383210090132001	82-09-22	110	32	6.5	3	.1	3.7	390
		82-12-15	110	33	7.6	4	.2	3.6	370
2	383235090090901	82-09-22	86	31	14	8	.3	4.4	390
3	383318090081101	82-10-05	130	35	11	5	.2	7.1	430
4	383325090073901	82-10-05	170	49	8.9	3	.2	6.0	450
5	383341090104301	82-10-06	120	28	17	8	.4	2.8	280
6	383342090115601	82-10-06	100	35	11	6	.2	3.1	430
7	383357090060901	82-09-30	160	28	46	16	.9	5.5	530
8	383357090094601	82-10-05	110	29	15	8	.3	5.9	350
		82-12-15	110	29	14	7	.3	5.1	360
9	383442090055301	82-09-29	100	38	12	6	.3	3.3	300
10	383454090053901	82-09-22	110	43	14	6	.3	3.8	330
11	383454090053902	82-09-22	130	32	11	5	.2	6.4	340
		82-12-15	110	32	12	6	.3	5.7	330
12	383515090055401	82-09-29	130	29	32	12	.7	58	340
		82-12-15	130	29	28	11	.6	52	340
13	383519090104701	82-10-05	130	37	26	10	.5	11	410
		82-12-15	130	36	24	10	.5	10	430
14	383552090073501	82-09-30	130	35	72	25	1.5	6.7	410
		82-12-14	120	34	58	22	1.2	5.6	390
15	383559090101501	82-10-05	280	96	40	7	.5	11	560
		82-12-15	210	81	41	9	.6	9.3	560
16	383639090032801	82-10-06	120	57	11	4	.2	2.1	380
17	383709090052001	82-10-04	80	21	11	8	.3	5.9	250
		82-12-14	80	20	9.1	6	.2	5.3	240
18	383725090072301	82-09-30	200	54	100	23	1.7	7.7	410
		82-12-14	150	44	21	8	.4	4.2	430
19	383740090065901	82-09-30	130	38	17	7	.3	6.6	410
		82-12-14	130	35	14	6	.3	4.6	410
20	383741090081701	82-09-30	190	51	47	13	.8	7.1	440
21	383747090073601	82-09-30	180	52	43	12	.8	7.5	370
		82-12-14	150	37	24	9	.5	4.0	380
22	383750090050501	82-09-23	98	28	16	9	.4	7.1	410
23	383800090034401	82-09-23	94	27	28	15	.7	5.2	290
24	383804090084601	82-09-30	150	40	33	12	.6	6.6	370
		82-12-14	170	38	32	11	.6	6.7	380
25	383820090082501	82-10-04	150	49	64	19	1.2	6.5	390
		82-12-13	160	52	66	19	1.2	5.9	430
26	383837090015901	82-10-04	91	39	36	17	.8	3.4	270
		82-12-14	110	51	40	15	.8	3.3	320
27	383839090090501	82-10-01	200	59	26	7	.4	6.3	410
		82-12-13	230	65	21	5	.3	7.5	420
28	383847090053301	82-09-23	500	200	110	10	1.1	19	510
		82-12-16	490	160	70	7	.7	17	500
29	383927090025201	82-09-23	140	40	18	7	.4	4.0	440
30	383933090012201	82-09-23	130	56	29	10	.6	1.9	330
		82-12-15	130	55	31	11	.6	1.3	340
31	383954090022101	82-09-23	74	32	9.0	6	.2	1.9	340
		82-12-16	72	33	9.0	6	.2	1.3	330
32	384017090072801	82-10-04	270	81	34	7	.5	10	360

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Sulfate dis- solved (mg/L as SO_4)	Chlo- ride, dis- solved (mg/L as Cl)	Fluo- ride, dis- solved (mg/L as F)	Solids, residue at 180 deg. C dis- solved (mg/L)	Nitro- gen, NO_2+NO_3 dis- solved (mg/L as N)	Phos- phorus, total (mg/L as P)	Phos- phorus total (mg/L as PO_4)
1	383210090132001	82-09-22	89	12	.30	547	<.10	.460	1.4
		82-12-15	90	7.8	.30	515	<.10	.440	1.4
2	383235090090901	82-09-22	8.0	3.3	.40	384	<.10	.820	2.5
3	383318090081101	82-10-05	80	11	.40	577	<.10	.600	1.8
4	383325090073901	82-10-05	190	29	.40	816	<.10	.070	.21
5	383341090104301	82-10-06	71	72	.30	576	<.10	.110	.34
6	383342090115601	82-10-06	8.0	6.3	.30	428	<.10	.710	2.2
7	383357090060901	82-09-30	72	38	.30	677	1.0	.140	.43
8	383357090094601	82-10-05	66	21	.30	490	<.10	.310	.95
		82-12-15	81	20	.30	518	<.10	.170	.52
9	383442090055301	82-09-29	120	14	.30	548	<.10	.870	2.7
10	383454090053901	82-09-22	180	14	.30	683	.11	.310	.95
11	383454090053902	82-09-22	140	7.9	.20	574	<.10	.180	.55
		82-12-15	130	5.9	.20	542	<.10	.020	.06
12	383515090055401	82-09-29	120	37	.30	798	29	1.50	4.6
		82-12-15	150	35	.30	777	20	2.10	6.4
13	383519090104701	82-10-05	110	25	.50	615	<.10	.610	1.9
		82-12-15	120	26	.40	647	<.10	.110	.34
14	383552090073501	82-09-30	210	18	3.0	775	<.10	.620	1.9
		82-12-14	160	18	5.4	734	<.10	.050	.15
15	383559090101501	82-10-05	800	49	.40	1650	<.10	.800	2.5
		82-12-15	520	49	.40	1180	<.10	.120	.37
16	383639090032801	82-10-06	140	9.1	.20	648	3.6	.030	.09
17	383709090052001	82-10-04	64	7.2	.30	389	2.8	.060	.18
		82-12-14	57	6.0	.30	366	1.7	.030	.09
18	383725090072301	82-09-30	510	26	.30	1250	<.10	.980	3.0
		82-12-14	200	27	.30	786	<.10	.020	.06
19	383740090065901	82-09-30	120	17	.20	614	<.10	.570	1.7
		82-12-14	140	21	.20	634	<.10	.040	.12
20	383741090081701	82-09-30	360	36	.30	1050	<.10	.260	.80
21	383747090073601	82-09-30	350	49	.30	916	<.10	.590	1.8
		82-12-14	200	40	.30	799	<.10	.040	.12
22	383750090050501	82-09-23	10	1.1	.40	432	<.10	.070	.21
23	383800090034401	82-09-23	130	14	.30	551	.40	.020	.06
24	383804090084601	82-09-30	190	40	.30	813	<.10	.580	1.8
		82-12-14	310	42	.30	918	<.10	.050	.15
25	383820090082501	82-10-04	200	76	.40	895	<.10	.450	1.4
		82-12-13	170	140	.30	998	<.10	.430	1.3
26	383837090015901	82-10-04	140	35	.40	527	.72	.100	.31
		82-12-14	190	32	.40	737	4.4	.110	.34
27	383839090090501	82-10-01	350	60	.40	991	<.10	.530	1.6
		82-12-13	450	110	.40	1260	<.10	.070	.21
28	383847090053301	82-09-23	1600	42	1.3	3000	<.10	.120	.37
		82-12-16	1700	45	1.2	2990	<.10	.060	.18
29	383927090025201	82-09-23	98	57	.30	760	<.10	.150	.46
30	383933090012201	82-09-23	260	39	.20	796	1.4	.070	.21
		82-12-15	260	45	.20	817	1.3	.020	.06
31	383954090022101	82-09-23	14	5.4	.20	381	<.10	.290	.89
		82-12-16	23	2.9	.20	372	<.10	.060	.18
32	384017090072801	82-10-04	410	160	.30	1300	7.6	.090	.28

