



Wisconsin Water Use

2024 Water Withdrawal Report

Water supply systems in Wisconsin capable of withdrawing 100,000 gallons or more per day are required to register and report water withdrawals annually. The state has over 15,000 registered sources that have withdrawn from wells, ponds, streams, rivers and lakes. The 1.7 trillion gallons withdrawn in 2024 is equivalent to 500,000 two-liter sodas per *person* in Wisconsin.

How, when and where water is withdrawn varies

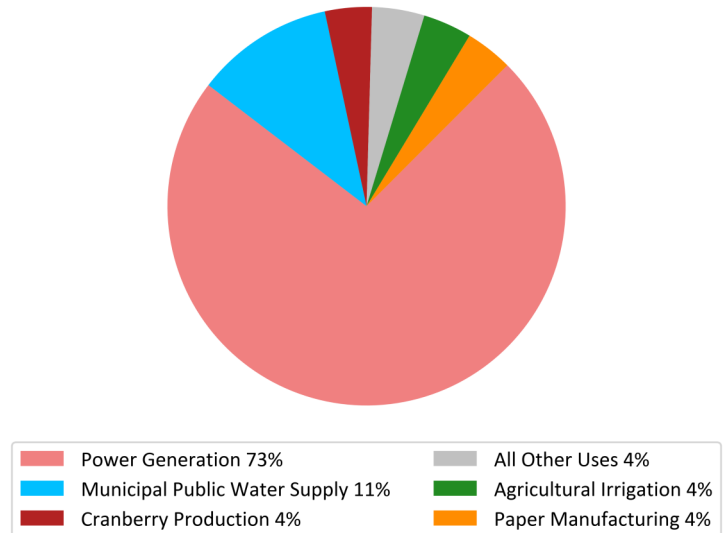
seasonally throughout the state. Yearly withdrawal volumes vary with precipitation trends. Comparing 2024 to the 30-year average:

- Wisconsin received 37 inches of precipitation, 4 inches less than the average (34 inches between 1990 and 2020).
- 2024 was the state's hottest year on record.
- Sept. and Oct. were the No. 6 driest on record.
- March through Aug. were the wettest months ever recorded.
- Southern and central Wisconsin saw wetter-than-normal conditions while northern Wisconsin was drier-than-normal.¹

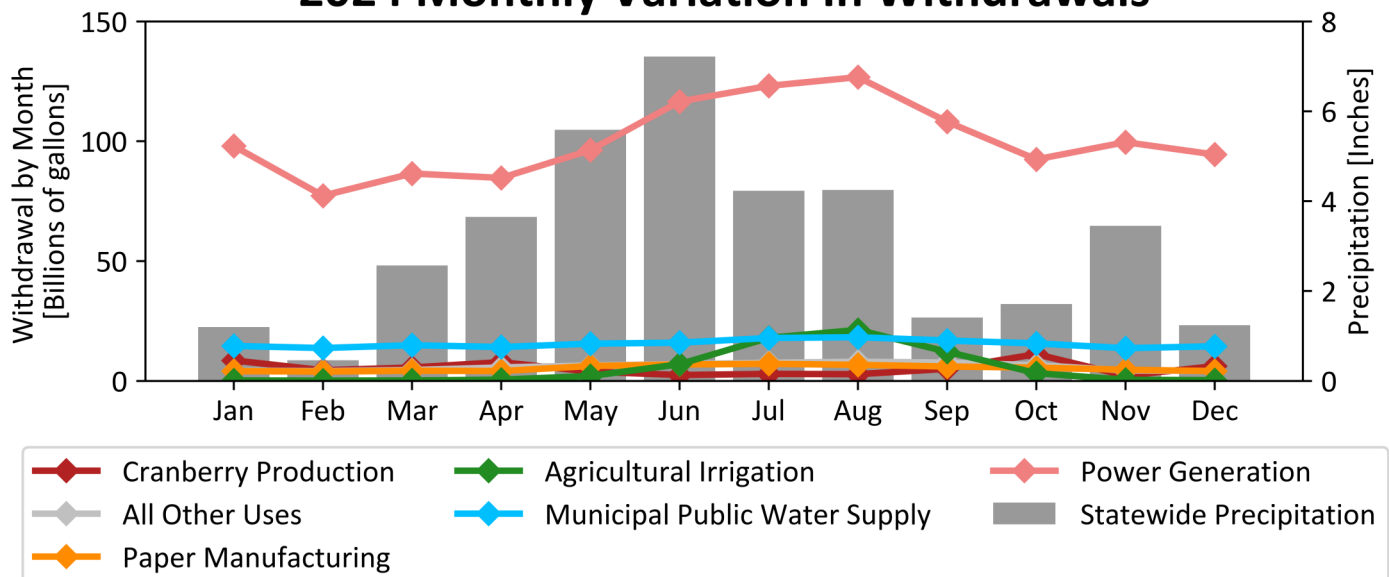
2024 total water withdrawals were 9% lower than the average annual water use for between 2015 – 2024. Similar to previous years' data, power generation and agricultural irrigation varied the most by season.

