

## Groundwater Management in the Great Lakes Region

Often referred to as the “sixth Great Lake,” the total volume of groundwater within the Great Lakes basin is estimated to be greater than the volume of Lake Michigan.<sup>1</sup> Despite its scale and connection to the quality and quantity of Great Lakes surface water, extensive knowledge gaps exist regarding groundwater availability at the state-wide, basin, and regional scales.<sup>2</sup> This policy summary serves to expand The Joyce Foundation’s Groundwater Governance in EPA Region 5 report<sup>3</sup> to the entirety of the Great Lakes region.<sup>4</sup> All information included in **Table 1** applies to the entire jurisdiction.

**Table 1.** This table displays various aspects of groundwater regulations, usage, and policy for each of the ten Great Lakes states and provinces.

Jurisdiction	Agencies Engaged in Groundwater Oversight	Percentage of Population Relying on Groundwater for Drinking Water	Groundwater Use Legal Doctrine <sup>5</sup>	Groundwater Withdrawal Registration and/or Permitting
Illinois	Illinois Environmental Protection Agency (EPA); Illinois Dept. of Agriculture (DOA); Illinois Dept. of Natural Resources (DNR); Illinois Dept. of Public Health	40%	Reasonable Use	Annual reporting of withdrawals that pump at a rate of 70 gallons per minute or greater (100,000 gallons per day [GPD]) <sup>6</sup> is mandatory.
Indiana	Indiana DNR; Indiana Dept. of Environmental Management; Office of the Indiana State Chemist	60%	Absolute Ownership	Registration is required for users with the capacity to withdraw 100,000 GPD.
Michigan	Michigan Dept. of Environment, Great Lakes, and Energy; Michigan Dept. of Health and Human Services; Michigan Dept. of Agriculture and Rural Development	44%	Reasonable Use	Registration is required for users with the capacity to withdraw 100,000 GPD up to two million GPD. <sup>7</sup> A permit is required for users with the capacity to withdraw over two million GPD.

<sup>1</sup> Coon, W.F., and Sheets, R.A., 2006, [Estimate of ground water in storage in the Great Lakes Basin, United States, 2006](#): U.S. Geological Survey Scientific Investigations Report 2006–5180, 19 p.

<sup>2</sup> The Joyce Foundation. [Groundwater Governance in EPA Region 5](#).

<sup>3</sup> Ibid.

<sup>4</sup> The U.S. EPA Region 5 states are Illinois, Indiana, Michigan, Minnesota, Ohio, and Minnesota. The Great Lakes region includes those six states, plus the state of New York and the commonwealth of Pennsylvania and the Canadian provinces of Ontario and Québec.

<sup>5</sup> Definitions for each of these doctrines can be found at the following report by The National Agricultural Law Center: [High-Capacity Wells: A Survey of Groundwater Withdrawals Rights and Regulations](#).

<sup>6</sup> One gallon equates to approximately 3.79 liters.

<sup>7</sup> Except withdrawals for hydroelectric power production and contamination remediation.