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Arsenic total (μg/L as As)	Arsenic sus-pended total (μg/L as As)	Arsenic dis-solved (μg/L as As)	Cadmium total recov-erable (μg/L as Cd)	Cadmium sus-pended recov-erable (μg/L as Cd)	Cadmium dis-solved (μg/L as Cd)	Chro-mium, total recov-erable (μg/L as Cr)
1	383210090132001	82-09-22	--	--	4	--	--	2	--
		82-12-15	--	--	4	--	--	1	--
2	383235090090901	82-09-22	--	--	--	--	--	<10	--
3	383318090081101	82-10-05	--	--	4	--	--	2	--
4	383325090073901	82-10-05	--	--	--	--	--	<10	--
5	383341090104301	82-10-06	--	--	--	--	--	<10	--
6	383342090115601	82-10-06	--	--	13	--	--	2	--
7	383357090060901	82-09-30	--	--	--	--	--	<10	--
8	383357090094601	82-10-05	--	--	3	--	--	1	--
		82-12-15	--	--	3	--	--	<1	--
9	383442090055301	82-09-29	--	--	--	--	--	<10	--
10	383454090053901	82-09-22	9	8	1	12	10	2	<1
11	383454090053902	82-09-22	--	--	3	--	--	2	--
		82-12-15	--	--	3	--	--	<1	--
12	383515090055401	82-09-29	--	--	--	--	--	<10	--
		82-12-15	--	--	5	--	--	<1	--
13	383519090104701	82-10-05	--	--	3	--	--	2	--
		82-12-15	--	--	6	--	--	1	--
14	383552090073501	82-09-30	--	--	1	--	--	2	--
		82-12-14	--	--	3	--	--	2	--
15	383559090101501	82-10-05	--	--	4	--	--	<1	--
		82-12-15	--	--	8	--	--	5	--
16	383639090032801	82-10-06	--	--	1	--	--	1	--
17	383709090052001	82-10-04	--	--	1	--	--	1	--
		82-12-14	--	--	2	--	--	<1	--
18	383725090072301	82-09-30	--	--	--	--	--	<10	--
		82-12-14	--	--	3	--	--	2	--
19	383740090065901	82-09-30	--	--	1	--	--	1	--
		82-12-14	--	--	2	--	--	3	--
20	383741090081701	82-09-30	--	--	--	--	--	<10	--
21	383747090073601	82-09-30	--	--	1	--	--	2	--
		82-12-14	--	--	2	--	--	<1	--
22	383750090050501	82-09-23	--	--	35	--	--	2	--
23	383800090034401	82-09-23	--	--	--	--	--	<10	--
24	383804090084601	82-09-30	--	--	1	--	--	2	--
		82-12-14	--	--	3	--	--	1	--
25	383820090082501	82-10-04	--	--	--	--	--	<10	--
		82-12-13	--	--	2	--	--	<1	--
26	383837090015901	82-10-04	--	--	--	--	--	<10	--
		82-12-14	--	--	2	--	--	1	--
27	383839090090501	82-10-01	--	--	2	--	--	<1	--
		82-12-13	--	--	3	--	--	3	--
28	383847090053301	82-09-23	--	--	2	--	--	1	--
		82-12-16	--	--	3	--	--	1	--
29	383927090025201	82-09-23	--	--	--	--	--	<10	--
30	383933090012201	82-09-23	--	--	1	--	--	<1	--
		82-12-15	--	--	2	--	--	<1	--
31	383954090022101	82-09-23	--	--	--	--	--	<10	--
		82-12-16	--	--	2	--	--	<1	--
32	384017090072801	82-10-04	--	--	--	--	--	<10	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Chromium, dissolved (µg/L as Cr)	Copper, total recoverable (µg/L as Cu)	Copper, suspended recoverable (µg/L as Cu)	Copper, dissolved (µg/L as Cu)	Iron, total recoverable (µg/L as Fe)	Iron, suspended recoverable (µg/L as Fe)	Iron, dissolved (µg/L as Fe)
1	383210090132001	82-09-22	2	--	--	<1	--	--	13000
		82-12-15	<1	--	--	2	--	--	11000
2	383235090090901	82-09-22	--	--	--	10	--	--	9900
3	383318090081101	82-10-05	1	--	--	<1	--	--	13000
4	383325090073901	82-10-05	--	--	--	<10	--	--	220
5	383341090104301	82-10-06	--	--	--	<10	--	--	1000
6	383342090115601	82-10-06	1	--	--	3	--	--	11000
7	383357090060901	82-09-30	--	--	--	<10	--	--	2400
8	383357090094601	82-10-05	1	--	--	2	--	--	6200
		82-12-15	<1	--	--	1	--	--	6300
9	383442090055301	82-09-29	--	--	--	<10	--	--	6500
10	383454090053901	82-09-22	<1	120	120	1	79000	72000	6600
11	383454090053902	82-09-22	<1	--	--	2	--	--	5700
		82-12-15	<1	--	--	2	--	--	5600
12	383515090055401	82-09-29	--	--	--	<10	--	--	80
		82-12-15	<1	--	--	2	--	--	<3
13	383519090104701	82-10-05	<1	--	--	2	--	--	11000
		82-12-15	<1	--	--	4	--	--	11000
14	383552090073501	82-09-30	1	--	--	<1	--	--	5900
		82-12-14	<1	--	--	2	--	--	14000
15	383559090101501	82-10-05	1	--	--	<1	--	--	57000
		82-12-15	<1	--	--	1	--	--	49000
16	383639090032801	82-10-06	<1	--	--	<1	--	--	120
17	383709090052001	82-10-04	1	--	--	<1	--	--	10
		82-12-14	<1	--	--	2	--	--	<3
18	383725090072301	82-09-30	--	--	--	<10	--	--	15000
		82-12-14	<1	--	--	2	--	--	8300
19	383740090065901	82-09-30	1	--	--	1	--	--	11000
		82-12-14	<1	--	--	1	--	--	10000
20	383741090081701	82-09-30	--	--	--	<10	--	--	15000
21	383747090073601	82-09-30	1	--	--	<1	--	--	16000
		82-12-14	<1	--	--	1	--	--	10000
22	383750090050501	82-09-23	1	--	--	6	--	--	7600
23	383800090034401	82-09-23	--	--	--	<10	--	--	40
24	383804090084601	82-09-30	1	--	--	1	--	--	11000
		82-12-14	1	--	--	2	--	--	14000
25	383820090082501	82-10-04	--	--	--	10	--	--	15000
		82-12-13	<1	--	--	2	--	--	16000
26	383837090015901	82-10-04	--	--	--	10	--	--	10
		82-12-14	<1	--	--	8	--	--	40
27	383839090090501	82-10-01	2	--	--	2	--	--	18000
		82-12-13	<1	--	--	2	--	--	24000
28	383847090053301	82-09-23	4	--	--	<1	--	--	82000
		82-12-16	<1	--	--	2	--	--	80000
29	383927090025201	82-09-23	--	--	--	<10	--	--	8500
30	383933090012201	82-09-23	<1	--	--	2	--	--	680
		82-12-15	1	--	--	1	--	--	800
31	383954090022101	82-09-23	--	--	--	<10	--	--	10
		82-12-16	<1	--	--	1	--	--	3500
32	384017090072801	82-10-04	--	--	--	10	--	--	40

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Lead, total recov-erable (μg/L as Pb)	Lead, sus-pended recov-erable (μg/L as Pb)	Lead, dis-solved (μg/L as Pb)	Manga-nese, total recov-erable (μg/L as Mn)	Manga-nese, sus-pended recov. (μg/L as Mn)	Manga-nese, dis-solved (μg/L as Mn)	Mercury total recov-erable (μg/L as Hg)
1	383210090132001	82-09-22	--	--	5	--	--	660	--