2024 Withdrawals By Use

Total Withdrawals = 1.65 Trillion Gallons

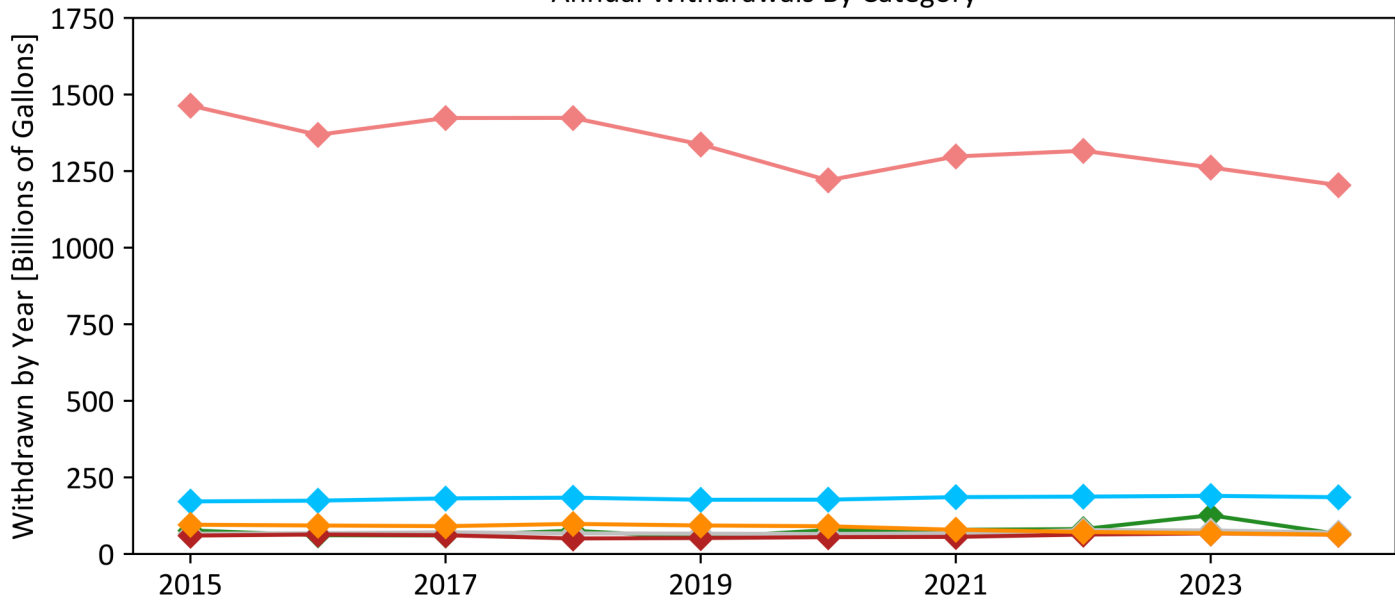


2024 Monthly Variation In Withdrawals

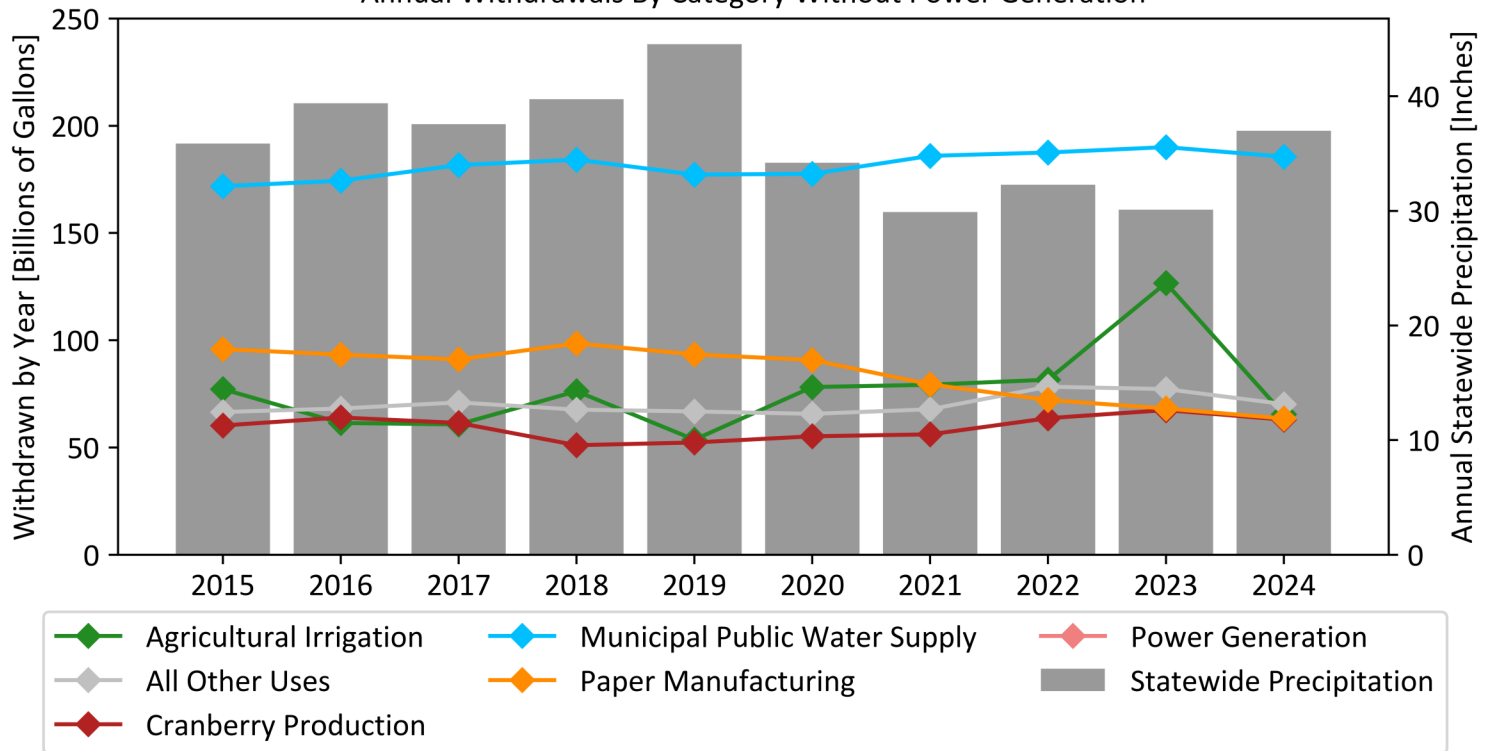


Annual Total Withdrawals By Category, 2015 To 2024

Annual Withdrawals By Category



Annual Withdrawals By Category Without Power Generation



Power generation is the **primary** use for water withdrawal in Wisconsin. Though the trend could change, improved process efficiency and power plant closures account for the decrease in power generation water withdrawals since 2012.

Water withdrawals are highest in years with higher temperatures and/or lower precipitation due to increased need for power generation cooling and increased demand for agricultural irrigation and municipal public water supply. Seasonality of precipitation also affects withdrawals. For instance, 2023 was much drier during the growing season than 2024, which resulted in a relatively higher agricultural irrigation water use in 2023.

2024 Water Withdrawals By Category And Source

Water Use	Total Active Sources	Total 2024 Withdrawals (Bgal)	Total Active Groundwater Sources	2024 Groundwater Withdrawals (Bgal)	Total Active Surface Water Sources	2024 Surface Water Withdrawals (Bgal)
Agricultural Irrigation	3819	65.5	3701	63.3	118	2.2
All Other Uses	1416	11.2	1291	5.3	125	5.9
Non-Municipal Public Supply	1657	3.3	1655	2.4	2	0.9
Municipal Public Water Supply	1571	185.6	1546	89.0	25	96.6
Cranberry Production	372	63.0	128	2.4	244	60.6
Commercial	455	5.5	447	1.1	8	4.4
Dairy Production	893	7.8	892	7.8	1	0.0
Industrial (non-mining)	511	12.8	496	10.1	15	2.7
Golf Course Irrigation	392	4.4	339	3.8	53	0.6
Non-Metallic Mining	111	14.0	59	1.4	52	12.6
Aquaculture	137	11.1	121	6.1	16	5.0
Power Generation	55	1204.2	35	2.3	20	1201.9
Paper Manufacturing	37	63.5	9	1.5	28	62.0
Total	11426	1651.9	10719	196.5	707	1455.3

Compared to water withdrawals since 2012, in 2024:

- Power generation withdrawal volume was the lowest on record.
- Agricultural irrigation withdrawal volume was the fourth lowest.
- Municipal withdrawal volume was the fifth greatest, about average over the period.
- Paper manufacturing withdrawal volume was the lowest of any year, continuing a five-year decline.

Water users measure withdrawals using one of several methods. For groundwater, these methods include totalizing flow meters, hour meters, horizontal pipe discharge measurements and other methods approved by the DNR on a case-by-case basis. For surface water, these methods include measurement from a rectangular or V-notch weir, horizontal pipe discharge measurement, estimation from flooding events based on area and other methods approved by the DNR on a case-by-case basis. For the roughly 11,000 who reported in 2024, 72% measured with flow or hour meters versus 28% who estimated their withdrawals. An additional 3,000 sources did not withdraw water in 2024 but are registered with the Wisconsin DNR.

