



Wisconsin Water Use

2015 Withdrawal Summary

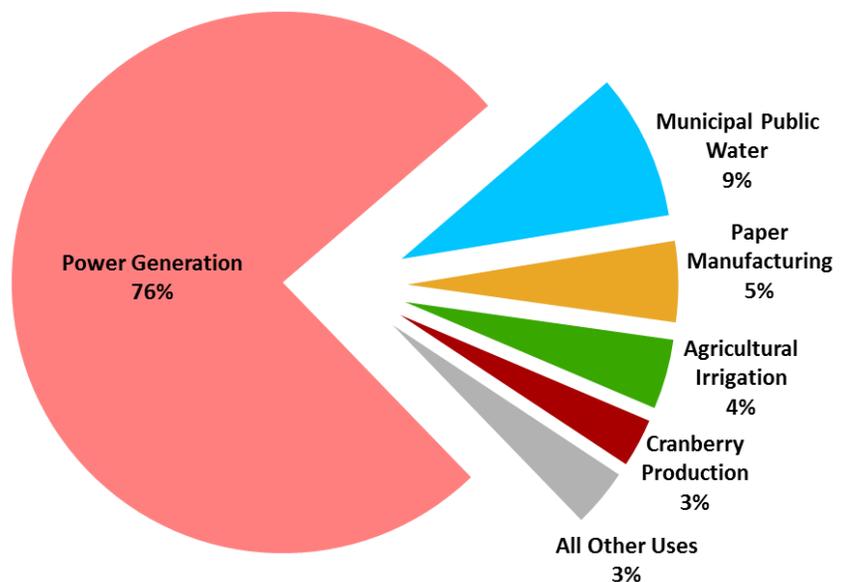
Water supply systems in Wisconsin capable of withdrawing 100,000 gallons or more per day are required to register and report withdrawals annually. The state currently has over 12,000 registered active sources that include wells, ponds, streams, rivers and lakes. In 2015, total statewide water withdrawals exceeded 2.04 trillion gallons, an increase of 4% compared to 2014. The 2.04 trillion gallons is roughly equal to 3 times the volume of water in Lake Winnebago or enough water to cover the surface area of Wisconsin in nearly 1.7 inches of water.

How and when water is withdrawn varies seasonally. Withdrawal volumes typically vary throughout the year with seasonal temperature and precipitation patterns. 2015 saw similar temperatures but less precipitation than in 2014, resulting in increased water use in Wisconsin.

- Municipal Public Water demand and cooling water demand for Power Generation and Paper Manufacturing typically increases with the heat of summer.
- Agricultural Irrigation water use increased 6.5% from 2014.
- Cranberry Production saw a significant decline in water use for the second straight year using 9.2% less water in 2015 than 2014. Cranberry growers are using 30% less water annually, than in 2012.