		82-12-15	--	--	7	--	--	470	--
2	383235090090901	82-09-22	--	--	<100	--	--	270	--
3	383318090081101	82-10-05	--	--	6	--	--	30	--
4	383325090073901	82-10-05	--	--	<100	--	--	370	--
5	383341090104301	82-10-06	--	--	<100	--	--	240	--
6	383342090115601	82-10-06	--	--	5	--	--	240	--
7	383357090060901	82-09-30	--	--	100	--	--	230	--
8	383357090094601	82-10-05	--	--	1	--	--	260	--
		82-12-15	--	--	5	--	--	270	--
9	383442090055301	82-09-29	--	--	<100	--	--	130	--
10	383454090053901	82-09-22	140	140	5	1700	1700	30	<.1
11	383454090053902	82-09-22	--	--	5	--	--	290	--
		82-12-15	--	--	6	--	--	310	--
12	383515090055401	82-09-29	--	--	<100	--	--	430	--
		82-12-15	--	--	4	--	--	470	--
13	383519090104701	82-10-05	--	--	3	--	--	890	--
		82-12-15	--	--	8	--	--	930	--
14	383552090073501	82-09-30	--	--	4	--	--	500	--
		82-12-14	--	--	12	--	--	590	--
15	383559090101501	82-10-05	--	--	2	--	--	2700	--
		82-12-15	--	--	7	--	--	2400	--
16	383639090032801	82-10-06	--	--	1	--	--	460	--
17	383709090052001	82-10-04	--	--	2	--	--	620	--
		82-12-14	--	--	3	--	--	650	--
18	383725090072301	82-09-30	--	--	100	--	--	460	--
		82-12-14	--	--	7	--	--	640	--
19	383740090065901	82-09-30	--	--	3	--	--	220	--
		82-12-14	--	--	8	--	--	220	--
20	383741090081701	82-09-30	--	--	<100	--	--	420	--
21	383747090073601	82-09-30	--	--	4	--	--	490	--
		82-12-14	--	--	5	--	--	410	--
22	383750090050501	82-09-23	--	--	6	--	--	160	--
23	383800090034401	82-09-23	--	--	<100	--	--	1500	--
24	383804090084601	82-09-30	--	--	4	--	--	390	--
		82-12-14	--	--	7	--	--	630	--
25	383820090082501	82-10-04	--	--	<100	--	--	610	--
		82-12-13	--	--	8	--	--	890	--
26	383837090015901	82-10-04	--	--	<100	--	--	10	--
		82-12-14	--	--	4	--	--	10	--
27	383839090090501	82-10-01	--	--	3	--	--	660	--
		82-12-13	--	--	10	--	--	980	--
28	383847090053301	82-09-23	--	--	2	--	--	4700	--
		82-12-16	--	--	8	--	--	5300	--
29	383927090025201	82-09-23	--	--	<100	--	--	330	--
30	383933090012201	82-09-23	--	--	2	--	--	480	--
		82-12-15	--	--	4	--	--	570	--
31	383954090022101	82-09-23	--	--	<100	--	--	350	--
		82-12-16	--	--	10	--	--	380	--
32	384017090072801	82-10-04	--	--	100	--	--	690	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Mercury dis-solved (µg/L as Hg)	Zinc, total recov-erable (µg/L as Zn)	Zinc, sus-pended recov-erable (µg/L as Zn)	Zinc, dis-solved (µg/L as Zn)	Carbon, organic dis-solved (mg/L as C)	PCB, total (µg/L)	Aldrin, total (µg/L)
1	383210090132001	82-09-22	<.1	--	--	20	2.6	--	--
		82-12-15	<.1	--	--	10	--	<.10	<.01
2	383235090090901	82-09-22	--	--	--	120	2.2	--	--
3	383318090081101	82-10-05	<.1	--	--	150	2.5	--	--
4	383325090073901	82-10-05	--	--	--	1600	2.3	--	--
5	383341090104301	82-10-06	--	--	--	200	1.7	--	--
6	383342090115601	82-10-06	<.1	--	--	570	3.5	--	--
7	383357090060901	82-09-30	--	--	--	2900	3.3	--	--
8	383357090094601	82-10-05	<.1	--	--	1000	2.3	--	--
		82-12-15	<.1	--	--	1400	--	<.10	<.01
9	383442090055301	82-09-29	--	--	--	20	2.0	--	--
10	383454090053901	82-09-22	<.1	300	280	20	2.2	--	--
11	383454090053902	82-09-22	<.1	--	--	50	2.2	--	--
		82-12-15	<.1	--	--	81	--	<.10	<.01
12	383515090055401	82-09-29	--	--	--	60	2.9	--	--
		82-12-15	<.1	--	--	39	--	<.10	<.01
13	383519090104701	82-10-05	<.1	--	--	20	3.1	--	--
		82-12-15	<.1	--	--	8	--	<.10	<.01
14	383552090073501	82-09-30	.4	--	--	10	1.8	--	--
		82-12-14	<.1	--	--	<4	--	--	--
15	383559090101501	82-10-05	<.1	--	--	2700	12	--	--
		82-12-15	<.1	--	--	2200	--	<.10	--
16	383639090032801	82-10-06	<.1	--	--	200	1.2	--	--
17	383709090052001	82-10-04	<.1	--	--	70	1.6	--	--
		82-12-14	<.1	--	--	130	--	--	--
18	383725090072301	82-09-30	--	--	--	30	4.6	--	--
		82-12-14	.8	--	--	<4	--	<.10	<.01
19	383740090065901	82-09-30	.1	--	--	20	1.6	--	--
		82-12-14	<.1	--	--	<4	--	--	--
20	383741090081701	82-09-30	--	--	--	20	2.9	--	--
21	383747090073601	82-09-30	.1	--	--	10	1.6	--	--
		82-12-14	<.1	--	--	<4	--	--	--
22	383750090050501	82-09-23	<.1	--	--	2500	3.6	--	--
23	383800090034401	82-09-23	--	--	--	560	1.7	--	--
24	383804090084601	82-09-30	<.1	--	--	30	2.7	--	--
		82-12-14	<.1	--	--	<4	--	--	--
25	383820090082501	82-10-04	--	--	--	20	4.8	--	--
		82-12-13	.2	--	--	51	--	<.10	<.01
26	383837090015901	82-10-04	--	--	--	290	3.5	--	--
		82-12-14	<.1	--	--	370	--	<.10	<.01
27	383839090090501	82-10-01	.1	--	--	30	1.9	--	--
		82-12-13	.1	--	--	22	--	--	--
28	383847090053301	82-09-23	<.1	--	--	20	2.5	--	--
		82-12-16	.1	--	--	40	--	<.10	<.01
29	383927090025201	82-09-23	--	--	--	280	1.7	--	--
30	383933090012201	82-09-23	<.1	--	--	20	1.7	--	--
		82-12-15	<.1	--	--	11	--	--	--
31	383954090022101	82-09-23	--	--	--	10	2.8	--	--
		82-12-16	<.1	--	--	18	--	--	--
32	384017090072801	82-10-04	--	--	--	190	4.3	--	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Chlordane, total (µg/L)	DDD, total (µg/L)	DDE, total (µg/L)	DDT, total (µg/L)	Dieldrin total (µg/L)	Endosulfan, total (µg/L)	Endrin, total (µg/L)	Heptachlor, total (µg/L)
1	383210090132001	82-09-22	--	--	--	--	--	--	--	--
		82-12-15	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
2	383235090090901	82-09-22	--	--	--	--	--	--	--	--
3	383318090081101	82-10-05	--	--	--	--	--	--	--	--
4	383325090073901	82-10-05	--	--	--	--	--	--	--	--
5	383341090104301	82-10-06	--	--	--	--	--	--	--	--