Surface Water Withdrawals

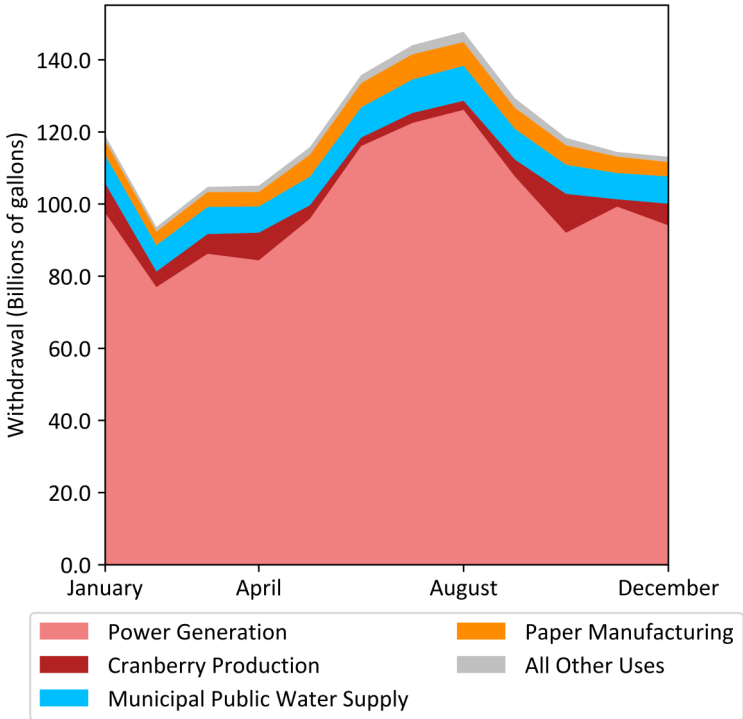
In 2024, surface water withdrawals accounted for **88% of total water use**, continuing the general trend observed from 2012 to 2024 of decreasing water withdrawals for power generation.

While most water withdrawals in Wisconsin are from surface water, water loss is minimal relative to the amount withdrawn because water is used and discharged near the point of withdrawal.

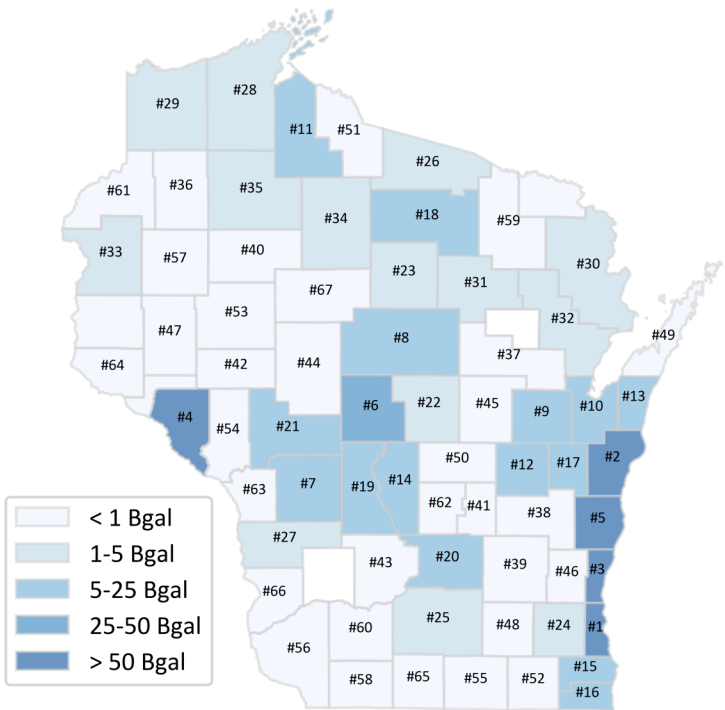
Power generation facilities accounted for the largest volume of surface water withdrawals at 1.2 trillion gallons. These facilities are concentrated along Lake Michigan and the Wisconsin and Mississippi Rivers.

Municipal public water supply was the next highest use for surface water at 0.097 trillion gallons, concentrated in counties with large populations bordering Lake Michigan. The ‘All Other Uses’ category includes mining, industry, commercial uses, other-than-municipal water systems, non-transient, non-community water systems, schools, fire protection, remediation and other uses.

2024 Surface Water Withdrawals By Use
Annual Total Surface Water Withdrawals = 1.46 Billion Gallons



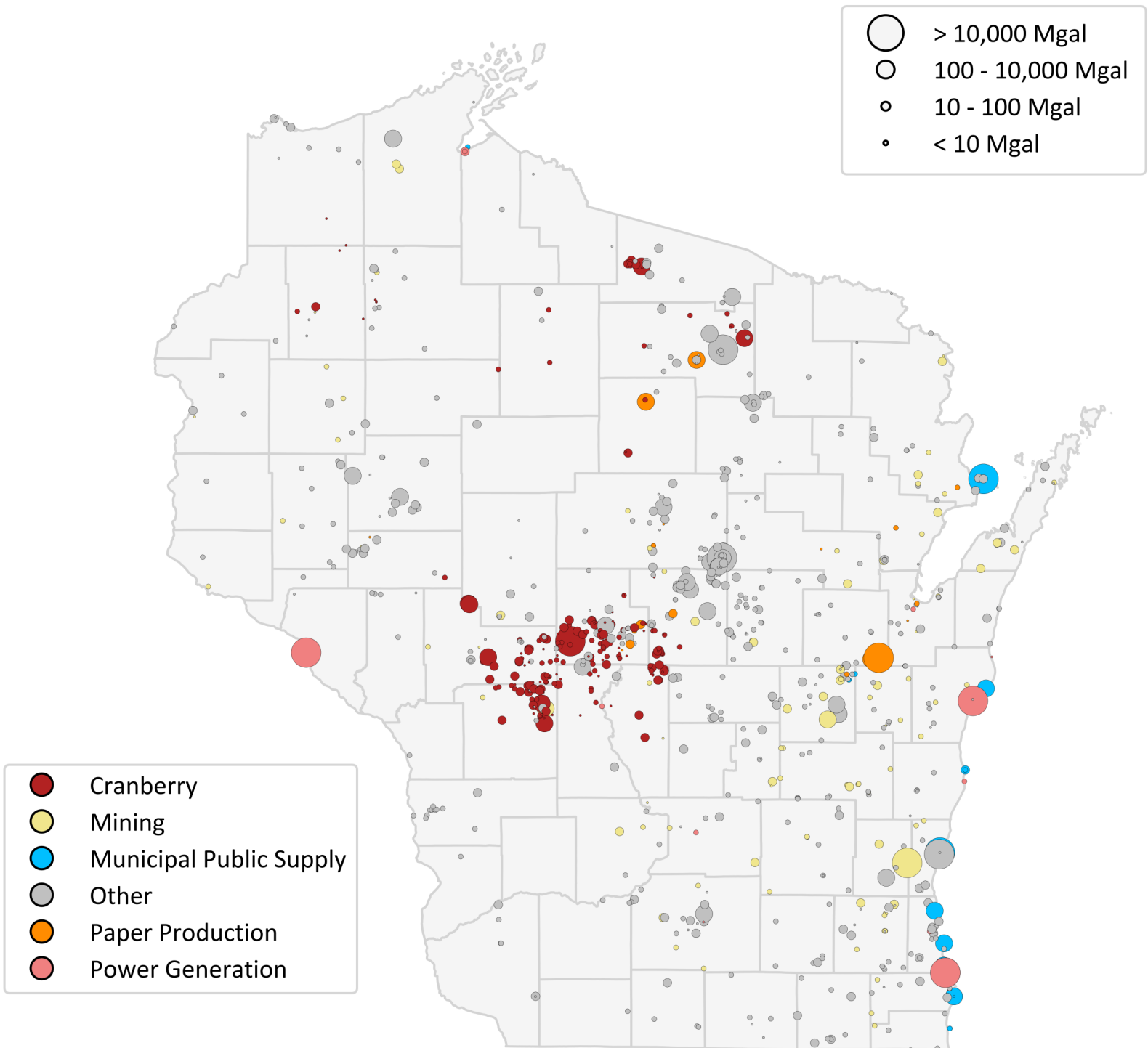
2024 Surface Water Withdrawals By County