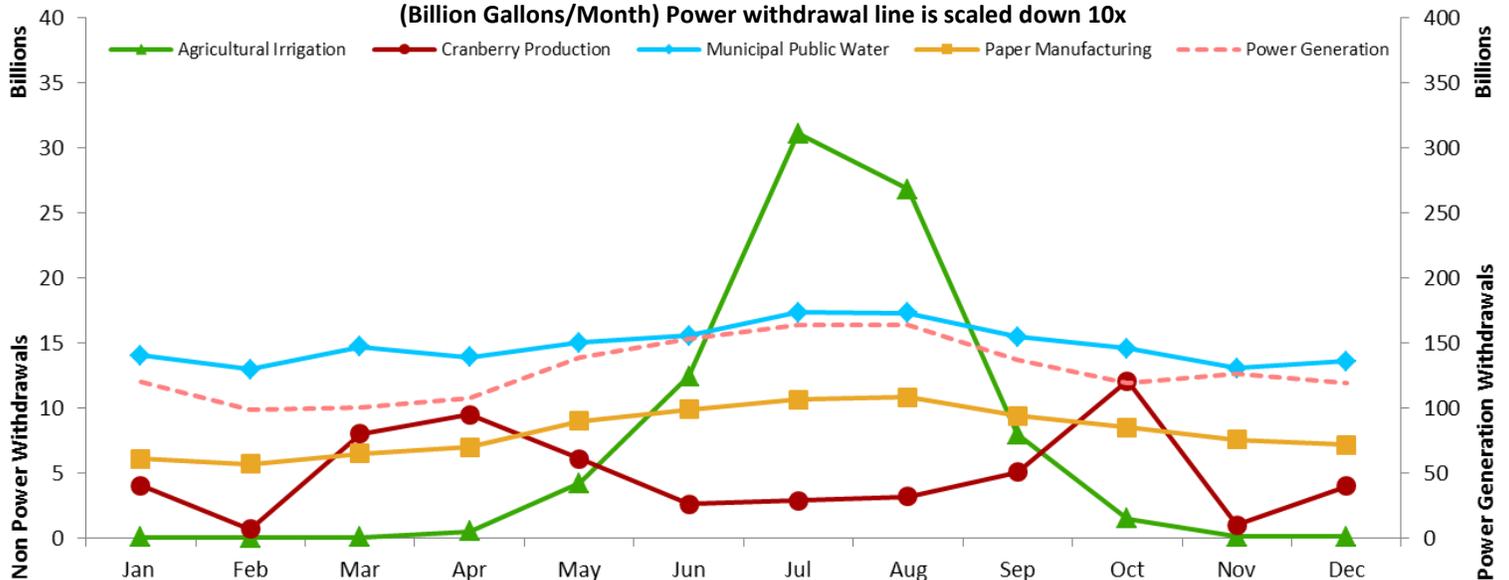
2015 Withdrawals by Use

Total Withdrawals = 2.04 Trillion Gallons



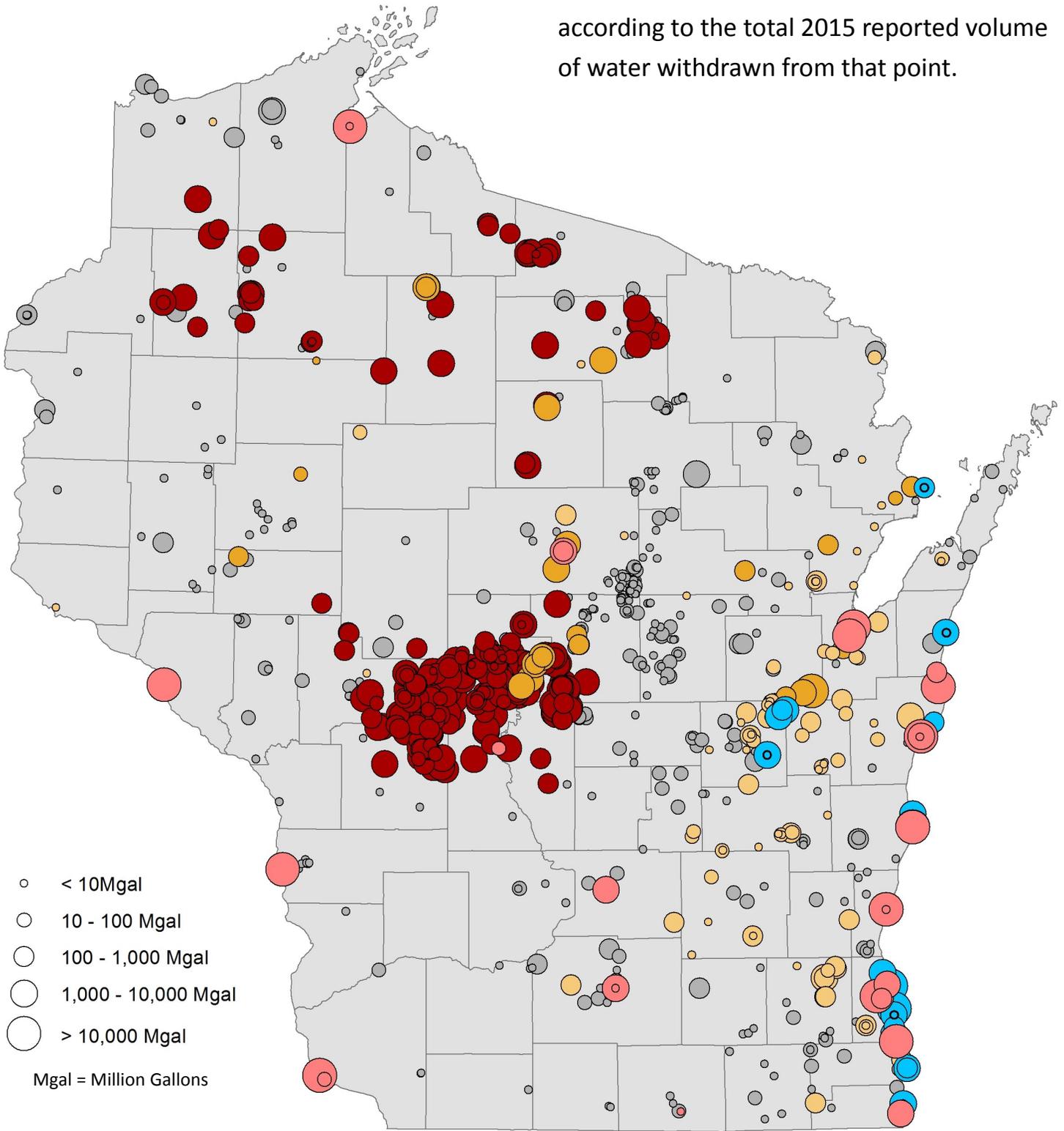
2015 Monthly Variation in Top 5 Withdrawals

(Billion Gallons/Month) Power withdrawal line is scaled down 10x



2015 Surface Water Annual Withdrawals

Each circle represents a single 2015 point of withdrawal. The size of the circle varies according to the total 2015 reported volume of water withdrawn from that point.

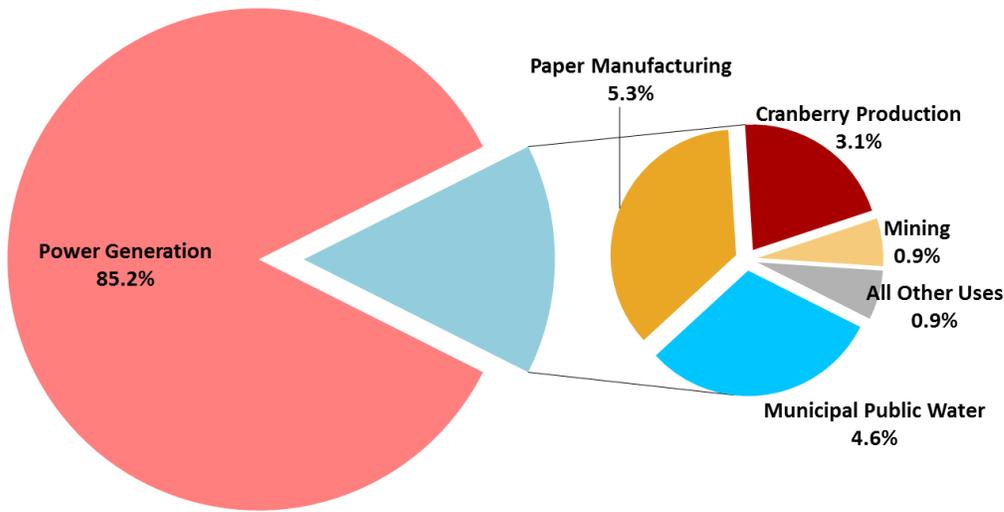


- < 10Mgal
 - 10 - 100 Mgal
 - 100 - 1,000 Mgal
 - 1,000 - 10,000 Mgal
 - > 10,000 Mgal
- Mgal = Million Gallons