6	383342090115601	82-10-06	--	--	--	--	--	--	--	--
7	383357090060901	82-09-30	--	--	--	--	--	--	--	--
8	383357090094601	82-10-05	--	--	--	--	--	--	--	--
		82-12-15	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
9	383442090055301	82-09-29	--	--	--	--	--	--	--	--
10	383454090053901	82-09-22	--	--	--	--	--	--	--	--
11	383454090053902	82-09-22	--	--	--	--	--	--	--	--
		82-12-15	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
12	383515090055401	82-09-29	--	--	--	--	--	--	--	--
		82-12-15	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
13	383519090104701	82-10-05	--	--	--	--	--	--	--	--
		82-12-15	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
14	383552090073501	82-09-30	--	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--	--
15	383559090101501	82-10-05	--	--	--	--	--	--	--	--
		82-12-15	<.10	<.01	<.01	<.01	<.01	<.01	<.01	--
16	383639090032801	82-10-06	--	--	--	--	--	--	--	--
17	383709090052001	82-10-04	--	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--	--
18	383725090072301	82-09-30	--	--	--	--	--	--	--	--
		82-12-14	<.10	<.01	<.01	<.01	.01	<.01	<.01	<.01
19	383740090065901	82-09-30	--	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--	--
20	383741090081701	82-09-30	--	--	--	--	--	--	--	--
21	383747090073601	82-09-30	--	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--	--
22	383750090050501	82-09-23	--	--	--	--	--	--	--	--
23	383800090034401	82-09-23	--	--	--	--	--	--	--	--
24	383804090084601	82-09-30	--	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--	--
25	383820090082501	82-10-04	--	--	--	--	--	--	--	--
		82-12-13	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
26	383837090015901	82-10-04	--	--	--	--	--	--	--	--
		82-12-14	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
27	383839090090501	82-10-01	--	--	--	--	--	--	--	--
		82-12-13	--	--	--	--	--	--	--	--
28	383847090053301	82-09-23	--	--	--	--	--	--	--	--
		82-12-16	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
29	383927090025201	82-09-23	--	--	--	--	--	--	--	--
30	383933090012201	82-09-23	--	--	--	--	--	--	--	--
		82-12-15	--	--	--	--	--	--	--	--
31	383954090022101	82-09-23	--	--	--	--	--	--	--	--
		82-12-16	--	--	--	--	--	--	--	--
32	384017090072801	82-10-04	--	--	--	--	--	--	--	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Hepta-chlor epoxide total (µg/L)	Lindane total (µg/L)	Meth-oxy-chlor, total (µg/L)	Mirex, total (µg/L)	Naph-tha-lenes, poly-chlor. total (µg/L)	Per-thane total (µg/L)	Tox-aphene, total (µg/L)
1	383210090132001	82-09-22	--	--	--	--	--	--	--
		82-12-15	<.01	<.01	<.01	<.01	<.10	<.10	<1
2	383235090090901	82-09-22	--	--	--	--	--	--	--
3	383318090081101	82-10-05	--	--	--	--	--	--	--
4	383325090073901	82-10-05	--	--	--	--	--	--	--
5	383341090104301	82-10-06	--	--	--	--	--	--	--
6	383342090115601	82-10-06	--	--	--	--	--	--	--
7	383357090060901	82-09-30	--	--	--	--	--	--	--
8	383357090094601	82-10-05	--	--	--	--	--	--	--
		82-12-15	<.01	<.01	<.01	<.01	<.10	<.10	<1
9	383442090055301	82-09-29	--	--	--	--	--	--	--
10	383454090053901	82-09-22	--	--	--	--	--	--	--
11	383454090053902	82-09-22	--	--	--	--	--	--	--
		82-12-15	<.01	<.01	<.01	<.01	<.10	<.10	<1
12	383515090055401	82-09-29	--	--	--	--	--	--	--
		82-12-15	<.01	<.01	<.01	<.01	<.10	<.10	<1
13	383519090104701	82-10-05	--	--	--	--	--	--	--
		82-12-15	<.01	<.01	<.01	<.01	<.10	<.10	<1
14	383552090073501	82-09-30	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--
15	383559090101501	82-10-05	--	--	--	--	--	--	--
		82-12-15	--	--	<.01	<.01	<.10	<.10	<1
16	383639090032801	82-10-06	--	--	--	--	--	--	--
17	383709090052001	82-10-04	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--
18	383725090072301	82-09-30	--	--	--	--	--	--	--
		82-12-14	<.01	<.01	<.01	<.01	<.10	<.10	<1
19	383740090065901	82-09-30	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--
20	383741090081701	82-09-30	--	--	--	--	--	--	--
21	383747090073601	82-09-30	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--
22	383750090050501	82-09-23	--	--	--	--	--	--	--
23	383800090034401	82-09-23	--	--	--	--	--	--	--
24	383804090084601	82-09-30	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--
25	383820090082501	82-10-04	--	--	--	--	--	--	--
		82-12-13	<.01	<.01	<.01	<.01	<.10	<.10	<1
26	383837090015901	82-10-04	--	--	--	--	--	--	--
		82-12-14	<.01	<.01	<.01	<.01	<.10	<.10	<1
27	383839090090501	82-10-01	--	--	--	--	--	--	--
		82-12-13	--	--	--	--	--	--	--
28	383847090053301	82-09-23	--	--	--	--	--	--	--
		82-12-16	<.01	<.01	<.01	<.01	<.10	<.10	<1
29	383927090025201	82-09-23	--	--	--	--	--	--	--
30	383933090012201	82-09-23	--	--	--	--	--	--	--
		82-12-15	--	--	--	--	--	--	--
31	383954090022101	82-09-23	--	--	--	--	--	--	--
		82-12-16	--	--	--	--	--	--	--
32	384017090072801	82-10-04	--	--	--	--	--	--	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Time	Depth below land surface (water level) (feet)	Specific conductance (μmhos)	pH (standard units)	Temperature (deg C)	Color (platinum-cobalt units)	Hardness (mg/L as $CaCO_3$)	Hardness, noncarbonate (mg/L $CaCO_3$)
32	384017090072801	82-12-16	1000	13.30	2160	6.6	13.5	10	1100	751
33	384031090021201	82-09-24	0845	14.50	905	6.6	14.1	3	490	164
34	384055090032101	82-09-23	1815	--	996	6.8	16.2	8	530	212
