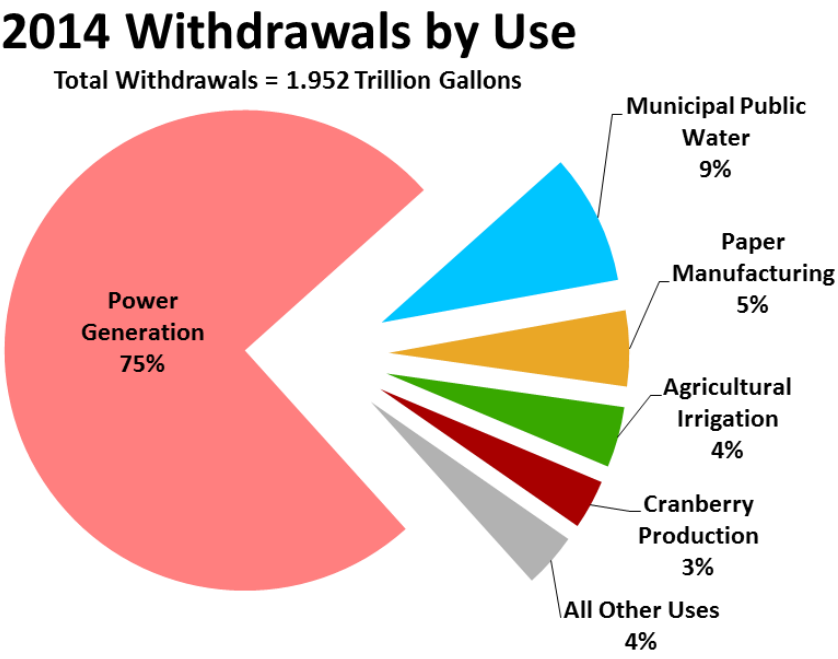
Wisconsin Water Use

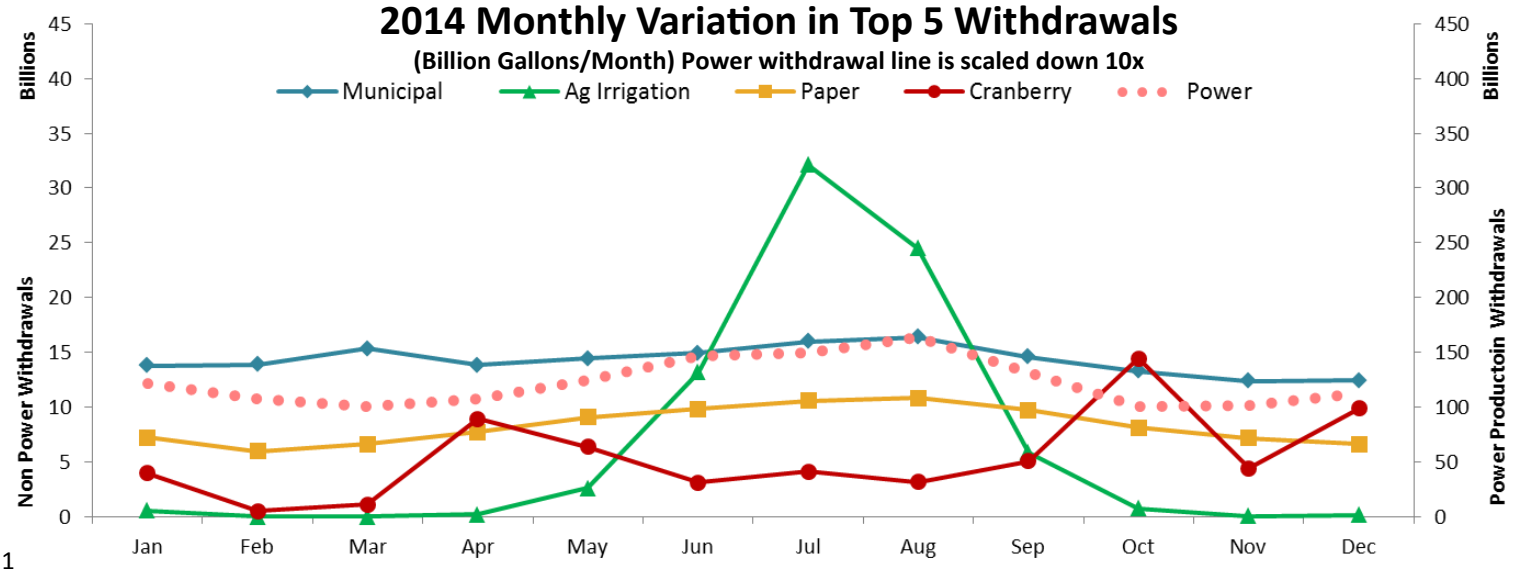
2014 Withdrawal Summary

Water supply systems in Wisconsin capable of withdrawing 100,000 gallons per day are required to register and report withdrawals. In 2014, total statewide withdrawals exceeded 1.95 trillion gallons of water from over 12,000 active sources. These sources include wells, ponds, streams, rivers and lakes. This amount 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. Total 2014 withdrawals were down 7.8% from 2013.

How and when water is withdrawn varies seasonally. Withdrawal volumes typically vary throughout the year