- Power Generation
- Municipal Water Supply
- Mining
- Paper Production
- Cranberry Production
- All Other Uses

2015 Total Surface Water Withdrawals by Water Use

1.82 trillion gallons statewide

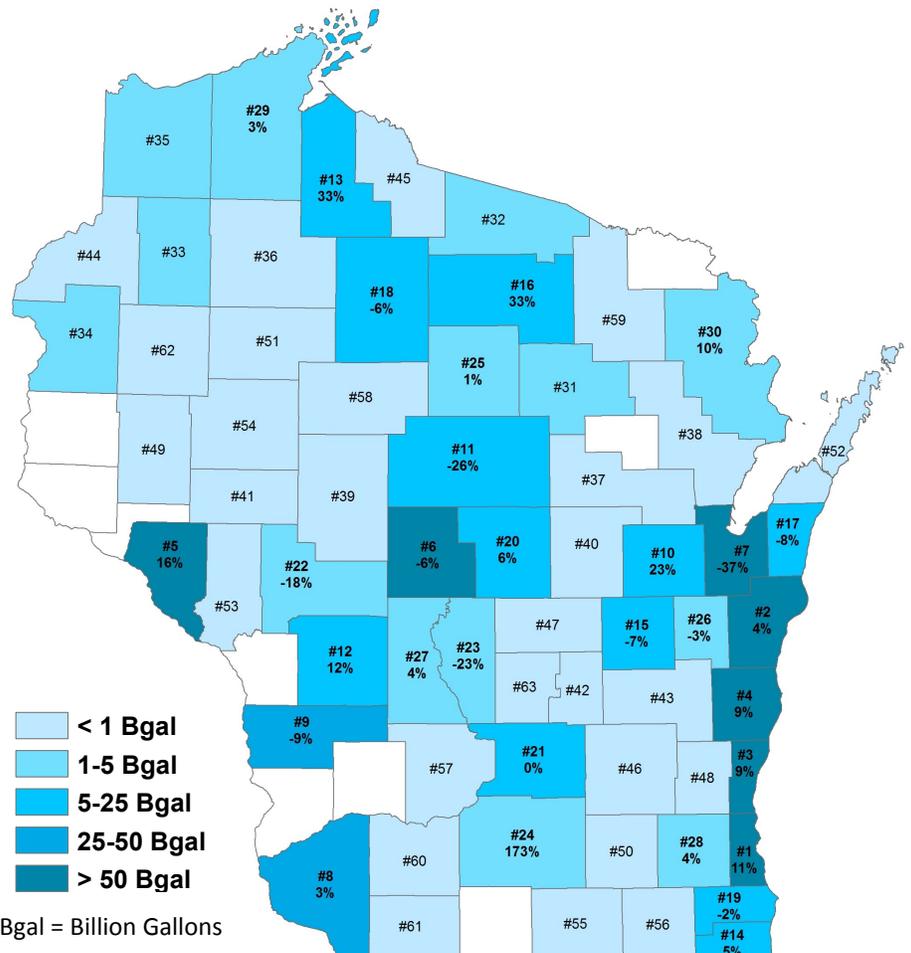


- Many surface water withdrawals are used and discharged near their point of withdrawal. This results in little water lost from the original source relative to the size of the withdrawal.
- 89% of all statewide withdrawals were from surface water. Totaling 1.82 trillion gallons from 779 active sources in 2015.
- The largest volume of water withdrawn in the state (1.55 trillion gallons) was used by Power Generation facilities. These facilities are concentrated along Lake Michigan and the Wisconsin and Mississippi Rivers.

2015 Total Surface Water Withdrawals by County

Top number indicates ranking of total withdrawal by county (#1 = highest, #72 = lowest).
The bottom number represents percent change from 2014 for the 30 highest ranked counties.