		82-12-16	1200	12.20	1030	6.8	13.5	6	510	185
35	384055090032102	82-09-24	1200	13.30	756	6.8	13.7	1	360	0
		82-12-16	1330	12.20	772	7.1	13.5	5	400	17
36	384055090083801	82-10-01	1100	--	855	7.0	14.5	6	400	139
		82-12-13	1230	--	845	7.0	14.0	7	360	121
37	384058090044901	82-09-24	1130	4.60	706	6.8	13.5	<1	360	33
38	384147090040001	82-09-24	1030	16.70	561	6.6	14.4	3	280	36
39	384151090012201	82-09-28	1700	8.00	812	6.8	14.3	6	400	238
		82-12-14	1500	6.80	812	7.0	14.0	5	380	230
40	384152090085001	82-10-01	1330	38.60	1180	6.7	16.6	15	600	182
		82-12-13	1500	30.70	1020	6.9	15.5	7	500	143
41	384158090025101	82-09-24	0930	13.60	1070	6.6	14.9	2	430	162
		82-12-14	1415	17.20	1150	6.5	15.0	7	400	143
42	384211090065501	82-10-04	1330	13.80	704	6.8	14.1	6	360	41
		82-12-13	1400	12.40	738	6.7	14.0	6	350	13
43	384215090093401	82-10-01	1200	--	929	6.6	16.0	7	450	59
44	384225090090001	82-10-01	1450	33.00	952	6.6	15.8	8	510	145
45	384235090020901	82-09-24	1500	6.20	895	6.6	14.1	3	420	79
46	384320090060901	82-09-29	1815	18.00	1670	6.6	16.4	9	860	340
		82-12-16	0915	--	1730	6.6	16.5	7	840	293
47	384340090024401	82-09-24	1545	3.80	598	7.3	14.6	4	250	80
48	384341090070601	82-09-29	1715	--	598	6.5	16.9	9	300	46
49	384350090005801	82-09-29	0830	14.50	808	6.6	13.2	6	450	173
		82-12-17	0930	9.90	815	6.9	12.5	5	430	136
50	384356090042001	82-09-27	1800	5.60	990	6.4	15.2	7	520	93
51	384454090060001	82-09-28	1000	9.60	585	7.2	13.9	7	300	23
52	384510090045501	82-09-27	1700	--	589	6.6	14.9	6	310	48
53	384604090025201	82-09-28	1530	9.30	442	6.6	15.1	5	210	82
		82-12-17	0900	--	455	6.5	14.0	6	190	63
54	384646090014901	82-09-27	1300	5.60	201	7.6	13.8	10	95	33
55	384733090011801	82-09-27	1130	--	762	6.2	13.4	7	410	32
56	384746090022201	82-09-28	1430	27.30	553	6.8	13.8	6	270	64
57	384750090055701	82-09-28	1100	30.00	808	6.6	14.1	5	350	93
		82-12-17	0800	25.10	913	6.7	14.0	4	390	126
58	384756090040401	82-09-28	0900	--	471	6.4	15.4	6	220	25
59	384838090035801	82-09-28	0800	19.00	652	7.2	13.3	6	280	87
60	384915090054101	82-09-28	1230	--	654	6.7	14.8	5	350	53
61	385000090055601	82-09-27	1530	32.00	685	6.4	13.4	9	330	16
62	385211090045401	82-09-27	1430	60.80	829	6.6	13.7	6	400	98
63	385255090093301	82-09-29	1530	30.90	727	6.7	14.0	15	280	0

Table 5.--Data tables--Continued

Map index number	Station number	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)	Percent sodium	Sodium ad- sorp- tion ratio	Potas- sium, dis- solved (mg/L as K)	Alka- linity field (mg/L as $CaCO_3$)
32	384017090072801	82-12-16	290	96	56	10	.8	12	370
33	384031090021201	82-09-24	120	47	15	6	.3	1.6	330
34	384055090032101	82-09-23	150	38	12	5	.2	8.8	320
		82-12-16	140	40	13	5	.3	8.1	330
35	384055090032102	82-09-24	85	35	8.8	5	.2	3.2	360
		82-12-16	91	41	10	5	.2	2.7	380
36	384055090083801	82-10-01	110	30	28	13	.6	4.1	260
		82-12-13	95	30	29	15	.7	3.7	240
37	384058090044901	82-09-24	99	28	10	6	.2	6.1	330
38	384147090040001	82-09-24	84	16	5.8	4	.2	4.7	240
39	384151090012201	82-09-28	100	36	8.3	4	.2	8.9	160
		82-12-14	96	34	8.0	4	.2	7.1	150
40	384152090085001	82-10-01	170	43	30	10	.6	8.2	420
		82-12-13	140	37	22	9	.4	6.9	360
41	384158090025101	82-09-24	120	32	46	19	1.0	4.4	270
		82-12-14	110	31	49	21	1.1	3.8	260
42	384211090065501	82-10-04	100	27	7.9	4	.2	4.2	320
		82-12-13	100	25	6.6	4	.2	4.1	340
43	384215090093401	82-10-01	130	30	28	12	.6	6.4	390
44	384225090090001	82-10-01	140	40	22	8	.4	5.0	370
45	384235090020901	82-09-24	100	41	14	7	.3	2.2	340
46	384320090060901	82-09-29	230	69	22	5	.3	4.7	520
		82-12-16	220	71	29	7	.5	5.4	550
47	384340090024401	82-09-24	72	17	34	23	1.0	3.5	170
48	384341090070601	82-09-29	77	25	7.1	5	.2	5.4	250
49	384350090005801	82-09-29	97	51	17	8	.4	.7	280
		82-12-17	96	45	13	6	.3	.6	290
50	384356090042001	82-09-27	140	42	17	7	.3	3.9	430
51	384454090060001	82-09-28	85	22	9.0	6	.2	3.4	280
52	384510090045501	82-09-27	82	25	15	10	.4	2.2	260
53	384604090025201	82-09-28	55	18	11	10	.3	1.5	130
		82-12-17	51	16	8.4	9	.3	1.8	130
54	384646090014901	82-09-27	27	6.7	4.1	8	.2	1.0	62
55	384733090011801	82-09-27	94	43	9.4	5	.2	1.1	380
56	384746090022201	82-09-28	75	21	9.8	7	.3	1.8	210
57	384750090055701	82-09-28	100	25	36	18	.9	2.0	260
		82-12-17	110	27	42	19	1.0	2.4	260
58	384756090040401	82-09-28	62	17	8.8	8	.3	1.2	200
59	384838090035801	82-09-28	76	21	17	12	.5	1.7	190
60	384915090054101	82-09-28	95	28	14	8	.3	1.8	300
61	385000090055601	82-09-27	89	25	25	14	.6	3.6	310
62	385211090045401	82-09-27	100	36	28	13	.6	3.5	300
63	385255090093301	82-09-29	72	24	57	31	1.5	2.5	310

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Sulfate dissolved (mg/L as SO_4)	Chloride, dissolved (mg/L as Cl)	Fluoride, dissolved (mg/L as F)	Solids, residue at 180 deg. C dissolved (mg/L)	Nitrogen, NO_2+NO_3 dissolved (mg/L as N)	Phosphorus, total (mg/L as P)	Phosphorus total (mg/L as PO_4)
32	384017090072801	82-12-16	530	140	.20	1640	15	.060	.18
33	384031090021201	82-09-24	180	11	.30	624	<.10	.150	.46
34	384055090032101	82-09-23	180	28	.40	694	7.8	.040	.12
		82-12-16	180	29	.30	702	8.3	.040	.12
35	384055090032102	82-09-24	55	7.2	.30	461	<.10	.210	.64
		82-12-16	55	6.4	.20	451	<.10	.030	.09
36	384055090083801	82-10-01	110	75	.30	629	<.10	.400	1.2
		82-12-13	87	77	.30	520	<.10	1.00	3.1