Jurisdiction	Agencies Engaged in Groundwater Oversight	Percentage of Population Relying on Groundwater for Drinking Water	Groundwater Use Legal Doctrine <sup>5</sup>	Groundwater Withdrawal Registration and/or Permitting
Minnesota	Minnesota DNR; Minnesota Pollution Control Agency; Minnesota Dept. of Health (DOH); Minnesota DOA	74%	Absolute Dominion	New or existing water users in Minnesota must obtain a permit to withdraw more than 10,000 GPD or one million gallons per year.
New York	New York State (NYS) Dept. of Environmental Conservation; NYS DOH; NYS Dept. of Agriculture and Markets; NYS Dept. of State	25%	Reasonable Use	A Water Withdrawal Permit is required for all non-agricultural water withdrawal systems with the capacity to withdraw 100,000 GPD or more and a Water Withdrawal Permit or Agricultural Registration is required for agricultural users that withdraw an average of 100,000 GPD in any 30-day period.
Ohio	Ohio DNR; Ohio EPA; Ohio DOH; Ohio DOA	42%	Restatement (Second) of Torts	Ohio requires registration for all facilities with the capacity to withdraw at least 100,000 GPD. A permit is required for any facility in Ohio that withdraws waters of the state in an amount that would result in a new or increased consumptive use of more than an average of two million GPD in any 30-day period.
Ontario	Ontario Ministry of the Environment, Conservation, and Parks; Ontario Ministry of Energy and Mines	23%	Reasonable Use	A Permit to Take Water is required for any person who withdraws more than 50,000 liters per day (LPD). <sup>8</sup> Water takings for ordinary household purposes, watering of livestock or poultry and firefighting purposes are exempt from obtaining a permit, unless a new or increased transfer of water of 379,000 LPD or more is established for household purposes or watering of livestock or poultry.
Pennsylvania	Pennsylvania Dept. of Environmental Protection; Pennsylvania Dept. of Conservation and Natural Resources	50%	Reasonable Use	Registration is required for all public supply and hydroelectric power users and all other users whose total withdrawal exceeds an average rate of 10,000 GPD in any 30-day period.
Québec	Québec Ministry of the Environment, the Fight against Climate Change, Wildlife and Parks (MELCCFP)	25%	Public Trust	Any water user whose total water withdrawals are equal to or greater than 50,000 LPD, at least one day during a calendar year, must report withdrawals to the MELCCFP. Ministerial authorization is mandatory for all withdrawals equivalent to or greater than 75,000 LPD.
Wisconsin	Wisconsin DNR; Wisconsin Dept. of Agriculture, Trade, and Consumer Protection	70%	Restatement (Second) of Torts	Registration is required for users with the capacity to withdraw 100,000 GPD. An individual permit is required to withdraw water if the withdrawal will result in a water loss averaging two million GPD in a 30-day period.

<sup>8</sup> One liter equates to approximately 0.26 gallons.

## Great Lakes Basin Groundwater Management

The Great Lakes-St. Lawrence River Basin Water Resources Compact (Compact) and the accompanying Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement (Agreement) established a regional governance framework to promote the efficiency and conservation of water and retain the quantity of surface water and groundwater in the basin.<sup>9</sup> Under the Compact and the Agreement, the states and provinces are required to report water withdrawals, diversions and consumptive uses from within the basin. These reports are added to the [Great Lakes Regional Water Use Database](#), which has tracked water use data since 1987 and informs discussions pursuant to the Compact and Agreement. Each jurisdiction oversees its own water use program to manage their respective water resources. **Table 2** summarizes how each Great Lakes state registers, permits, and enforces water use reporting compliance. Because water withdrawal thresholds do not usually differ between surface water and groundwater, information provided covers water management within the Great Lakes-St. Lawrence River basin from all [water use sectors](#) and sources (i.e., groundwater, tributary surface water, and Great Lakes surface water) unless otherwise stated in the table or footnotes.

**Table 2.** This table highlights the registration and/or permitting thresholds and fees assessed for groundwater withdrawals within the Great Lakes-St. Lawrence River basin for each of the ten Great Lakes states and provinces. The Compliance (fine) column documents how each jurisdiction compels groundwater users to report their withdrawals to their relevant state agency/provincial ministry.

Jurisdiction	Registration (fee)	Permitting (fee)	Compliance (fine)
<b>Illinois</b>	Participation in the Illinois State Water Survey is required for high capacity well and intake owners withdrawing more than 100,000 gallons per day (GPD); no fee is required.	An allocation permit is required for all users diverting water from Lake Michigan; no fee is assessed.	Illinois DNR sends letters to permittees for late data submissions or data errors; no fine is issued.
<b>Indiana</b>	Registration is required for users with the capacity to withdraw 100,000 GPD; no fee is assessed.	A permit is required for any new or increased average daily withdrawal over any consecutive 90-day period that exceeds one million GPD; no fee is assessed.	Indiana DNR contacts users by phone and email to ensure water use reports are submitted by March 31 each year; no fine is issued.
<b>Michigan</b>	Registration is required for users with the capacity to withdraw 100,000 GPD up to two million GPD; a \$200 <sup>10</sup> annual fee is assessed to some users.	A permit is required for users with the capacity to withdraw over two million GPD; a \$2,000 permit application fee is required.	The Michigan Department of Environment, Great Lakes, and Energy sends compliance violation notices by mail to registrants and permittees; a civil fine of \$1,000 can be levied for noncompliance.
<b>Minnesota</b>	Registration is captured in the permitting process.	A permit is required for users that withdraw one million gallons per year or 10,000 GPD; a reporting fee of at least \$140 is assessed to users.	Minnesota DNR communicates with users about compliance with permit terms and conditions, then escalates enforcement with penalties (i.e., fines) as warranted.
<b>New York</b>	Registration is not currently available. A registration program was available to agricultural users that reported withdrawals to NYS DEC on or before February 15, 2012; no fee is assessed.	A permit is required for non-agricultural users with the capacity to withdraw 100,000 GPD and agricultural users that withdraw an average of 100,000 GPD in any 30-day period; no permit or water usage fees are assessed.	NYS DEC contacts users by mail and email with warnings and notices of violation or consent orders to ensure compliance; most water withdrawal program violations carry a statutory maximum fine of up to \$2,500 + \$500 per day.
<b>Ohio</b>	Registration is required for users with the capacity to withdraw 100,000 GPD; no fee is assessed.	A permit is required for all new/increased withdrawals and consumptive uses; <sup>11</sup> no fee is assessed.	Ohio DNR contacts noncompliant users by mail and refers them to the Ohio AG office; no fine is issued.