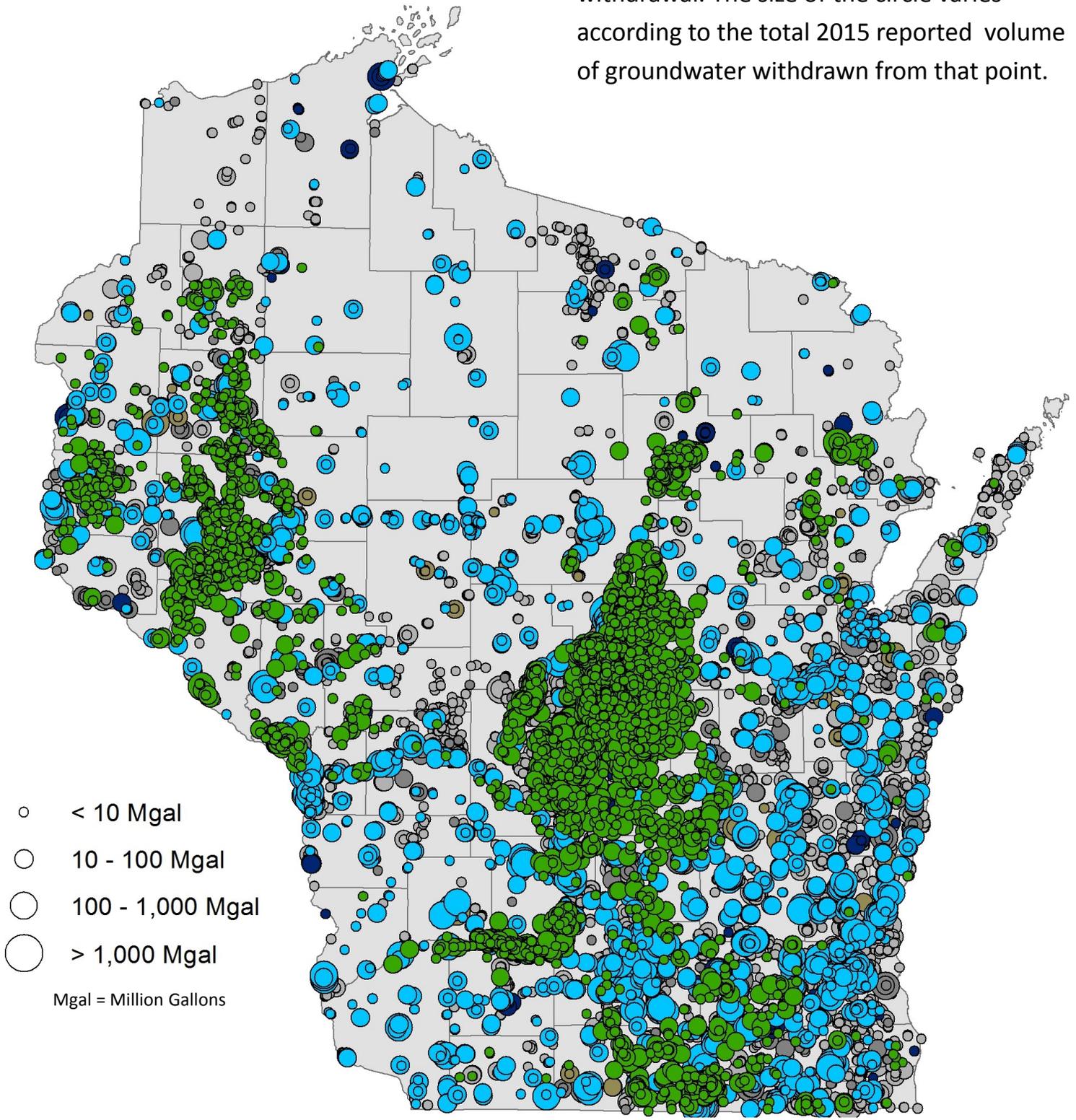
- The number of active surface water sources increased from 769 in 2014 to 779 in 2015 with the total surface water withdrawals increasing 4.9%.
 - ◆ Surface water withdrawals for Municipal Supply (9%) and Power Generation (6%) sectors increased from 2014, totaling 87.8 billion gallons.
 - ◆ An increase was seen in Non-Metallic Mining (7%) due mostly to increased dewatering.
- Power Generation facilities represented the majority of withdrawals in the five top ranked counties of Milwaukee (#1), Manitowoc(#2), Ozaukee (#3), Sheboygan (#4) and Buffalo (#5).
 - ◆ The resumption of full operation of power generation facilities in Dane County resulted in a 173% increase in surface water withdrawals.
- Surface water is key to producing some of Wisconsin’s top products:
 - ◆ Paper in Brown (#7), Wood (#6), Outagamie (#10) and Marathon (#11) counties.
 - ◆ Cranberry in Wood (#6), Monroe (#12), and Jackson (#22).



Counties without ranking have no registered surface water withdrawals.

2015 Groundwater Annual Withdrawals

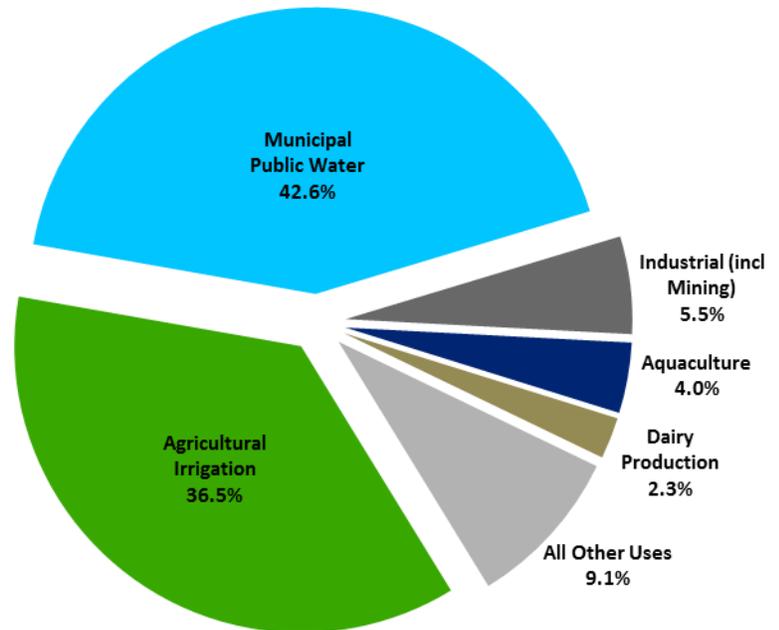
Each circle represents a single 2015 point of withdrawal. The size of the circle varies according to the total 2015 reported volume of groundwater withdrawn from that point.



