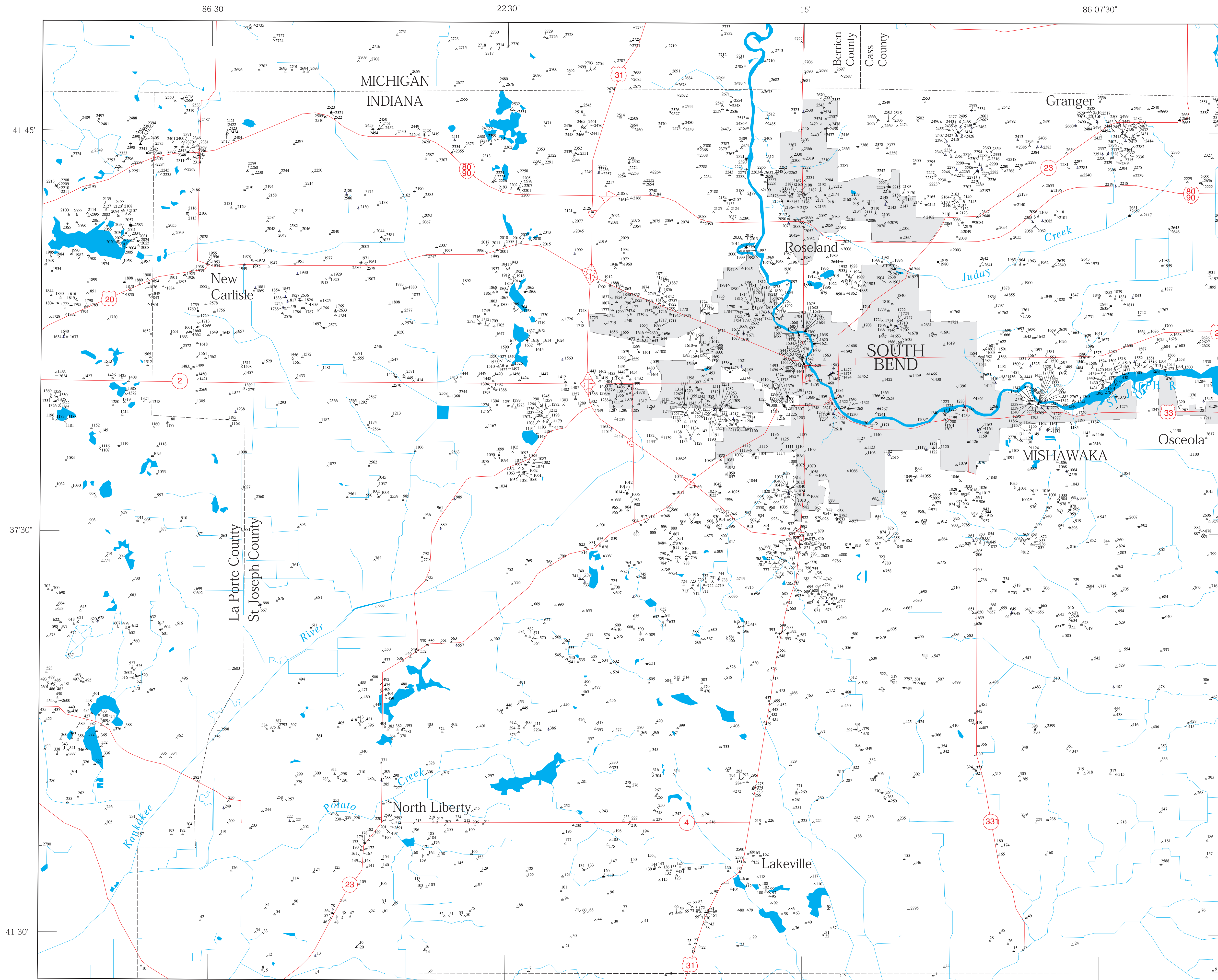


LOCATION OF WELLS WITH LITHOLOGIC, WATER QUALITY, AND GEOHYDROLOGIC CHARACTERISTIC INFORMATION IN THE STUDY AREA



SUMMARY AND CONCLUSIONS

The domestic and municipal water supply for the City of South Bend and for St. Joseph County, Indiana, is withdrawn primarily from thick layers of sand and gravel in the unconsolidated glacial deposits. These permeable layers can be shallow and susceptible to contamination. The U.S. Geological Survey, in cooperation with the South Bend Water Works, compiled lithologic, water-quality, and geohydrologic information in a map format to assess the availability and quality of ground water in and around the South Bend area. The study area includes all of St. Joseph County and the eastern part of La Porte County.