Milwaukee (#1), Manitowish (#2), Ozaukee (#3), Buffalo (#4) and Sheboygan (#5) Counties made up 85% of the total surface withdrawals in 2024.

The top 10 surface water withdrawing counties used water for power generation, paper manufacturing or cranberry production. Milwaukee (#1), Manitowish (#2), Ozaukee (#3), Buffalo (#4), Sheboygan (#5) and Brown (#10) counties used most of their surface water for power generation. Wood (#6), Marathon (#8) and Outagamie (#9) counties primarily used surface water for paper manufacturing. Monroe County (#7) primarily used surface water for cranberry production

2024 Surface Water Withdrawals



The size of the dot corresponds to the scale of surface water withdrawal, with the smallest dot indicating less than 10 million gallons annually and the largest over 10 billion gallons annually. Municipal public supply and power generation surface water withdrawals consist of fewer large-volume withdrawal sites, while cranberry production consists of numerous lower volume withdrawals. Water users withdraw water at different times of the year, based on need, for example, withdrawals for power generation peak in late summer when cooling needs are highest. Cranberry growers' peak use for withdrawals is in late spring and again in late fall.

Groundwater Withdrawals

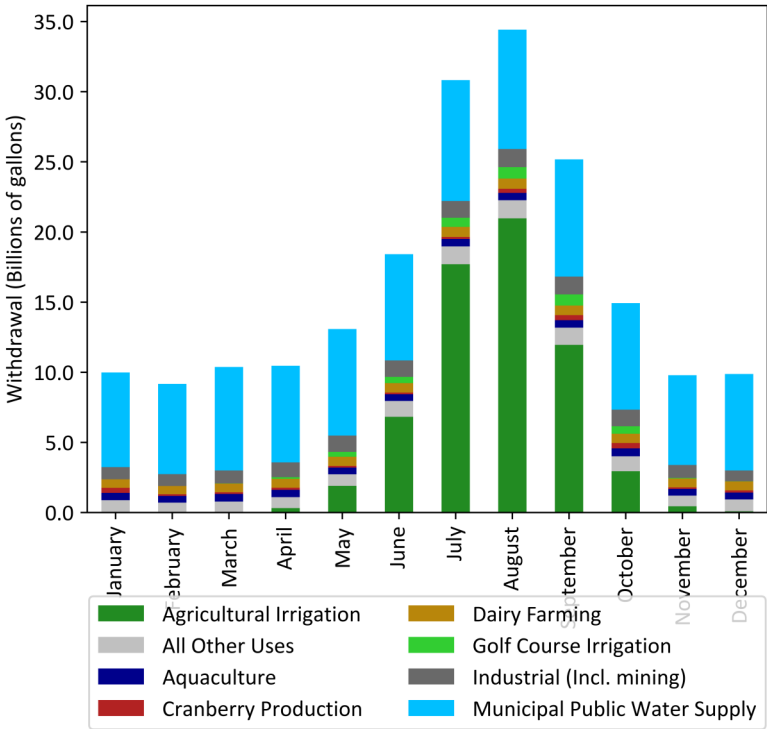
Groundwater withdrawals accounted for 12% of all statewide withdrawals. These withdrawals totaled 196 billion gallons from just over 10,000 high-capacity wells in 2024.

Municipal public water systems were the largest users of groundwater, withdrawing 89 billion gallons of groundwater in 2024. These wells are typically owned by cities and supply water for residential, commercial, institutional and industrial uses. Municipal suppliers provide drinking water to more than two-thirds of Wisconsin residents.

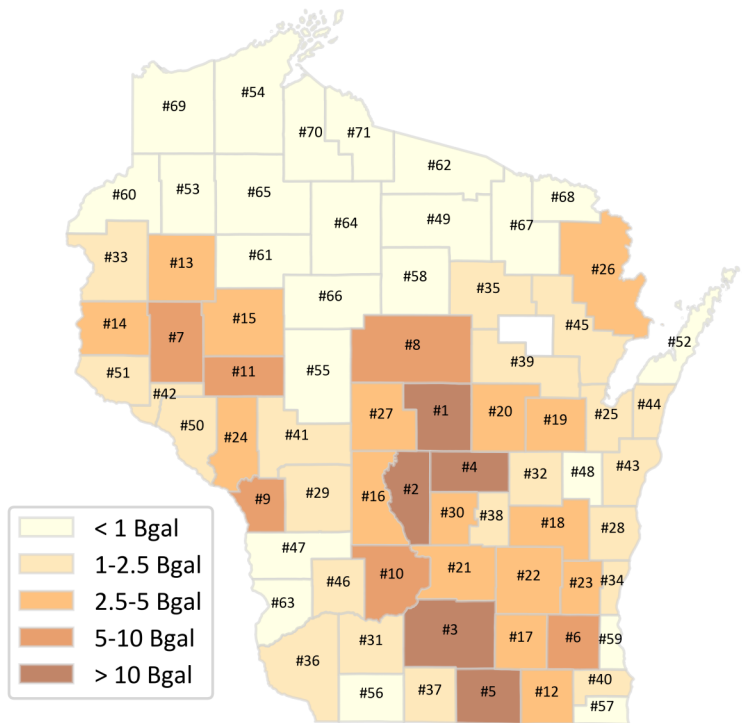
Agricultural irrigation used the second most groundwater at 63 billion gallons.

The category ‘All Other Uses’ includes silviculture, commercial, non-dairy livestock, paper manufacturing, power generation, other-than-municipal water supply, non-transient non-community water supply, transient non-community water supply and schools.