<sup>9</sup> Great Lakes—St. Lawrence River Basin Sustainable Water Resources [Compact and Agreement](#).

<sup>10</sup> \$1 USD equates to approximately \$1.39 CAD as of January 2026.

<sup>11</sup> The water use threshold for permitting is one million GPD for groundwater and inland surface water uses and 2.5 million GPD for Lake Erie surface water uses.

Jurisdiction	Registration (fee)	Permitting (fee)	Compliance (fine)
<b>Ontario</b>	As of March 29, 2016, certain routine and low risk water takings that meet the criteria in O. Reg. 63/16 under the Environmental Protection Act (e.g., pumping tests and road construction and construction site dewatering projects) must be registered in the Environmental Activity and Sector Registry (EASR) instead of requiring a Permit to Take Water; no fee is assessed.	A Permit to Take Water is required for any person who withdraws more than 50,000 liters per day (LPD). Water takings for ordinary household purposes, watering of livestock or poultry and firefighting purposes are exempt from obtaining a permit, unless a new or increased transfer of water of 379,000 LPD or more is established for household purposes or watering of livestock or poultry; a permit fee of \$750 to \$3,000 <sup>12</sup> is assessed. <sup>13</sup>	When Ontario's environmental rules are not followed, environmental penalties may be issued, including a \$1,000 per day fine for failure to submit a quarterly report.
<b>Pennsylvania</b>	Registration is required for all public supply and hydroelectric power users and all other users that withdraw 10,000 GPD; no fee is assessed.	The permitting of withdrawals is accomplished through multiple Pennsylvania DEP permitting programs that focus on the type of industry and activity. The threshold for management of withdrawals is any new or increased withdrawal from the basin in an amount that equals or exceeds 100,000 GPD averaged over any 90-day period; no fee is assessed.	Pennsylvania DEP mails or emails users to ensure reporting compliance; no fine is issued.
<b>Québec</b>	Any water user who withdraws water from the St. Lawrence River basin from a withdrawal site whose works or installations have a nominal withdrawal capacity equal to or greater than 379,000 LPD is required to declare annually to the MELCCFP; charges are established on the basis of the volume of water used in a year. <sup>14</sup>	Ministerial authorization is mandatory for all withdrawals equivalent to or greater than 75,000 liters per day but also for certain withdrawals whose maximum flow rate is less than 75,000 liters per day (e.g., withdrawals serving fewer than 20 people for human consumption or water that is withdrawn in the St. Lawrence River basin to be transferred out of the basin); charges are established on the basis of the volume of water used in a year. <sup>15</sup>	An administrative monetary penalty of \$350 in the case of an individual or \$1,500 in other cases may be imposed on anyone who fails to report water withdrawal volumes and other required information to the MELCCFP.
<b>Wisconsin</b>	Registration is required for users with the capacity to withdraw 100,000 GPD; a fee of at least \$125 per property is assessed.	A permit is required for users that withdraw 100,000 GPD; <sup>16</sup> an application fee of \$500 is assessed for high capacity well approvals.	Violations of registration, reporting, water use permit or approvals, or diversion regulations and approvals may be referred to the Wisconsin DOJ. Wisconsin DNR sends reminder notices to water users that have not reported. Water users that do not pay water use fees are referred to collections. Wisconsin DNR has the authority to issue fines between \$10 and \$10,000 for violations of Great Lakes Water Resources Compact implementing legislation.