with seasonal temperature and precipitation patterns. A cool summer and high precipitation in 2014 led to decreased withdrawals for most uses compared to 2013.

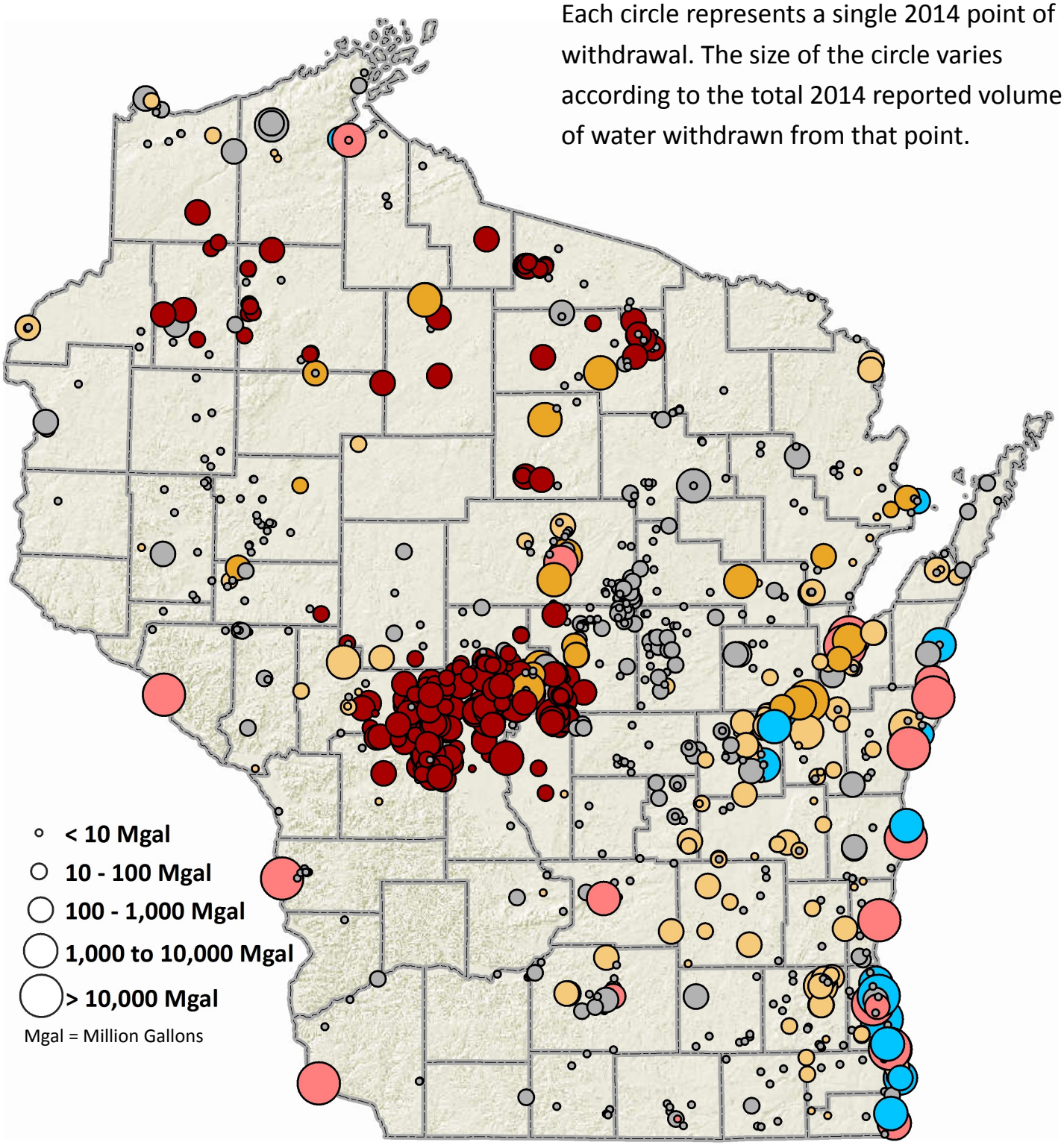
- Municipal water demand and cooling water demand for power and paper production typically increases with the heat of summer.
- Agricultural irrigation peak withdrawals were down 16% from 38 billion gallons in August 2013 to 32 billion gallons in July 2014.
- Overall, Municipal withdrawals were down 3.4% from 2013 despite a 7.4% increase in January to March due to broken pipe losses and frozen pipe prevention during the harsh winter of 2013-2014.