2024 Groundwater Withdrawals By Use
Annual Total Groundwater Withdrawals = 197 Billion Gallons



2024 Groundwater Withdrawals By County

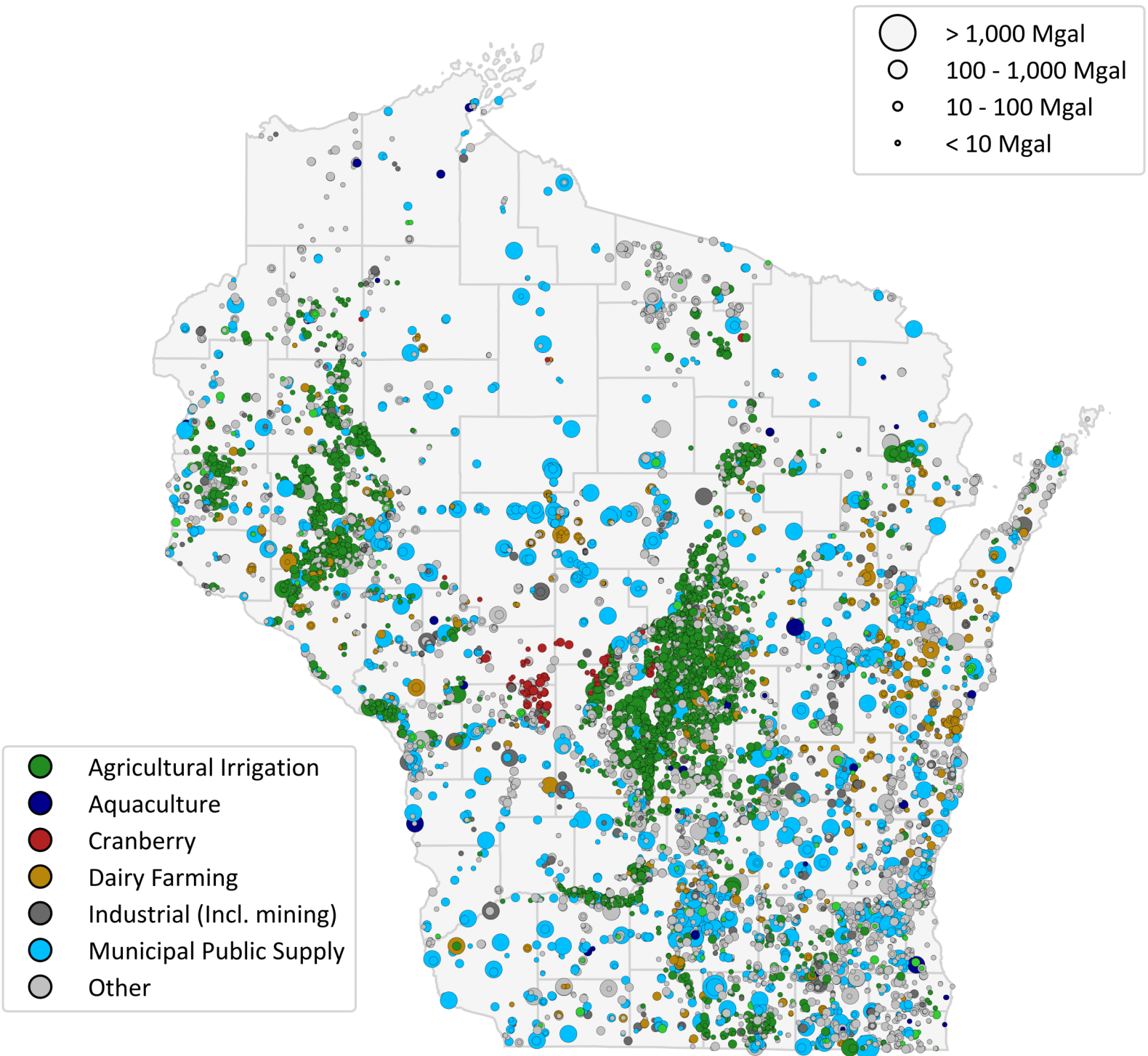


The top five ranked counties for groundwater withdrawal made up almost 38% of total groundwater withdrawals.

Groundwater users in the top 10 ranked counties primarily used withdrawals for agricultural irrigation and municipal public water supply. Portage (#1), Adams (#2), Waushara (#4) and Dunn (#7) counties used more water for agricultural irrigation, while Dane (#3), Rock (#5), Waukesha (#6), Marathon (#8), La Crosse (#9) and Sauk (#10) counties used more water for municipal supply.

Unranked counties do not have high capacity wells registered with the Department.

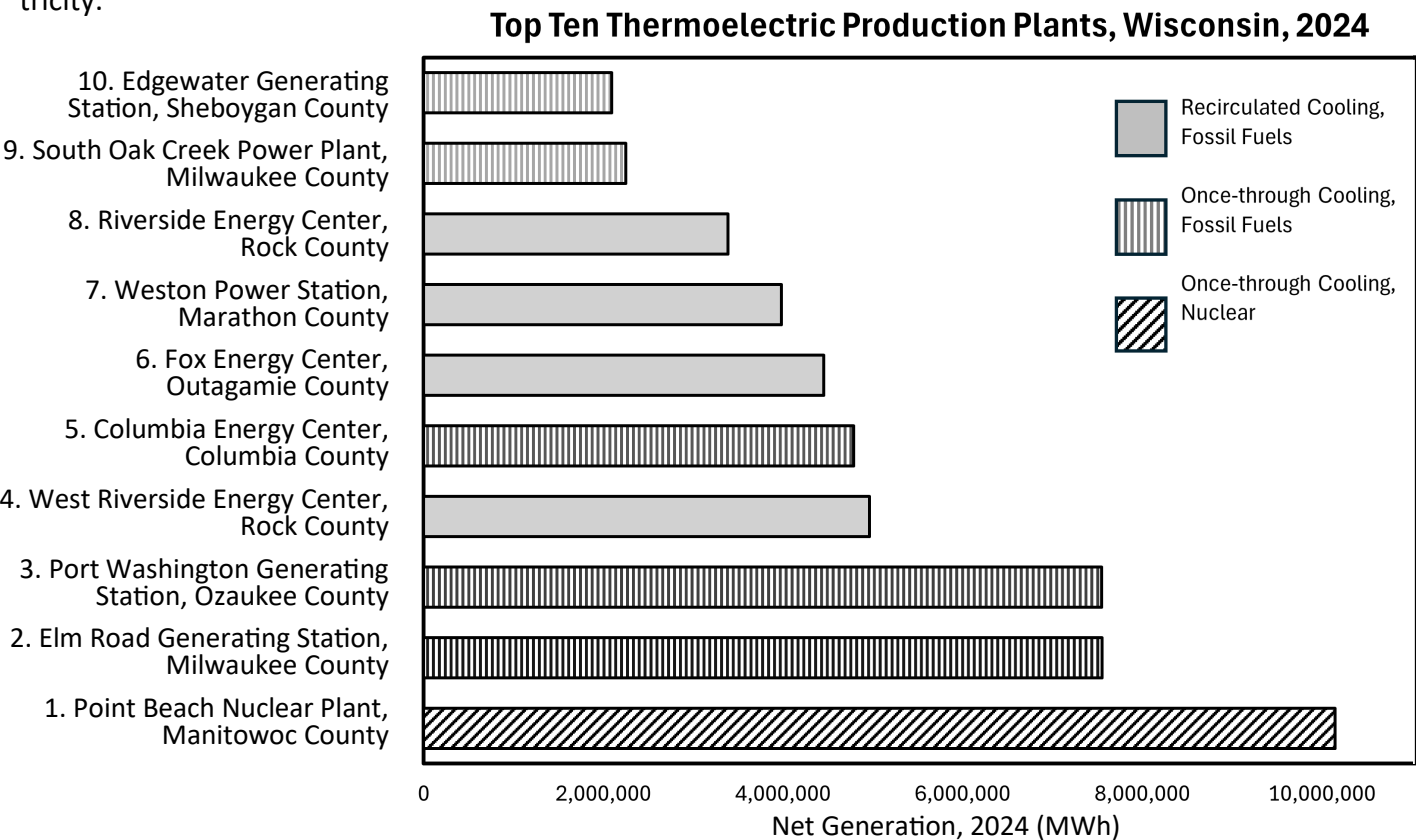
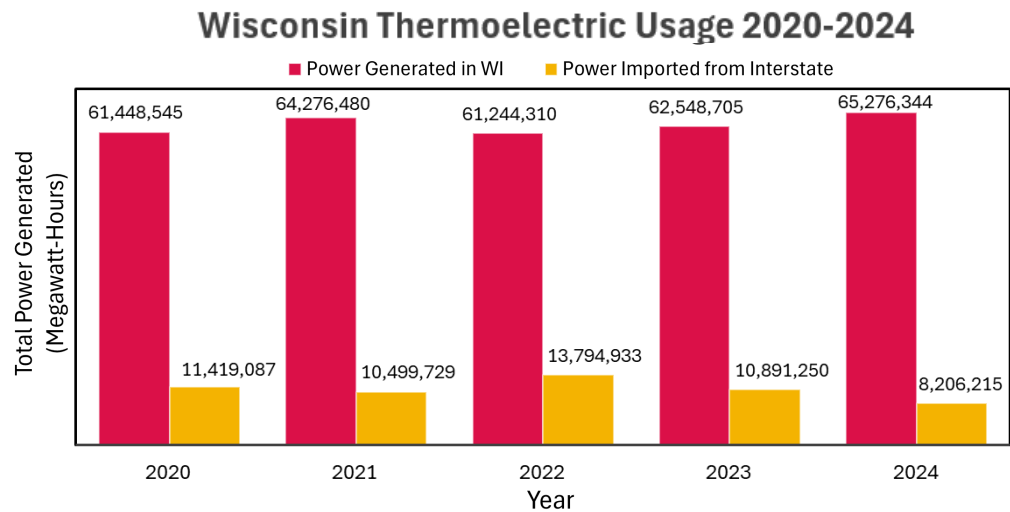
2024 Groundwater Withdrawals