37	384058090044901	82-09-24	73	6.5	.30	441	<.10	.230	.71
38	384147090040001	82-09-24	69	4.2	.30	354	<.10	.520	1.6
39	384151090012201	82-09-28	140	20	.60	580	29	.160	.49
		82-12-14	150	22	.50	541	23	.150	.46
40	384152090085001	82-10-01	190	65	.30	891	<.10	.500	1.5
		82-12-13	150	43	.40	681	.24	.180	.55
41	384158090025101	82-09-24	58	170	.20	743	<.10	.490	1.5
		82-12-14	43	170	.20	642	<.10	.380	1.2
42	384211090065501	82-10-04	75	7.9	.30	465	<.10	.500	1.5
		82-12-13	78	8.5	.30	471	<.10	.070	.21
43	384215090093401	82-10-01	140	29	.30	671	<.10	.460	1.4
44	384225090090001	82-10-01	160	40	.30	706	<.10	.460	1.4
45	384235090020901	82-09-24	130	28	.20	635	<.10	.260	.80
46	384320090060901	82-09-29	190	79	.30	1220	31	.170	.52
		82-12-16	190	75	.20	1180	25	.050	.15
47	384340090024401	82-09-24	98	30	.20	389	<.10	.160	.49
48	384341090070601	82-09-29	65	4.9	.40	373	<.10	.620	1.9
49	384350090005801	82-09-29	150	10	.30	539	<.10	.120	.37
		82-12-17	160	11	.20	547	<.10	.050	.15
50	384356090042001	82-09-27	81	48	.30	673	<.10	.380	1.2
51	384454090060001	82-09-28	45	2.9	.30	372	<.10	.400	1.2
52	384510090045501	82-09-27	59	3.3	.30	392	2.2	.170	.52
53	384604090025201	82-09-28	75	16	.30	297	<.10	.290	.89
		82-12-17	71	15	.30	288	<.10	.090	.28
54	384646090014901	82-09-27	17	11	<.10	140	2.0	.180	.55
55	384733090011801	82-09-27	100	8.9	.20	510	<.10	.070	.21
56	384746090022201	82-09-28	57	16	.10	347	1.2	.280	.86
57	384750090055701	82-09-28	110	50	.20	539	<.10	.380	1.2
		82-12-17	130	57	.20	584	<.10	.120	.37
58	384756090040401	82-09-28	41	4.3	.20	287	<.10	.980	3.0
59	384838090035801	82-09-28	56	62	.10	393	<.10	.440	1.4
60	384915090054101	82-09-28	41	21	.10	454	<.10	.430	1.3
61	385000090055601	82-09-27	38	30	.20	415	<.10	.250	.77
62	385211090045401	82-09-27	110	40	.20	539	.17	.060	.18
63	385255090093301	82-09-29	34	39	.40	422	<.10	.530	1.6

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Arsenic total (µg/L as As)	Arsenic sus-pended total (µg/L as As)	Arsenic dis-solved (µg/L as As)	Cadmium total recov-erable (µg/L as Cd)	Cadmium sus-pended recov-erable (µg/L as Cd)	Cadmium dis-solved (µg/L as Cd)	Chro-mium, total recov-erable (µg/L as Cr)
32	384017090072801	82-12-16	--	--	2	--	--	1	--
33	384031090021201	82-09-24	--	--	--	--	--	<10	--
34	384055090032101	82-09-23	--	--	1	--	--	2	--
		82-12-16	--	--	2	--	--	<1	--
35	384055090032102	82-09-24	--	--	15	--	--	2	--
		82-12-16	--	--	18	--	--	2	--
36	384055090083801	82-10-01	--	--	1	--	--	<1	--
		82-12-13	--	--	1	--	--	2	--
37	384058090044901	82-09-24	--	--	--	--	--	<10	--
38	384147090040001	82-09-24	--	--	--	--	--	<10	--
39	384151090012201	82-09-28	--	--	--	--	--	<10	--
		82-12-14	--	--	2	--	--	2	--
40	384152090085001	82-10-01	--	--	3	--	--	1	--
		82-12-13	--	--	3	--	--	<1	--
41	384158090025101	82-09-24	--	--	3	--	--	1	--
		82-12-14	--	--	5	--	--	3	--
42	384211090065501	82-10-04	--	--	2	--	--	2	--
		82-12-13	--	--	3	--	--	2	--
43	384215090093401	82-10-01	--	--	1	--	--	1	--
44	384225090090001	82-10-01	--	--	--	--	--	<10	--
45	384235090020901	82-09-24	--	--	--	--	--	<10	--
46	384320090060901	82-09-29	--	--	1	--	--	1	--
		82-12-16	--	--	2	--	--	<1	--
47	384340090024401	82-09-24	--	--	--	--	--	<10	--
48	384341090070601	82-09-29	--	--	39	--	--	<1	--
49	384350090005801	82-09-29	--	--	1	--	--	1	--
		82-12-17	--	--	2	--	--	<1	--
50	384356090042001	82-09-27	--	--	--	--	--	<10	--
51	384454090060001	82-09-28	--	--	--	--	--	<10	--
52	384510090045501	82-09-27	--	--	1	--	--	2	--
53	384604090025201	82-09-28	--	--	3	--	--	2	--
		82-12-17	--	--	6	--	--	<1	--
54	384646090014901	82-09-27	--	--	--	--	--	<10	--
55	384733090011801	82-09-27	--	--	--	--	--	<10	--
56	384746090022201	82-09-28	--	--	--	--	--	<10	--
57	384750090055701	82-09-28	--	--	1	--	--	1	--
		82-12-17	--	--	2	--	--	2	--
58	384756090040401	82-09-28	--	--	--	--	--	<10	--
59	384838090035801	82-09-28	--	--	--	--	--	<10	--
60	384915090054101	82-09-28	--	--	--	--	--	<10	--
61	385000090055601	82-09-27	--	--	1	--	--	1	--
62	385211090045401	82-09-27	--	--	1	--	--	1	--
63	385255090093301	82-09-29	--	--	--	--	--	<10	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Chromium, dissolved (µg/L as Cr)	Copper, total recoverable (µg/L as Cu)	Copper, suspended recoverable (µg/L as Cu)	Copper, dissolved (µg/L as Cu)	Iron, total recoverable (µg/L as Fe)	Iron, suspended recoverable (µg/L as Fe)	Iron, dissolved (µg/L as Fe)
32	384017090072801	82-12-16	<1	--	--	10	--	--	120
33	384031090021201	82-09-24	--	--	--	10	--	--	4800
34	384055090032101	82-09-23	<1	--	--	2	--	--	20
		82-12-16	<1	--	--	1	--	--	12
35	384055090032102	82-09-24	1	--	--	<1	--	--	8100
		82-12-16	<1	--	--	1	--	--	9900
36	384055090083801	82-10-01	<1	--	--	1	--	--	8500
		82-12-13	1	--	--	1	--	--	8900
37	384058090044901	82-09-24	--	--	--	<10	--	--	3500
38	384147090040001	82-09-24	--	--	--	10	--	--	12000
39	384151090012201	82-09-28	--	--	--	10	--	--	10
		82-12-14	<1	--	--	<1	--	--	48
40	384152090085001	82-10-01	1	--	--	1	--	--	12000
		82-12-13	<1	--	--	2	--	--	4600
41	384158090025101	82-09-24	1	--	--	2	--	--	14000
		82-12-14	1	--	--	3	--	--	14000
42	384211090065501	82-10-04	1	--	--	1	--	--	8200
		82-12-13	<1	--	--	2	--	--	9300
43	384215090093401	82-10-01	<1	--	--	2	--	--	12000