2014 Surface Water Annual Withdrawals

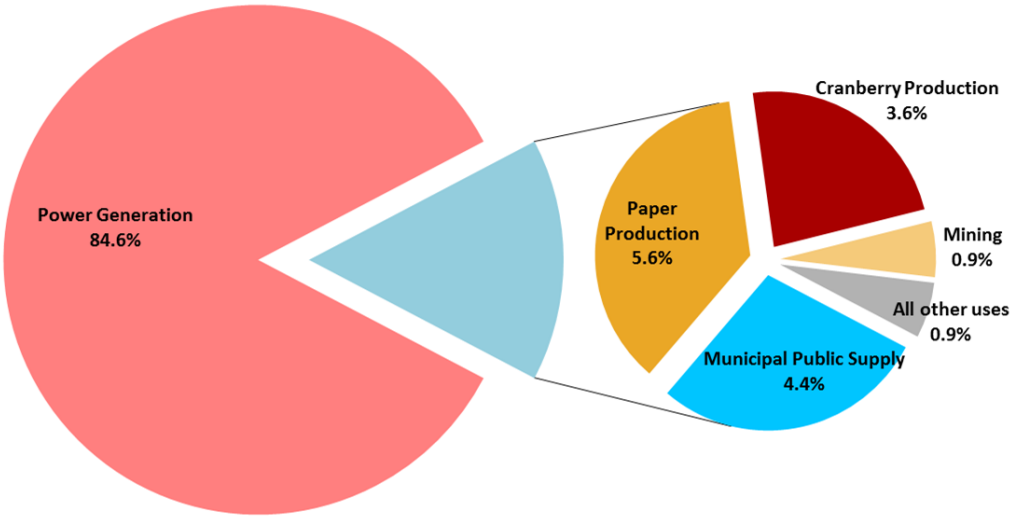
Each circle represents a single 2014 point of withdrawal. The size of the circle varies according to the total 2014 reported volume of water withdrawn from that point.