Each dot on this map represents a groundwater withdrawal site. The size of the dot corresponds to the scale of groundwater withdrawal, with the smallest representing less than 10 million gallons annually and the largest representing over 1 billion gallons annually. Groundwater withdrawals for municipal public supply are highest in areas where large surface water sources are unavailable. While agricultural irrigation made up a similar share of total groundwater withdrawals as municipal public supply, agricultural irrigation withdrawals occur almost exclusively during the growing season from May to September.

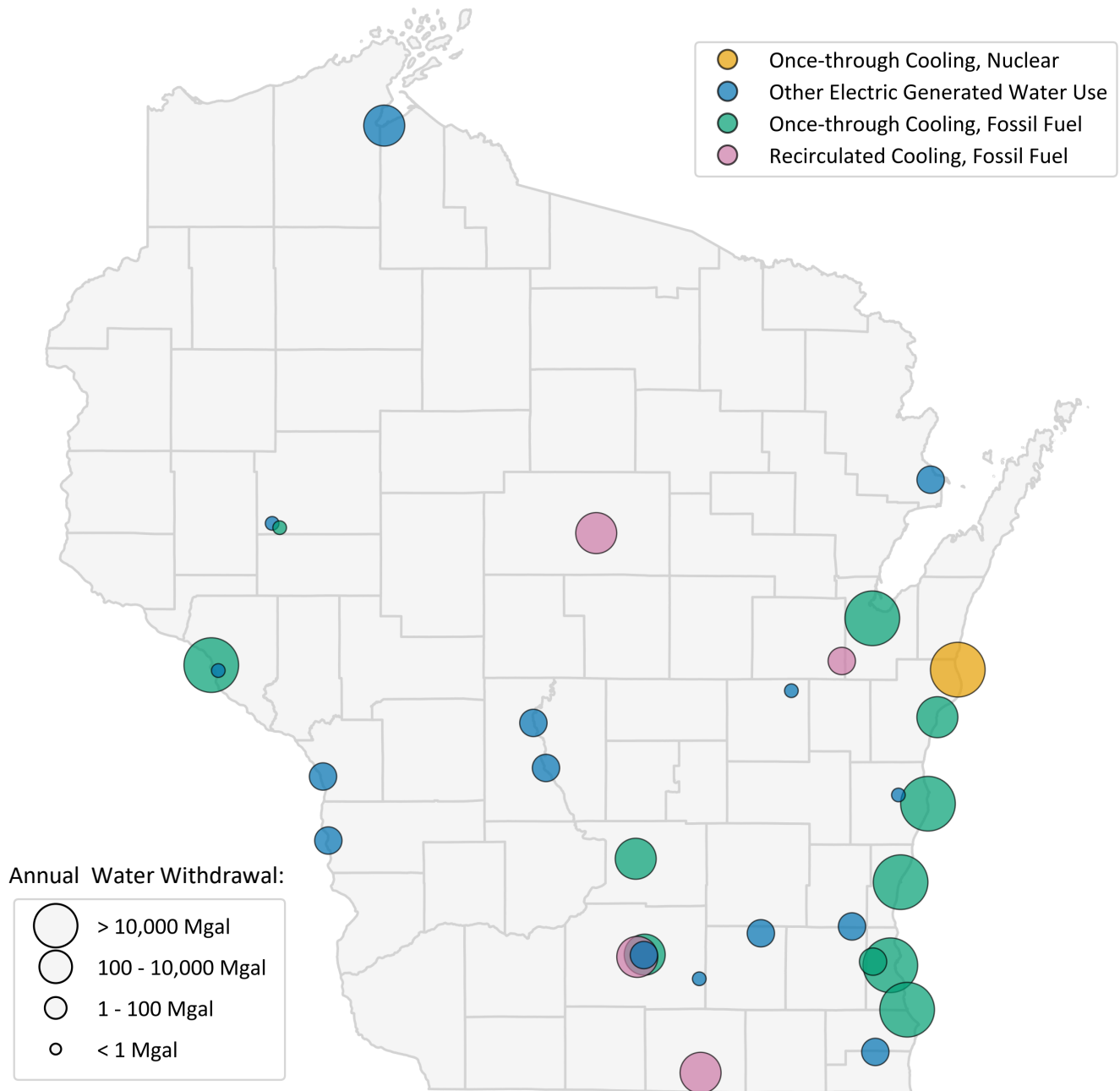
Thermoelectric Power Generation and Water Use

In 2024, thermoelectric power production was the largest water use sector, comprising 73% of water withdrawals in the state of Wisconsin across 36 facilities. From 2020-2024, Wisconsin produced 85% of its required power on average, importing additional power demand from other states. Of in-state generation, thermoelectric sources produced about 88% of electricity. Other sources, including renewables, supplied roughly 12% of in-state electricity.