44	384225090090001	82-10-01	--	--	--	10	--	--	10000
45	384235090020901	82-09-24	--	--	--	<10	--	--	9200
46	384320090060901	82-09-29	<1	--	--	1	--	--	20
		82-12-16	<1	--	--	1	--	--	<3
47	384340090024401	82-09-24	--	--	--	<10	--	--	250
48	384341090070601	82-09-29	<1	--	--	1	--	--	5200
49	384350090005801	82-09-29	<1	--	--	1	--	--	1600
		82-12-17	<1	--	--	2	--	--	1800
50	384356090042001	82-09-27	--	--	--	<10	--	--	6400
51	384454090060001	82-09-28	--	--	--	<10	--	--	5000
52	384510090045501	82-09-27	<1	--	--	5	--	--	20
53	384604090025201	82-09-28	<1	--	--	3	--	--	5000
		82-12-17	<1	--	--	1	--	--	5200
54	384646090014901	82-09-27	--	--	--	<10	--	--	<10
55	384733090011801	82-09-27	--	--	--	<10	--	--	1500
56	384746090022201	82-09-28	--	--	--	<10	--	--	4600
57	384750090055701	82-09-28	1	--	--	2	--	--	8900
		82-12-17	<1	--	--	1	--	--	9400
58	384756090040401	82-09-28	--	--	--	<10	--	--	6600
59	384838090035801	82-09-28	--	--	--	10	--	--	15000
60	384915090054101	82-09-28	--	--	--	<10	--	--	380
61	385000090055601	82-09-27	1	--	--	1	--	--	6900
62	385211090045401	82-09-27	<1	--	--	2	--	--	260
63	385255090093301	82-09-29	--	--	--	<10	--	--	7600

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Lead, total recov-erable (µg/L as Pb)	Lead, sus-pended recov-erable (µg/L as Pb)	Lead, dis-solved (µg/L as Pb)	Manga-nese, total recov-erable (µg/L as Mn)	Manga-nese, sus-pended recov. (µg/L as Mn)	Manga-nese, dis-solved (µg/L as Mn)	Mercury total recov-erable (µg/L as Hg)
32	384017090072801	82-12-16	--	--	3	--	--	1000	--
33	384031090021201	82-09-24	--	--	<100	--	--	650	--
34	384055090032101	82-09-23	--	--	2	--	--	710	--
		82-12-16	--	--	4	--	--	800	--
35	384055090032102	82-09-24	--	--	4	--	--	400	--
		82-12-16	--	--	8	--	--	470	--
36	384055090083801	82-10-01	--	--	3	--	--	280	--
		82-12-13	--	--	6	--	--	270	--
37	384058090044901	82-09-24	--	--	<100	--	--	800	--
38	384147090040001	82-09-24	--	--	<100	--	--	310	--
39	384151090012201	82-09-28	--	--	<100	--	--	<10	--
		82-12-14	--	--	3	--	--	5	--
40	384152090085001	82-10-01	--	--	6	--	--	680	--
		82-12-13	--	--	3	--	--	460	--
41	384158090025101	82-09-24	--	--	6	--	--	990	--
		82-12-14	--	--	9	--	--	1100	--
42	384211090065501	82-10-04	--	--	5	--	--	200	--
		82-12-13	--	--	5	--	--	220	--
43	384215090093401	82-10-01	--	--	6	--	--	830	--
44	384225090090001	82-10-01	--	--	<100	--	--	550	--
45	384235090020901	82-09-24	--	--	<100	--	--	510	--
46	384320090060901	82-09-29	--	--	2	--	--	150	--
		82-12-16	--	--	4	--	--	130	--
47	384340090024401	82-09-24	--	--	<100	--	--	270	--
48	384341090070601	82-09-29	--	--	1	--	--	590	--
49	384350090005801	82-09-29	--	--	3	--	--	370	--
		82-12-17	--	--	3	--	--	430	--
50	384356090042001	82-09-27	--	--	<100	--	--	500	--
51	384454090060001	82-09-28	--	--	<100	--	--	360	--
52	384510090045501	82-09-27	--	--	<1	--	--	80	--
53	384604090025201	82-09-28	--	--	3	--	--	400	--
		82-12-17	--	--	8	--	--	410	--
54	384646090014901	82-09-27	--	--	<100	--	--	10	--
55	384733090011801	82-09-27	--	--	<100	--	--	320	--
56	384746090022201	82-09-28	--	--	<100	--	--	590	--
57	384750090055701	82-09-28	--	--	4	--	--	50	--
		82-12-17	--	--	7	--	--	590	--
58	384756090040401	82-09-28	--	--	<100	--	--	880	--
59	384838090035801	82-09-28	--	--	<100	--	--	1600	--
60	384915090054101	82-09-28	--	--	<100	--	--	330	--
61	385000090055601	82-09-27	--	--	5	--	--	380	--
62	385211090045401	82-09-27	--	--	4	--	--	450	--
63	385255090093301	82-09-29	--	--	<100	--	--	1200	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Mercury dis- solved (µg/L as Hg)	Zinc, total recov- erable (µg/L as Zn)	Zinc, sus- pended recov- erable (µg/L as Zn)	Zinc, dis- solved (µg/L as Zn)	Carbon, organic dis- solved (mg/L as C)	PCB, total (µg/L)	Aldrin, total (µg/L)
32	384017090072801	82-12-16	.1	--	--	630	--	--	--
33	384031090021201	82-09-24	--	--	--	40	1.7	--	--
34	384055090032101	82-09-23	<.1	--	--	540	2.2	--	--
		82-12-16	<.1	--	--	350	--	<.10	<.01
35	384055090032102	82-09-24	<.1	--	--	30	1.9	--	--
		82-12-16	<.1	--	--	12	--	--	--
36	384055090083801	82-10-01	<.1	--	--	10	3.2	--	--
		82-12-13	.1	--	--	<4	--	<.10	<.01
37	384058090044901	82-09-24	--	--	--	330	2.1	--	--
38	384147090040001	82-09-24	--	--	--	60	1.6	--	--
39	384151090012201	82-09-28	--	--	--	50	1.0	--	--
		82-12-14	<.1	--	--	90	--	--	--
40	384152090085001	82-10-01	.2	--	--	20	3.5	--	--
		82-12-13	.2	--	--	<4	--	<.10	<.01
41	384158090025101	82-09-24	<.1	--	--	30	3.3	--	--
		82-12-14	<.1	--	--	18	--	<.10	<.01
42	384211090065501	82-10-04	<.1	--	--	10	1.5	--	--
		82-12-13	<.1	--	--	4	--	--	--
43	384215090093401	82-10-01	<.1	--	--	30	2.6	--	--
44	384225090090001	82-10-01	--	--	--	20	1.8		
45	384235090020901	82-09-24	--	--	--	20	1.4	--	--
46	384320090060901	82-09-29	<.1	--	--	370	2.1	--	--
		82-12-16	<.1	--	--	940	--	<.10	<.01
47	384340090024401	82-09-24	--	--	--	310	1.5	--	--
48	384341090070601	82-09-29	<.1	--	--	40	1.3	--	--
49	384350090005801	82-09-29	<.1	--	--	20	1.3	--	--
		82-12-17	<.1	--	--	<4	--	--	--
50	384356090042001	82-09-27	--	--	--	30	2.6	--	--
51	384454090060001	82-09-28	--	--	--	20	1.4	--	--
52	384510090045501	82-09-27	<.1	--	--	20	1.5	--	--
53	384604090025201	82-09-28	<.1	--	--	70	1.3	--	--
		82-12-17	<.1	--	--	28	--	--	--
54	384646090014901	82-09-27	--	--	--	30	.7	--	--