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

2014 Total Surface Water Withdrawals by Water Use

1.73 trillion gallons statewide

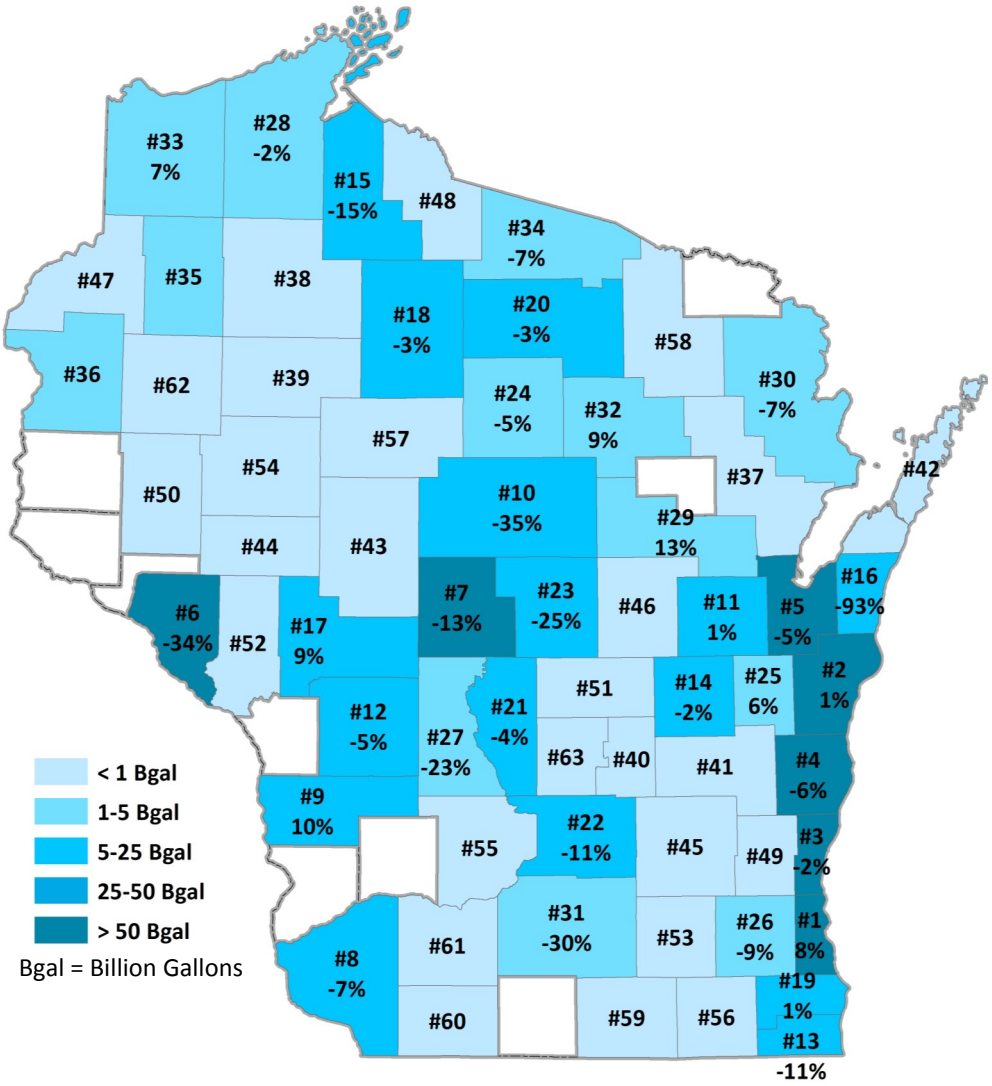


- Many surface water withdrawals are used and discharged near their point of withdrawal. This results in little water lost from the original source relative to the size of the withdrawal.
- 88% of all statewide withdrawals were from surface water. These totaled 1.73 trillion gallons from 769 sources active in 2014.
- The largest volume of water withdrawn in the state (1.47 trillion gallons) was used by power production facilities. These facilities are concentrated along Lake Michigan and the Wisconsin and Mississippi Rivers.