Types of thermoelectric power generation vary across the state and are generally categorized by cooling system and fuel type. In Wisconsin, the top ten production plants primarily fall into three categories of water users: once-through cooling and recirculated cooling for fossil fuels (i.e. natural gas, coal), or once-through cooling for nuclear energy. Once-through cooling refers to systems that circulate water through heat exchangers, then return the water to the lake or river. Recirculated cooling refers to systems that circulate water through heat exchangers, then cool the water in ponds or towers, and reuse the water multiple times at the facility.

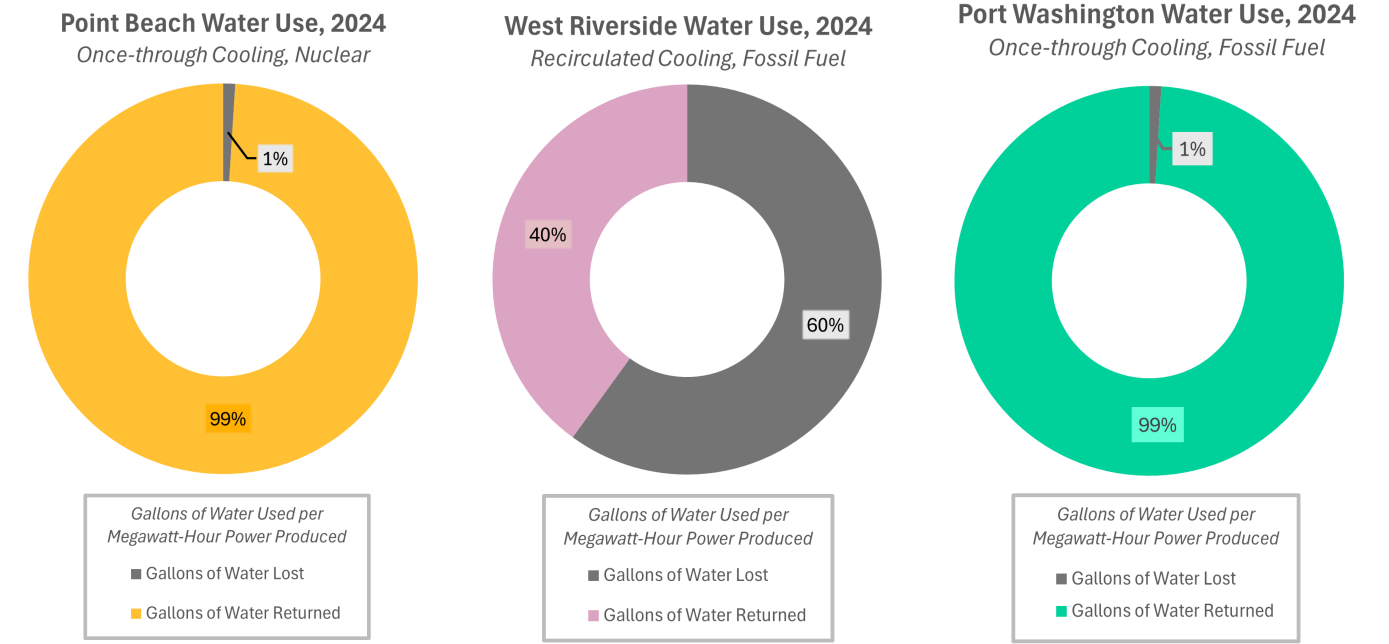
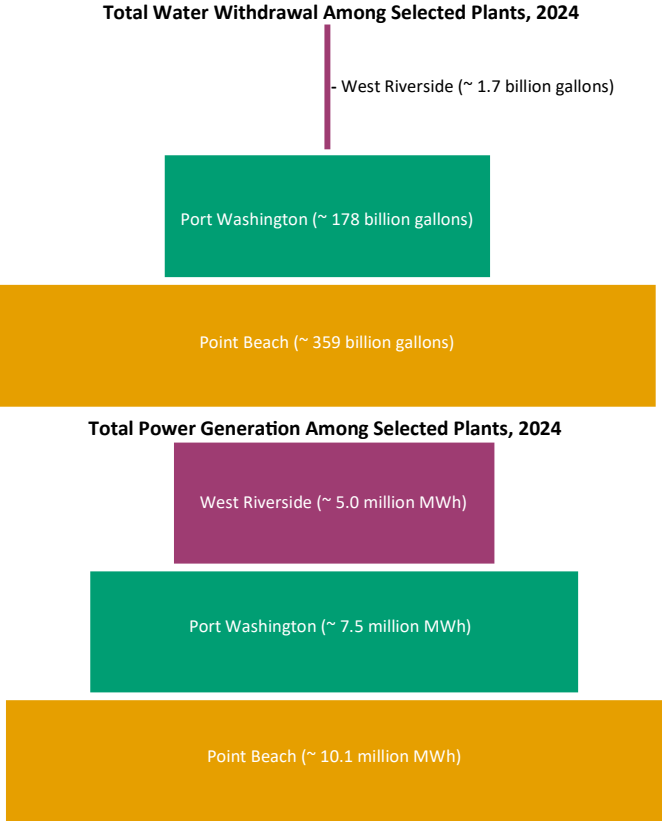
2024 Thermoelectric Power Generation Water Withdrawals



Thermoelectric power plants not only vary in how they generate electricity, but how they use water. Water withdrawal refers to the total volume of water taken from a river, lake, or groundwater aquifer. After this water is used for cooling and absorbing waste heat, most of it is returned to the source. For example, a once-through cooling system might withdraw 100 million gallons per day and return 98 million gallons. In contrast, consumptive use describes the portion of water not returned, which is typically lost through evaporation or incorporation into other materials. Recirculated cooling systems typically require less total water withdrawal but have higher consumptive use, as water evaporates in cooling towers or ponds. Consumptive use is typically estimated by using coefficients developed for each water use sector.

Water Use Variability Among Power Plants

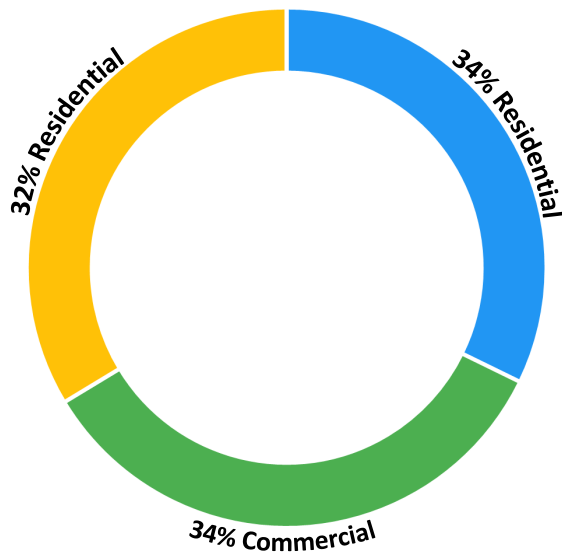
For thermoelectric power production in 2024 the Port Washington Generating station (once-through cooling fossil fuel plant), the West Riverside Energy Center (recirculating cooling fossil fuel plant) and the Point Beach Nuclear Plant (once-through cooling fossil fuel plant) were top energy producers in each of their facility types. These three plants were selected to demonstrate the differences in water use and plant type. To compare water use across plants and technologies, it is helpful to express use as the amount of water required per unit of electricity generated, i.e. gallons (gal) per megawatt-hour (MWh). Among the three — West Riverside, the facility with recirculating cooling systems, highest percentage of consumptive use. However, in terms of gallons lost per megawatt-hour West Riverside is the lowest among the three facilities.