2015 Total Groundwater Withdrawals by Water Use

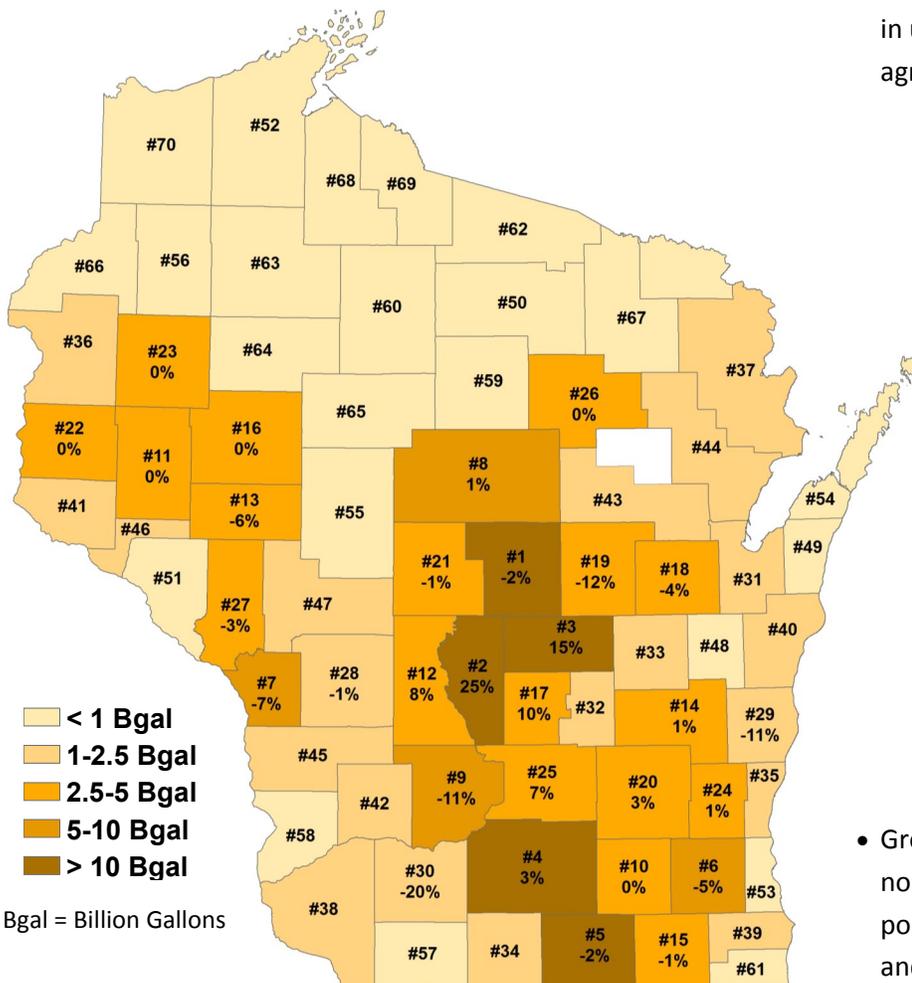
223 billion gallons statewide

- 11% of all statewide withdrawals were from groundwater. These totaled 223 billion gallons from over 11,000 high capacity wells active in 2015.
- Municipal Public Water supplies remained the largest withdrawer of groundwater. These wells are typically owned by cities and deliver water for residential, commercial, institutional and industrial uses. Municipal suppliers withdrew 95 billion gallons, down from 98 billion in 2014.
- Agricultural irrigation is the second largest withdrawer of groundwater in the state. Irrigation rates are typically tied to annual changes in weather. Total irrigation withdrawals increased 5% from 77 billion gallons in 2014 to 81 billion gallons in 2015.



2015 Total Groundwater Withdrawals by County

Top number indicates ranking of total withdrawal by county (#1 = highest, #71 = lowest).
The bottom number represents percent change from 2014 for the 30 highest ranked counties.



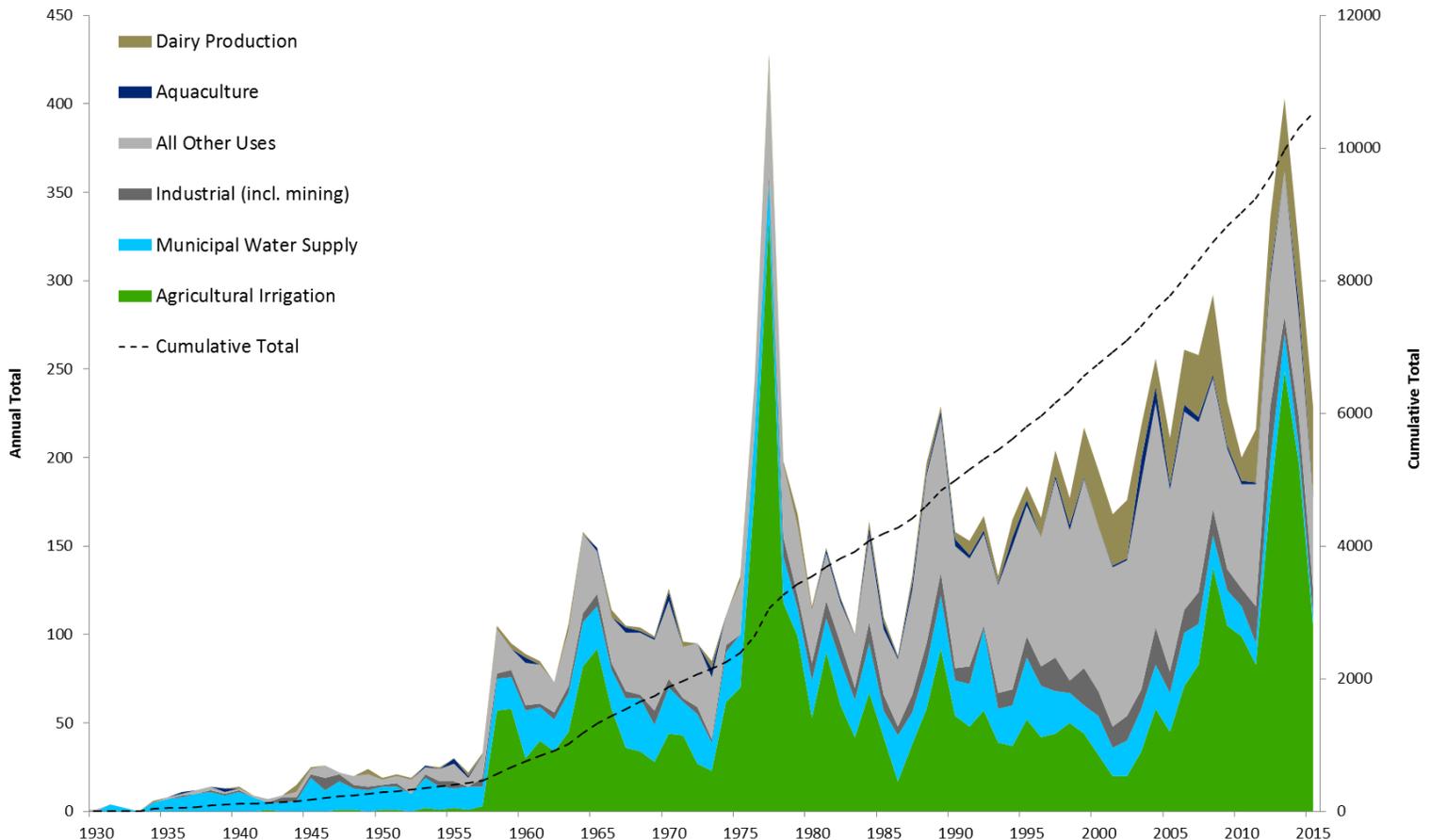
- Groundwater withdrawals are most concentrated in urban areas not supplied by surface water and agricultural areas with high irrigation demand.
 - ◆ Portage (#1), Adams (#2) and Waushara (#3), comprise much of the Central Sands area of the state. This area is a globally significant vegetable and potato producing region. Withdrawals decreased for the third straight year in Portage County, while withdrawals increased in Adams (25%) and Waushara (15%) for the first time since 2012.
 - ◆ Dane (#4), Rock (#5), and Waukesha (#6) have large urban/suburban populations that rely on groundwater to meet their residential, commercial and industrial water needs. Withdrawals in Dane increased slightly, despite falling from the #2 to the #4 groundwater user.
- Groundwater withdrawals are smallest in the far north where land use is more forest based, populations are lower, agriculture is less prevalent and aquifers are less productive.