<sup>12</sup> \$1 CAD equates to approximately \$0.72 USD as of January 2026.

<sup>13</sup> Additional fees are assessed for industrial or commercial water users who take more than 50,000 liters on any day in a calendar year. More information can be found at [https://www.ontario.ca/page/water-taking-report-and-charges#:~:text=The%20Water%20Taking%20Reporting%20System%20\(WTRS\)%20is,the%20ministry%20within%2030%20days%20of%20operation.](https://www.ontario.ca/page/water-taking-report-and-charges#:~:text=The%20Water%20Taking%20Reporting%20System%20(WTRS)%20is,the%20ministry%20within%2030%20days%20of%20operation.)

<sup>14</sup> Rates of charges can be found at Q-2, r. 42.1 – [Regulation respecting the charges payable for the use of water.](#)

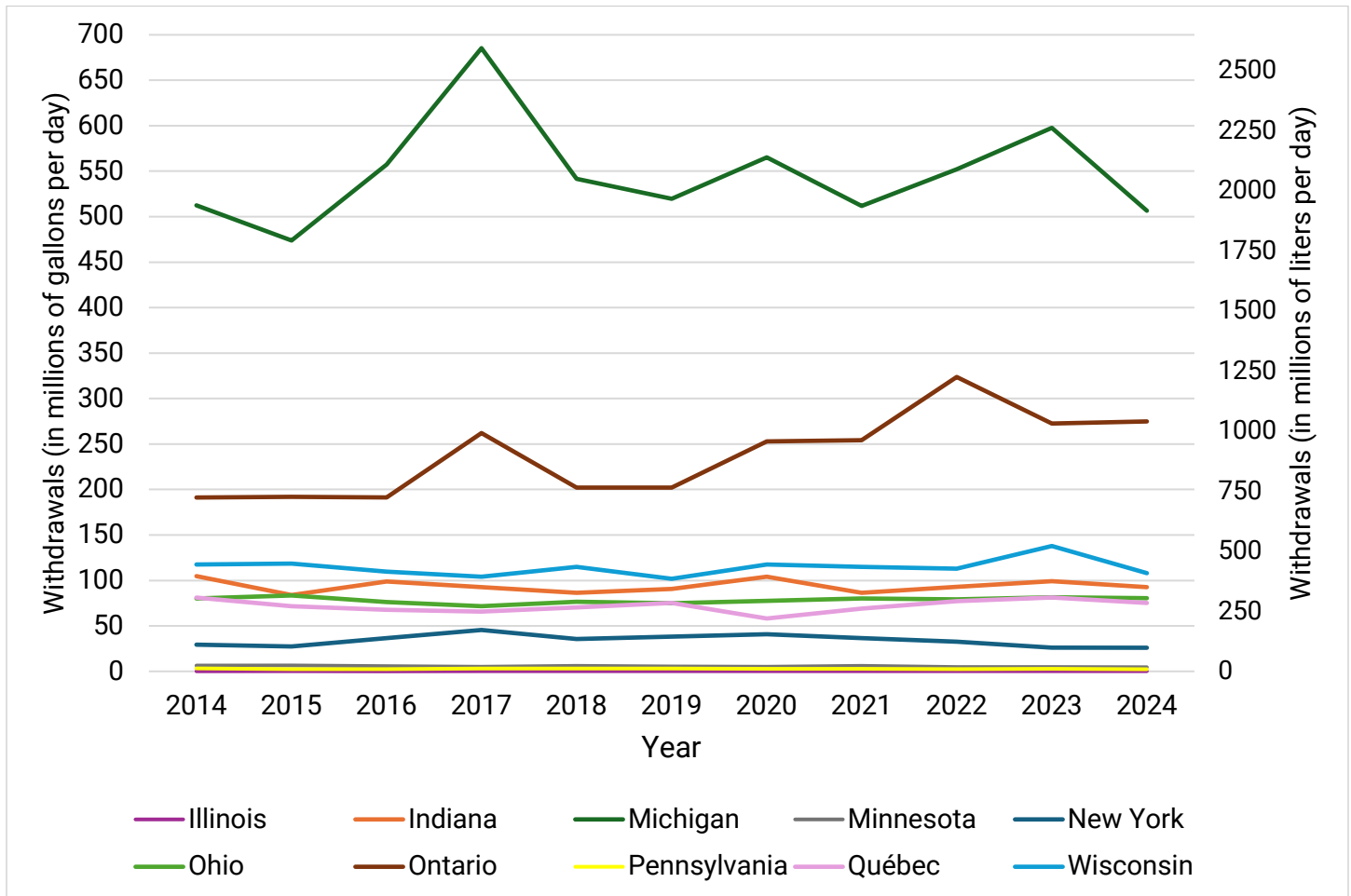
<sup>15</sup> Rates of charges can be found at Q-2, r. 42.1 – [Regulation respecting the charges payable for the use of water.](#)

