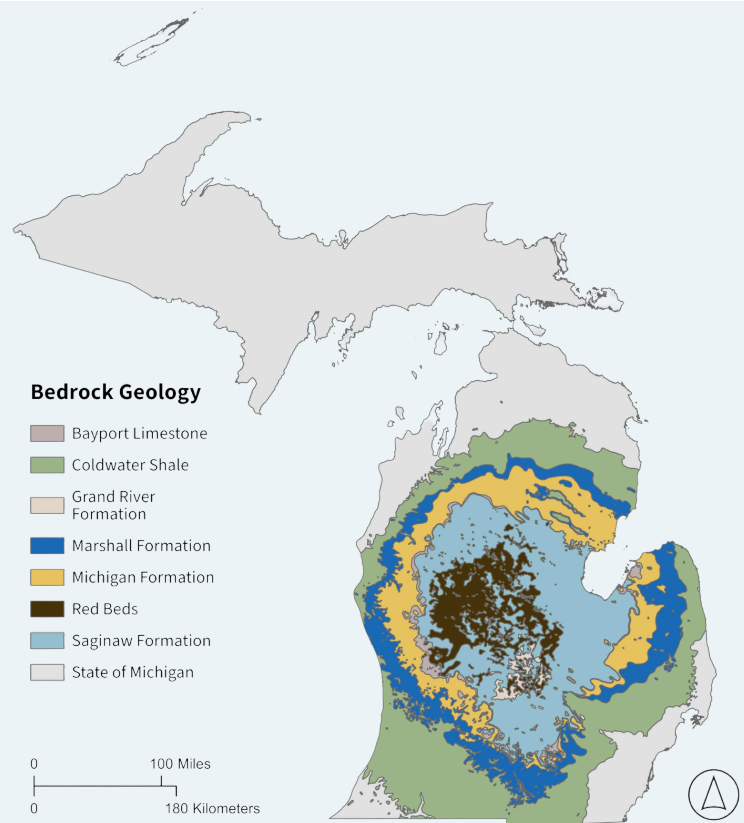


Exploring Michigan's Groundwater Resource

From *A Groundwater Strategy for Michigan: Protecting the "Sixth Great Lake"*

Geology

There are over 1,000 cubic miles of groundwater stored in the Great Lakes Basin, approximately the volume of Lake Huron. Michigan's groundwater is abundant but unevenly distributed due to its complex glacial geology, with most wells drawing from glacial aquifers and others relying on deeper bedrock aquifers such as the Marshall and Saginaw formations. Groundwater and surface water function as an interconnected system, with exchange between aquifers, streams, lakes, and wetlands, and connections ultimately extending to the Great Lakes.



Michigan's complex bedrock geology (Data from EGLE GeoWebFace, State of Michigan Open GIS Data)

Common Groundwater Contaminants

- **Geogenic sources** include naturally occurring contaminants such as arsenic, uranium, manganese, and brines.
- **Agricultural sources** include nutrients (nitrates, phosphorus), pathogens, and pesticides from fertilizer application, manure management, and field runoff.
- **Industrial sources** include PFAS, volatile organic compounds, and other chemicals from spills, leaking underground storage tanks, landfills, and legacy contamination.
- **Domestic sources** include effluent from failing septic systems and contaminants from household products and residential land use.



Brook Trout: the Michigan State Fish. Brook trout are reliant on groundwater-fed streams.

(Photo from Ryan Hagerty/USFWS)

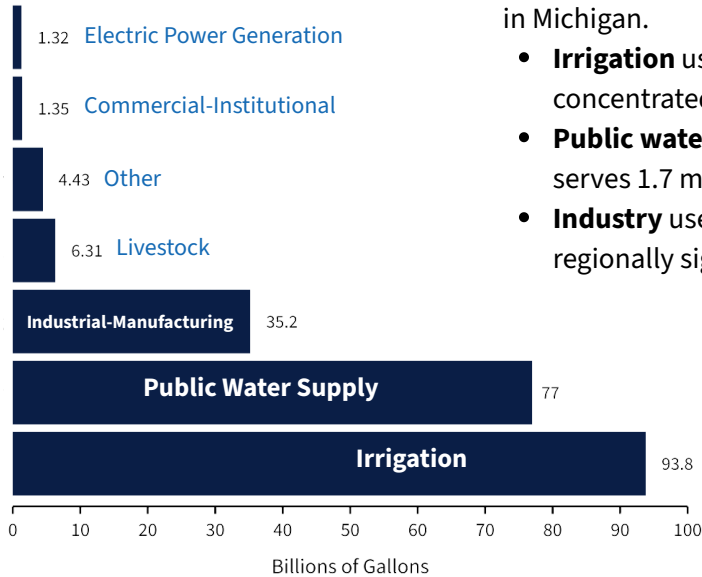
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Groundwater Use

A median of **219 billion gallons** of groundwater is used annually in Michigan.

- **Irrigation** uses 93.8 billion gallons per year and is concentrated in southwest Michigan.
- **Public water supply** uses 77 billion gallons per year and serves 1.7 million residents.
- **Industry** uses 35.2 billion gallons per year and can be regionally significant.



Over **1 million household wells** serve about a quarter of the state's population and are estimated to collectively withdraw at a rate of about 84 billion gallons per year.

Key Challenges

- Michigan groundwater quantity and quality face **growing pressures**. Expanding well drilling in the state suggests that groundwater withdrawals will continue to increase. Michigan also has an unusually high number of private household wells, increasing reliance on largely unmonitored sources.
- Contamination from various sources is likely widespread, yet testing, especially for private wells, is inconsistent. The full extent of **exposure is not well-tracked**, and data is largely unavailable.

Beyond its direct use by people, groundwater also quietly sustains much of what makes Michigan's landscape distinctive, feeding the streams and lakes that support native fishes and the broader web of life that defines the state's natural character. Recently, Michigan has increased attention to groundwater management through several ongoing projects. These improvements reflect recognition that current management may not fully capture the complexity and scale of the state's groundwater challenges. Continued advancements will be important, particularly as demand grows and hydrologic conditions become more variable.



See the full report