High Capacity Well Trends

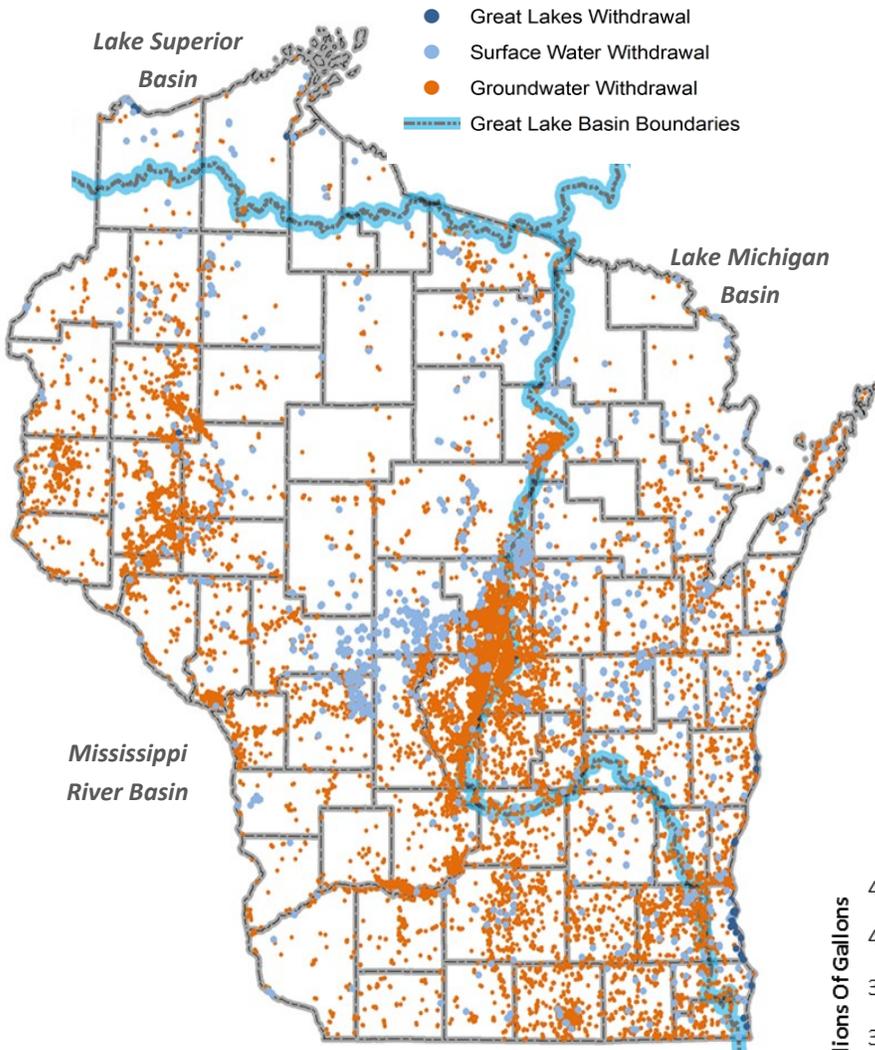
According to Wisconsin law, a high capacity well is any well located on a property on which all wells together have the collective capacity to withdraw 100,000 gallons per day or more. This is about 70 gallons per minute (gpm). For instance, a high capacity property could be composed of a single 70 gpm well, two 35 gpm wells or any combination of wells that together can withdraw 70 gpm or more. The capacity of many municipal wells is greater than 1500 gpm, most irrigation wells can withdraw about 1,000 gpm, industrial wells average about 300 gpm and dairy wells average about 70 gpm.