<sup>16</sup> General permits are required for withdrawals averaging 100,000 GPD but not exceeding one million GPD for 30 consecutive days; individual permits are required for withdrawals of at least one million GPD for 30 consecutive days.

## Great Lakes-St. Lawrence River Basin Groundwater Usage

Groundwater withdrawals from the Great Lakes basin have remained relatively stable over the last decade. Groundwater withdrawals for irrigation are typically the largest source of interannual variation, due to changing irrigation needs based on precipitation and temperature. See **Figure 1** below to view trends in reported groundwater withdrawals within the Great Lakes-St. Lawrence River basin from each facility withdrawing at least 100,000 gallons (379,000 liters) per day from 2014 to 2024.

**Figure 1.** Great Lakes-St. Lawrence River Basin Groundwater Withdrawals from 2014-2024.<sup>17</sup>



<sup>17</sup> As reported to the [Great Lakes Regional Water Use Database](#).

## State/Provincial Groundwater Definitions and Resources

The following section highlights state- and provincial-specific definitions of key terms related to groundwater management and jurisdictional programs, policies, tools, and other resources that facilitate the inventorying and/or creation of groundwater science and knowledge. For additional details on how each Great Lakes state and province manages groundwater, please refer to the individual jurisdiction groundwater management summaries created by the Great Lakes Commission with support from The Joyce Foundation [here](#).

### Illinois

#### Statewide definitions

- **Groundwater:** underground water which occurs within the saturated zone and geologic materials where the fluid pressure in the pore space is equal to or greater than atmospheric pressure.
- **High-capacity Well:** a high-capacity well or intake is any well or intake that is rated to pump 70 gallons per minute or greater. In addition, any facility which owns or operates multiple wells or intakes that when combined are rated to pump 70 gallons per minute is classified as a high-capacity operation.

#### Groundwater science and knowledge production

- The Illinois State Water Survey (ISWS) coordinated with Wisconsin and Iowa to create the Illinois Groundwater Flow Model, which allows for the study of regional impacts of withdrawals from the sandstone aquifer system.
- The Illinois Water Inventory Program under the ISWS produces an annual, statewide inventory of water use and withdrawals by high-capacity water wells and intakes from public water supplies, self-supplied industries, irrigation, fish and wildlife, and conservation.
- The Illinois State Geological Survey provides geologic information and research and produces the ILWATER mapping application containing more than 700,000 wells drilled in Illinois.

### Indiana

#### Statewide definitions

- **Groundwater:** "ground water" or "subterranean water", with some exceptions, means all water that fills the natural openings under the earth's surface.
- **High-capacity Facility:** any well or surface water intake, or combination of wells and intakes, capable of pumping at least 100,000 gallons/day, regardless of how much water is actually pumped.

#### Groundwater science and knowledge production

- The Indiana DNR keeps a water well database that serves as an inventory of Significant Water Withdrawal Facilities<sup>18</sup> and their associated withdrawal sources (groundwater wells and/or surface water intakes).
- Indiana has a collaborative Voluntary Monitoring Program with the USGS Ohio-Kentucky-Indiana that collects groundwater data for both short- and long-term applications and currently consists of more than 60 observation wells.
- The Indiana Water Balance Network compiles 15 Indiana Geological and Water Survey (IGWS) monitoring stations that collect hydrologic data, including groundwater levels, to track long-term hydrologic cycle trends.