55	384733090011801	82-09-27	--	--	--	50	1.2	--	--
56	384746090022201	82-09-28	--	--	--	20	1.2	--	--
57	384750090055701	82-09-28	<.1	--	--	10	1.3	--	--
		82-12-17	.1	--	--	77	--	--	--
58	384756090040401	82-09-28	--	--	--	70	1.8	--	--
59	384838090035801	82-09-28	--	--	--	20	2.2	--	--
60	384915090054101	82-09-28	--	--	--	40	1.4	--	--
61	385000090055601	82-09-27	.1	--	--	20	3.6	--	--
62	385211090045401	82-09-27	.2	--	--	40	1.5	--	--
63	385255090093301	82-09-29	--	--	--	30	4.4	--	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Chlordane, total (µg/L)	DDD, total (µg/L)	DDE, total (µg/L)	DDT, total (µg/L)	Dieldrin total (µg/L)	Endosulfan, total (µg/L)	Endrin, total (µg/L)	Heptachlor, total (µg/L)
32	384017090072801	82-12-16	--	--	--	--	--	--	--	--
33	384031090021201	82-09-24	--	--	--	--	--	--	--	--
34	384055090032101	82-09-23	--	--	--	--	--	--	--	--
		82-12-16	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
35	384055090032102	82-09-24	--	--	--	--	--	--	--	--
		82-12-16	--	--	--	--	--	--	--	--
36	384055090083801	82-10-01	--	--	--	--	--	--	--	--
		82-12-13	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
37	384058090044901	82-09-24	--	--	--	--	--	--	--	--
38	384147090040001	82-09-24	--	--	--	--	--	--	--	--
39	384151090012201	82-09-28	--	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--	--
40	384152090085001	82-10-01	--	--	--	--	--	--	--	--
		82-12-13	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
41	384158090025101	82-09-24	--	--	--	--	--	--	--	--
		82-12-14	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
42	384211090065501	82-10-04	--	--	--	--	--	--	--	--
		82-12-13	--	--	--	--	--	--	--	--
43	384215090093401	82-10-01	--	--	--	--	--	--	--	--
44	384225090090001	82-10-01	--	--	--	--	--	--	--	--
45	384235090020901	82-09-24	--	--	--	--	--	--	--	--
46	384320090060901	82-09-29	--	--	--	--	--	--	--	--
		82-12-16	<.10	<.01	<.01	<.01	<.01	<.01	<.01	<.01
47	384340090024401	82-09-24	--	--	--	--	--	--	--	--
48	384341090070601	82-09-29	--	--	--	--	--	--	--	--
49	384350090005801	82-09-29	--	--	--	--	--	--	--	--
		82-12-17	--	--	--	--	--	--	--	--
50	384356090042001	82-09-27	--	--	--	--	--	--	--	--
51	384454090060001	82-09-28	--	--	--	--	--	--	--	--
52	384510090045501	82-09-27	--	--	--	--	--	--	--	--
53	384604090025201	82-09-28	--	--	--	--	--	--	--	--
		82-12-17	--	--	--	--	--	--	--	--
54	384646090014901	82-09-27	--	--	--	--	--	--	--	--
55	384733090011801	82-09-27	--	--	--	--	--	--	--	--
56	384746090022201	82-09-28	--	--	--	--	--	--	--	--
57	384750090055701	82-09-28	--	--	--	--	--	--	--	--
		82-12-17	--	--	--	--	--	--	--	--
58	384756090040401	82-09-28	--	--	--	--	--	--	--	--
59	384838090035801	82-09-28	--	--	--	--	--	--	--	--
60	384915090054101	82-09-28	--	--	--	--	--	--	--	--
61	385000090055601	82-09-27	--	--	--	--	--	--	--	--
62	385211090045401	82-09-27	--	--	--	--	--	--	--	--
63	385255090093301	82-09-29	--	--	--	--	--	--	--	--

Table 5.--Data tables--Continued

Map index number	Station number	Date of sample	Hepta-chlor epoxide total (µg/L)	Lindane total (µg/L)	Meth-oxy-chlor, total (µg/L)	Mirex, total (µg/L)	Naph-tha-lenes, poly-chlor. total (µg/L)	Per-thane total (µg/L)	Tox-aphene, total (µg/L)
32	384017090072801	82-12-16	--	--	--	--	--	--	--
33	384031090021201	82-09-24	--	--	--	--	--	--	--
34	384055090032101	82-09-23	--	--	--	--	--	--	--
		82-12-16	<.01	<.01	<.01	<.01	<.10	<.10	<1
35	384055090032102	82-09-24	--	--	--	--	--	--	--
		82-12-16	--	--	--	--	--	--	--
36	384055090083801	82-10-01	--	--	--	--	--	--	--
		82-12-13	<.01	<.01	<.01	<.01	<.10	<.10	<1
37	384058090044901	82-09-24	--	--	--	--	--	--	--
38	384147090040001	82-09-24	--	--	--	--	--	--	--
39	384151090012201	82-09-28	--	--	--	--	--	--	--
		82-12-14	--	--	--	--	--	--	--
40	384152090085001	82-10-01	--	--	--	--	--	--	--
		82-12-13	<.01	<.01	<.01	<.01	<.10	<.10	<1
41	384158090025101	82-09-24	--	--	--	--	--	--	--
		82-12-14	<.01	<.01	<.01	<.01	<.10	<.10	<1
42	384211090065501	82-10-04	--	--	--	--	--	--	--
		82-12-13	--	--	--	--	--	--	--
43	384215090093401	82-10-01	--	--	--	--	--	--	--
44	384225090090001	82-10-01	--	--	--	--	--	--	--
45	384235090020901	82-09-24	--	--	--	--	--	--	--
46	384320090060901	82-09-29	--	--	--	--	--	--	--
		82-12-16	<.01	<.01	<.01	<.01	<.10	<.10	<1
47	384340090024401	82-09-24	--	--	--	--	--	--	--
48	384341090070601	82-09-29	--	--	--	--	--	--	--
49	384350090005801	82-09-29	--	--	--	--	--	--	--
		82-12-17	--	--	--	--	--	--	--
50	384356090042001	82-09-27	--	--	--	--	--	--	--
51	384454090060001	82-09-28	--	--	--	--	--	--	--
52	384510090045501	82-09-27	--	--	--	--	--	--	--
53	384604090025201	82-09-28	--	--	--	--	--	--	--
		82-12-17	--	--	--	--	--	--	--
54	384646090014901	82-09-27	--	--	--	--	--	--	--
55	384733090011801	82-09-27	--	--	--	--	--	--	--
56	384746090022201	82-09-28	--	--	--	--	--	--	--
57	384750090055701	82-09-28	--	--	--	--	--	--	--
		82-12-17	--	--	--	--	--	--	--
58	384756090040401	82-09-28	--	--	--	--	--	--	--
59	384838090035801	82-09-28	--	--	--	--	--	--	--
60	384915090054101	82-09-28	--	--	--	--	--	--	--
61	385000090055601	82-09-27	--	--	--	--	--	--	--
62	385211090045401	82-09-27	--	--	--	--	--	--	--
63	385255090093301	82-09-29	--	--	--	--	--	--	--

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