- Wisconsin began regulating construction of high capacity wells in 1945.
- Wisconsin maintains an inventory of high capacity wells dating back to the early 20th century.
- About 1/3 of the high capacity wells in Wisconsin are used for agricultural irrigation.
- Widespread use of wells for irrigation began in the late 1950s when a very severe drought coincided with the arrival of new irrigation and well drilling technology.
- The largest spikes in well construction coincide with drought as seen in 1976-77 and in 2012.
- Municipal well construction has declined in the last few years. This is due in part to new water efficient appliances, fixtures and technologies that reduce municipal customer demand.
- Low capacity private well owners are not required to register wells or report water use. These are mostly residential and farm wells that use an estimated 50 to 75 billion gallons per year.

Construction Dates of Currently Active High Capacity Wells



* Does not include approximately 4,000 registered small wells located on high capacity well properties mostly used for domestic purposes. Includes only currently active wells. Wells constructed and subsequently abandoned are not counted.

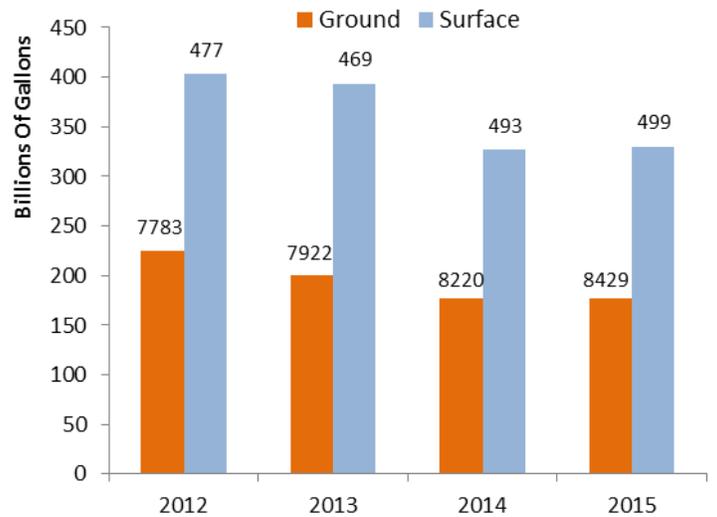


Withdrawal Variation through Time and Location

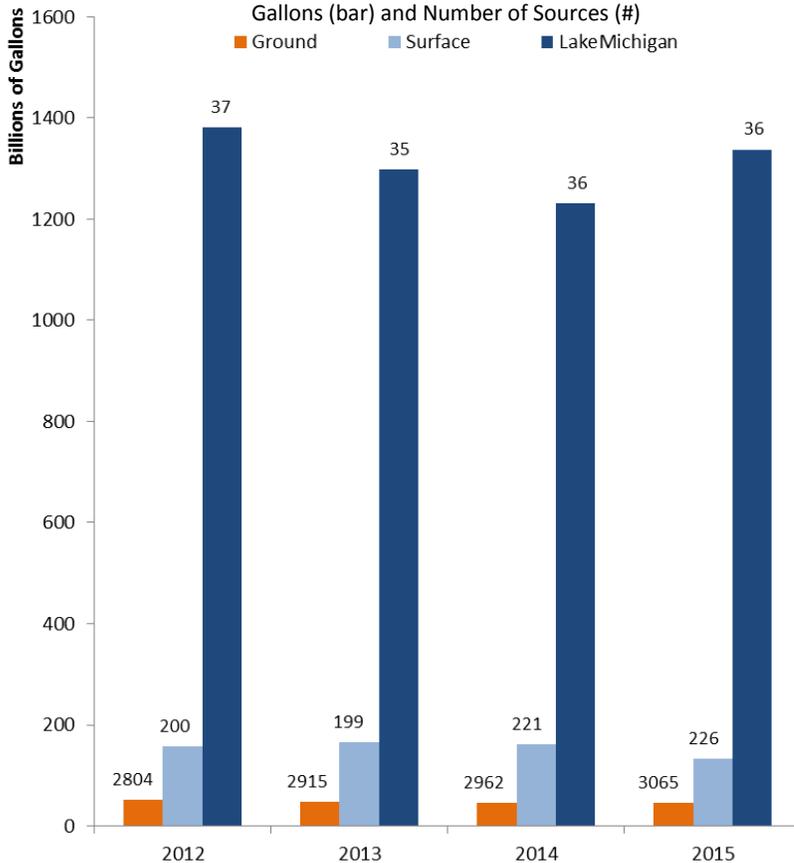
The density and intensity of withdrawals in Wisconsin depends largely on the nature of the source water and the water use.

- Lake Michigan is the single largest water source in Wisconsin supplying over 1.3 trillion gallons to only 36 sources.
- Although the total number of wells increased nearly 10% in the Mississippi River Basin between 2012 and 2015, the total amount of water withdrawn has decreased.
- Lake Superior is one of the largest lakes in the world, but supplies a relatively small amount of water to very few sources.

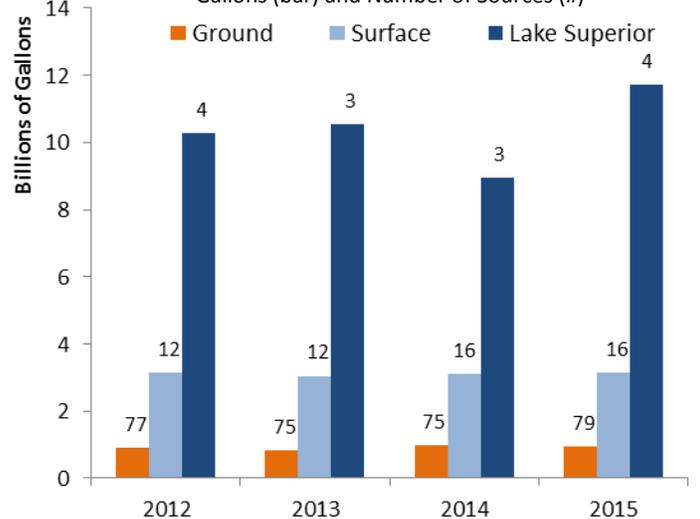
Mississippi River Basin Withdrawals
Gallons (bar) and Number of Sources (#)