### Michigan

#### Statewide definitions

- **Groundwater:** the water in the zone of saturation that fills all of the pore spaces of the subsurface geologic material.
- **High-capacity Well:** a well which has the capacity to withdraw more than 100,000 gallons per day in any consecutive 30-day period.

#### Groundwater science and knowledge production

- The State of Michigan's Water Withdrawal Assessment Tool is used to assess the impacts of pumping groundwater on surface water features, such as stream and river flows.
- The Michigan Geological Survey provides data on geology and hydrogeology and maintains a GIS data map that includes the location of water wells throughout the state.
- As part of Michigan's Hydrologic Enhancement for Michigan (HEMI) project, well records, streamflow and stream temperatures, and other water use data will be reviewed to identify where additional monitoring and data may be needed to better manage the water resources of the state.

<sup>18</sup> Indiana Department of Natural Resources. [Significant Water Withdrawal Facilities](#).

## Minnesota

### Statewide definitions

- **Groundwater:** water contained below the surface of the earth in the saturated zone including, without limitation, all waters whether under confined, unconfined, or perched conditions, in near-surface unconsolidated sediment or regolith, or in rock formations deeper underground.
- **High-capacity Well:** a well that discharges in excess of 10,000 gallons per day or one million gallons per year.

### Groundwater science and knowledge production

- The Minnesota Geological Survey (MGS), hosted by the University of Minnesota, has completed surficial, stratigraphic, and bedrock maps for half of Minnesota's 87 counties. These maps are used by the Minnesota DNR to create hydrogeologic atlases that focus on groundwater chemistry and pollution sensitivity.
- The MGS, in partnership with the Minnesota Department of Health, maintains a database of subsurface information for almost 600,000 water wells and borings drilled in the state.
- Minnesota DNR gathers and publishes annual permitted water use data on its website and produces a permit location map.

## New York

### Statewide definitions

- **Groundwater:** when rain falls to the ground, some of it is carried away as runoff down-slope into streams, lakes, and other bodies of water or into sewers. But some of it travels downward into the ground and through the underlying sediment, the upper part of which is not completely filled with water (the "unsaturated zone"). Continuing its downward route through the unsaturated zone, it moves through the interconnected openings of sand, gravel, silt, and clay or openings in rock until it reaches the "saturated zone" where it becomes groundwater.
- **High-capacity Well:** wells with the capacity to withdraw at least 100,000 gallons per day.

### Groundwater science and knowledge production

- The NYS Museum Geology Department and New York State Geological Survey (NYSGS) work to conduct geologic research and make datasets and maps available to state agencies, educational institutions, and the public.
- The NYS DECinfo Locator is an interactive map that allows users to access public data on public wells throughout the state. The Water Withdrawal Annual Report category in the Permits and Registrations information layer displays all permitted water withdrawal facilities and whether they use surface water or groundwater.
- New York maintains a GIS Clearinghouse that includes a map of unconsolidated aquifers throughout Upstate New York, which, together with the NYSGS surficial and bedrock geology maps, form a consistent set of geologic and groundwater maps for use in regional management of the groundwater resources of the state.

## Ohio

### Statewide definitions

- **Groundwater:** water saturating the void spaces, pores, and fractures in the soil and rock at some depth below the earth's surface.
- **High-capacity Well:** a well with the capacity to withdraw at least 100,000 gallons per day.

### Groundwater science and knowledge production

- The Ohio DNR Division of Geological Survey (ODNR-DGS) creates groundwater maps and publications including statewide maps of bedrock and glacial aquifers, aquifer yield, hydraulic conductivity, and some county maps of potentiometric surfaces.
- The ODNR-DGS maintains a statewide Groundwater Vulnerability Map; partners with the USGS to produce a statewide Observation Well Network that collects and analyzes groundwater-level data from 151 wells situated in 63 of Ohio's 88 counties; and compiles Monthly Water Inventory Reports on current precipitation data, stream flow data, and water levels for reservoirs, groundwater, and Lake Erie.
- The ODNR-DGS completed a hydrogeologic assessment of the Michindoh aquifer of northwest Ohio.