2024 Water Use for Large Production Plants							
Plant Name	Plant Type	Total Power Generation (MWh)	Total Water Withdrawal (Gallons)	Total Water Loss (Gallons)	Gallons used per MWh	Gallons lost per MWh	Total Water Loss %
West Riverside	Recirculated cooling, fossil fuel	4,961,149.00	1,754,298,022.00	1,052,578,813.00	353.61	212.16	60%
Port Washington	Once-through cooling, fossil fuel	7,547,276.00	178,584,111,000.00	1,785,841,110.00	23,662.06	236.62	1%
Point Beach	Once-through cooling, nuclear	10,146,871.00	359,628,100,000.00	3,596,281,000.00	35,442.27	354.42	1%

Who Uses Electricity in Wisconsin?

Approximate Annual Sector Sales in Megawatt-Hours



Residential Users:
Single family homes

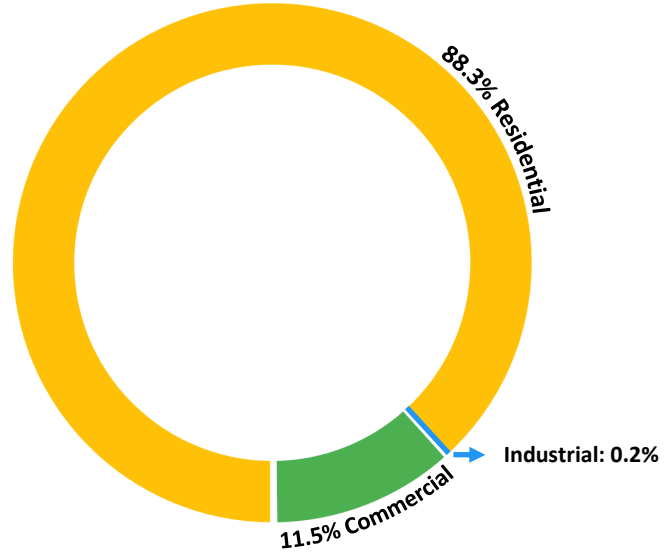


Commercial Users:
Government facilities
Service-providing facilities/equipment
Public/private organizations



Industrial Users:
Process/Production/Assembly Facilities
Mining
Agriculture
Manufacturing
Construction

Approximate Annual Customer Base by Sector



In 2024, Wisconsin's ten largest thermoelectric power facilities generated approximately 51 million megawatt-hours (MWh) of electricity, accounting for about 80% of the state's total generation. These facilities collectively withdrew an estimated 715 billion gallons of water, with 9.7 million gallons lost to consumptive use.

According to the EPA and 2024 U.S. Energy Information Agency electricity-sales data,² customers fall into four sectors: residential (single- and multi-family homes), commercial (government and service-providing facilities), industrial (manufacturing, mining, agriculture, construction) and transportation (mainly EVs and plug-in hybrids).

Residential customers purchased 32% of total MWh sold, commercial 34%, industrial 34%, and transportation 0.002%. By customer count, residential made up about 88.3% of all customers, commercial 11.5%, and industrial 0.2%. Major electricity uses in this sector were heating/cooling, appliances/electronics and lighting for residential and commercial sectors. Industrial use centered on heating/cooling, motor power and electro-chemical processes.^{3,4}

Sector Sales (megawatthours)	
Residential	22,016,559
Commercial	23,296,259
Industrial	22,977,299
Transportation	1,307
Total	68,291,424

Customers	
Residential	2,843,874
Commercial	369,433
Industrial	5,739
Other	NA
Transportation	2
Total	3,219,048

From EIA Table 8: "Sales to ultimate customers, revenue, and average price by sector, 1990 through 2024"³

Wisconsin Water Use Key Findings

- **11,426 active sources** withdrew water throughout the year. Wisconsin had 10,719 high-capacity wells and 707 surface water withdrawals active during 2024.
- **Water withdrawals peaked in the summer** when power generation increased withdrawals to cool power plants and agricultural irrigation increased withdrawals to supplement rainfall.
- Groundwater withdrawals accounted for **12% (197 billion gallons)** of the annual withdrawal volume, with the majority used for municipal water supply and agricultural irrigation.
- In 2024, Wisconsin water users withdrew **1.65 trillion gallons** from surface water and groundwater.
- **Power plants and municipalities** were the primary users of Lake Michigan water in southeastern Wisconsin.
- Once-through cooling systems withdrew the largest volumes of water but returned most of it. For example, Port Washington Generating Station produced **7.5 million MWh** and had a water loss of **1.8 billion gallons (1% of the 178 billion gallons withdrawn)**.
- Recirculated cooling systems withdrew less water but had proportionally higher consumptive use due to evaporation. For example, West Riverside Energy Center produced **5.0 million MWh** and had a water loss of **1 billion gallons (60% of 1.8 billion gallons withdrawn)**.
- The top 10 thermoelectric plants produced 51 million MWh (80% of statewide generation), **withdrew 715 billion gallons and consumed 9.7 million gallons**.
- Electricity sales were split between **residential (32%, 22 million MWh), commercial (34%, 23 million MWh), and industrial (34%, 23 million MWh) sectors**.
- **Total withdrawals in 2024 were the lowest observed since 2012**, and groundwater withdrawals ranked as fourth lowest, surpassed only by 2016, 2017 and 2019.
- Surface water withdrawals accounted for **88% (1,455 billion gallons)** of the annual water withdrawal volume.
- In 2024, thermoelectric power generation accounted for **73% of Wisconsin's total water withdrawals**.

Works Cited

1. Mason, B.; Vavrus S.; Hopkins E. (2024, January 30). *Annual 2024 Climate Summary*. Wisconsin State Climatology Office. <https://climatology.nelson.wisc.edu/wisconsin-annual-2024-climate-summary/>
2. U.S. Energy Information Administration. (2025a, October 24). *Form EIA-923 detailed data with previous form data (EIA-906/920) - U.S. energy information administration (EIA)*. <https://www.eia.gov/electricity/data/eia923/>
3. U.S. Environmental Protection Agency. (2025, March 13). *Electricity customers*. EPA. <https://www.epa.gov/energy/electricity-customers>
4. U.S. Energy Information Administration. (n.d.). *SEP Tables for Wisconsin [Excel spreadsheet]*. Retrieved from <https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fwww.eia.gov%2Felectricity%2Fstate%2Fxls%2FSEP%2520Tables%2520for%2520WI.xlsx&wdOrigin=BROWSELINK>