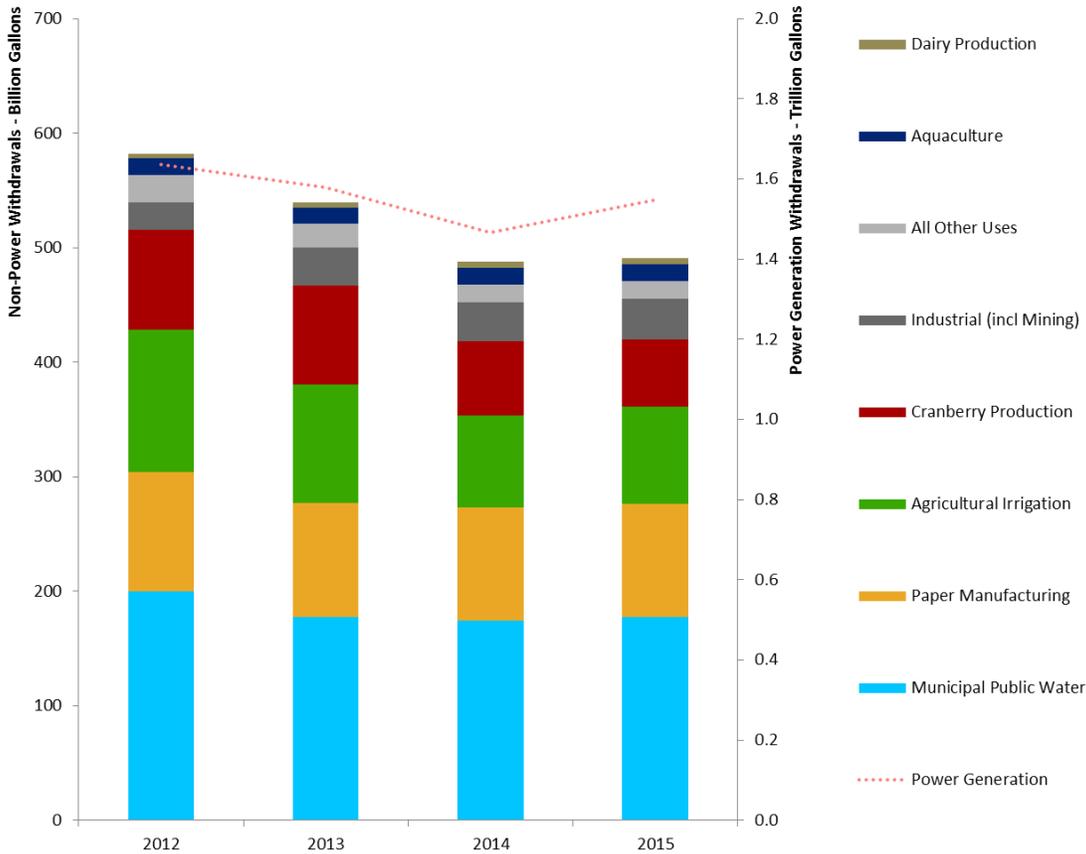
Lake Michigan Basin Withdrawals
Gallons (bar) and Number of Sources (#)



Lake Superior Basin Withdrawals
Gallons (bar) and Number of Sources (#)



Annual Withdrawals by Category 2012 to 2015



- Total withdrawals in Wisconsin increased slightly in 2015 but remained down from the highs in 2012.
- Withdrawals for Cranberry Production continued to decrease, down a total of 32% since 2012.
- Dairy Production (+24%) and Industrial (+50%) withdrawers were two sectors that increased withdrawals from 2012 to 2015.
- Paper Production and Municipal Public withdrawals continue to remain relatively steady since 2012.

2015 Wisconsin Withdrawal Reporting Facts

- High capacity sources are any wells or surface water intakes on a property with the capacity to withdraw at least 100,000 gallons per day or 70 gallons per minute.
- There were 15,183 registered high capacity withdrawal sources in the state in 2015: 14,145 wells and 1,038 surface water sources.
- Owners supplied reports for 97.7% of the state's registered sources.
- Owners reported 12% of the registered sources were unused in 2015.

Water Use	Total Active Sources	Total 2015 Withdrawal (Bgal)	Active Ground Water Sources	2015 Ground Water Withdrawal (Bgal)	Active Surface Water Sources	2015 Surface Water Withdrawal (Bgal)
Agricultural Irrigation	3,895	84.9	3,762	81.5	133	3.5
All Other Uses	2,425	8.2	2,382	6.1	43	2.2
Non-Municipal Public	1,681	2.8	1,681	2.8		
Municipal Public	1,664	177.7	1,640	94.9	24	82.8
Dairy Production	709	5.2	709	5.2		
Industrial (non-mining)	545	15.7	517	12.3	28	3.4
Golf Course Irrigation	442	4.5	378	3.9	64	0.6
Cranberry Production	404	59.2	139	3.0	265	56.3
Non-Metallic Mining	299	19.7	168	3.1	131	16.5
Aquaculture	163	14.6	144	7.2	19	7.5
Power Generation	66	1,547.6	37	1.2	29	1,546.4
Paper Manufacturing	52	98.3	11	1.8	41	96.5

Bgal = Billion Gallons

For more information regarding the Water Use Reporting program or to request more specific information on withdrawals, please visit our website or contact Water Use Program staff: dnr.wi.gov keyword "Water Use"

DNRWaterUseRegistration@Wisconsin.gov 608.266.2299