## Ontario

### Provincial definition of "groundwater"

- **Groundwater:** water that seeps into the ground and passes through subsurface materials such as soil, sediment and bedrock.
- **High-capacity Well:** a well that can yield a rate of more than 60 liters per second could be considered a high yield (high-capacity) well.

### Groundwater science and knowledge production

- The Ontario Ministry of the Environment, Conservation and Parks (MECP) manages a map of well record information from approximately one million reported wells throughout the province. MECP also oversees Ontario's Provincial Groundwater Monitoring Network, which monitors ambient groundwater quantity and quality conditions through 480 monitoring wells in the province.
- The Ontario Geological Survey (OGS) Publications Database houses a large collection of geological reports, maps, and books that the OGS has published over the years.
- The OGS's ambient groundwater geochemistry project has collected over 6,660 samples of groundwater from untreated bedrock- and surficial sediment-derived aquifers across southern Ontario and parts of northeastern Ontario and created digital datasets and maps with the aim of understanding relationships between aquifer composition and groundwater quality.

## Pennsylvania

### State definition of “groundwater”

- **Groundwater:** subsurface waters of the commonwealth.
- **High-capacity Well:** a well from which the total withdrawal from a point of withdrawal, or from multiple points of withdrawal operated as a system either concurrently or sequentially, within a watershed exceeds an average rate of 10,000 gallons per day in any 30-day period.

### Groundwater science and knowledge production

- The Pennsylvania Department of Conservation and Natural Resources (DCNR's) Pennsylvania Groundwater Information System contains publicly accessible data on water well and spring records. The DCNR's accompanying Pennsylvania GEOlogic Data Exploration (PaGEODE) interactive map contains information on bedrock and surficial geology and groundwater well site locations and yields.
- The Pennsylvania Department of Environmental Protection manages several GIS mapping tools, including a GIS Open Data Portal which provides access to public data on water pollution control and surface and groundwater withdrawals across the commonwealth.
- The Pennsylvania Geological Survey compiles a group of datasets on the bedrock geology of the commonwealth, consisting of ArcGIS shapefiles for geologic units.

## Québec

### Provincial definition of “groundwater”

- **Groundwater:** water in the saturated zone, or the entire region below the water table.
- **High-capacity Well:** wells that withdraw a daily volume of water equal to or greater than 75,000 liters for at least one day in the year and are wholly outside the Great Lakes-Lake Lawrence River basin. This threshold increases to 379,000 liters of water per day when withdrawals are made within the basin.

### Groundwater science and knowledge production

- The Québec Groundwater Monitoring Network is made up of more than 260 active monitoring stations throughout the province to measure how groundwater levels and temperatures are evolving in the context of climate change. Since 2017, the government of Québec has tasked university research teams to conduct groundwater knowledge acquisition projects to better understand the quality, quantity, and vulnerability of groundwater for public supply and ensure development and land use planning is compatible with water resource protection.
- Users can view and download the measurements and taken and other information on the monitoring stations in the first Groundwater Status Bulletin for the southern St. Lawrence River region. These efforts aim to improve groundwater data and develop forecasting capabilities to prepare for the impacts of climate change throughout the province.

## Wisconsin

### State definition of “groundwater”

- **Groundwater:** any of the waters of the state, as defined in Wis. Stat. § 281.01 (18), occurring in a saturated subsurface geological formation of rock or soil.
- **High-capacity Well:** a well that, together with all other wells on the same property, has a capacity of more than 100,000 gpd or 70 gallons per minute.

### Groundwater science and knowledge production

- The Wisconsin Geological and Natural History Survey (WGNHS) and the U.S. Geological Survey (USGS) partner to provide basic information related to hydrology, hydrogeology, and geology in Wisconsin. WGNHS and USGS also collaborate with municipal, county, state, and federal partners in regional hydrogeologic studies.
- The USGS maintains a statewide groundwater level monitoring network in coordination with the Wisconsin DNR and WGNHS. WGNHS also maintains a well database used primarily to map the geology and hydrology of the state.
- The Wisconsin DNR uses monthly water use reporting information from approved high-capacity wells to develop annual summaries of statewide water use. The Wisconsin DNR provides access to information on groundwater quality and quantity through story maps, a water quantity data viewer, a statewide annual report, and a groundwater quality database.