The ground-water-flow system in St. Joseph County and eastern La Porte County comprises two major aquifers (upper and lower). Both aquifers contain layers of sand, mixed sand and gravel, and gravel. The upper aquifer ranges in thickness from 0 to 150 feet (ft); the lower aquifer ranges from less than 10 ft to 180 ft thick. The aquifers can be separated vertically by a confining unit of clay-rich fill; thickness of the confining unit ranges from 0 to about 90 ft.

Areas of high horizontal hydraulic conductivity and transmissivity occur across the study area. Conductivities average 27 feet per day (ft/d) in the upper aquifer and 220 ft/d in the lower aquifer. The average transmissivity of the upper aquifer is 1,200 feet squared per day (ft<sup>2</sup>/day); the average transmissivity of the lower aquifer is 6,000 ft<sup>2</sup>/day. The lower aquifer has higher conductivities and transmissivities, on the average, than does the upper aquifer. The estimated recharge rates for four areas within the study area, calculated by use of stream base-flow separation, range from 7.36 to 12.5 inches per year.

Ground water is generally hard to very hard, near neutral to slightly alkaline (pH greater than 7.0), with median dissolved solid concentrations of 361 milligrams per liter (mg/L) in the upper aquifer and 430 mg/L in the lower aquifer. Concentrations of three constituents—dissolved solids, manganese, and iron—exceeded U.S. Environmental Protection Agency Secondary Maximum Contaminant Levels in samples from some wells. Concentrations of nitrate in two samples from the upper aquifer exceeded the Maximum Contaminant Level of 10 mg/L as N.

The maps indicate numerous areas around South Bend with adequate aquifer thickness and corresponding transmissivities to support development of additional ground-water resources for municipal use. The upper aquifer is thickest in the northeastern and southwestern parts of the study area, with areas of varying thickness to the west. The lower aquifer is thickest to the west, south, and north of South Bend. Numerous known contamination sites are in St. Joseph County; thus, the selection of new municipal well fields depends on the location of these sites relative to any new well fields and the corresponding ground-water-flow direction.

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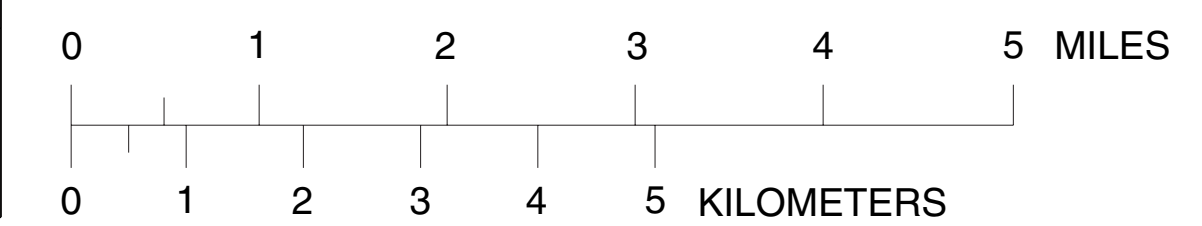
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- EXPLANATION
- ▲ Unique site identifier
  - Site with lithologic information
  - Site with water-quality information
  - Site with geohydrologic-characteristic information



Base maps from U.S. Geological Survey digital data, 1:100,000 1993  
Albers Equal Area projection  
Standard parallels 29° 30' and 40° 30', central meridian 40°

GEOHYDROLOGY AND QUALITY OF GROUND WATER IN UNCONSOLIDATED AQUIFERS NEAR SOUTH BEND, INDIANA

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