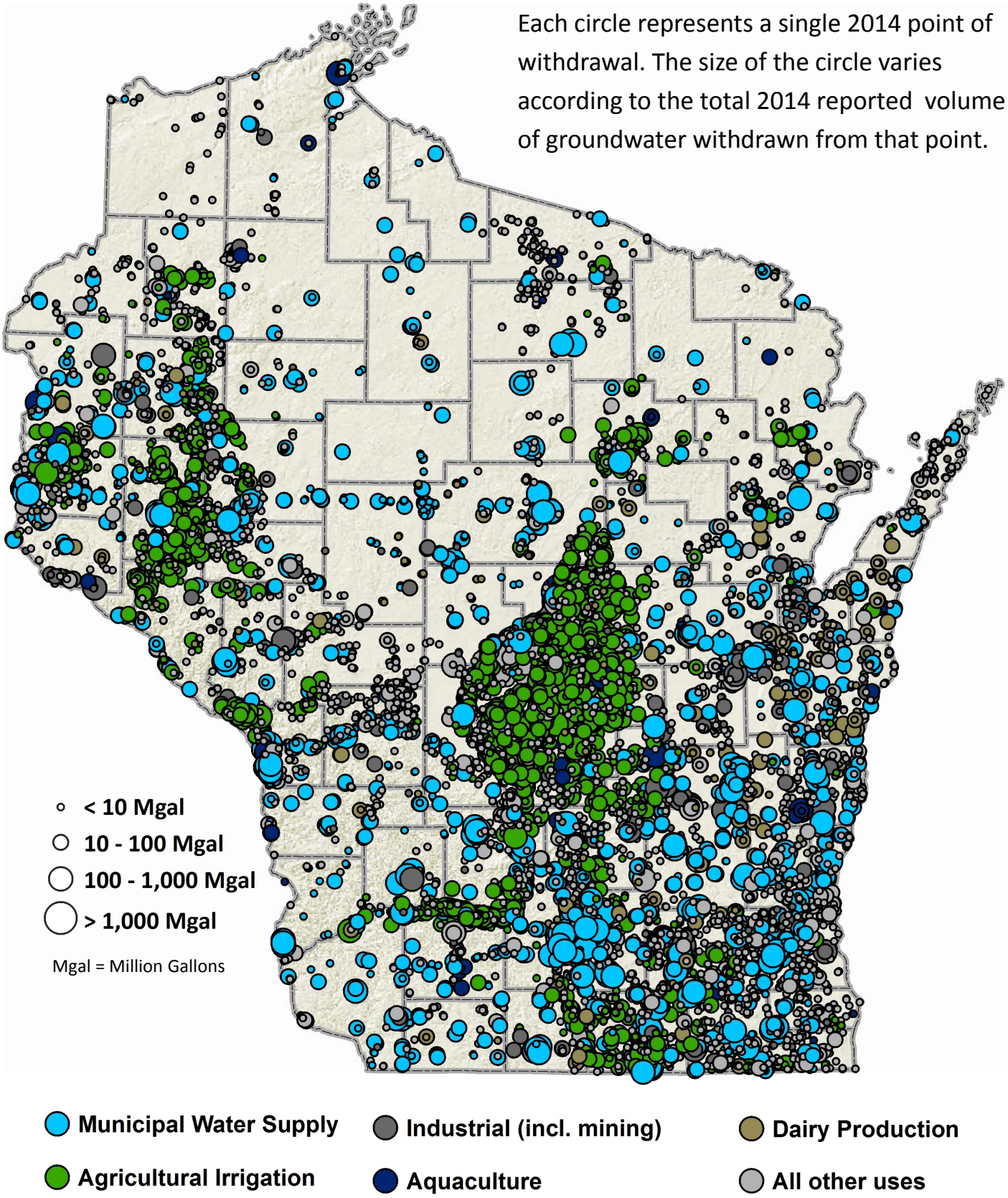
2014 Total Surface Water Withdrawals by County

Top number indicates ranking of total withdrawal by county (#1 = highest, #72 = lowest).
For counties with withdrawals > 1 Bgal, the bottom number represents % change from 2013.

- The number of active surface water sources increased from 682 in 2013 to 769 in 2014 but the total withdrawal was down 7.4% from 2013.
  - Withdrawals in several sectors decreased from 2013 including Municipal Supply (-11%) , Cranberry Production (-20%), and Power (-8%),
  - An increase was seen in Non-Metallic Mining (+24%) due mostly to increased dewatering.
- Power plants represented the majority of withdrawals in the four top ranked counties of Milwaukee (#1), Manitowoc (#2), Ozaukee (#3), Sheboygan (#4).
  - Withdrawals decreased steeply from 2013 in Kewaunee (#16) with the closure of the Kewaunee Nuclear Power Station.
- Surface water is key to producing some of Wisconsin's top products:
  - Paper in Brown (#5), Wood (#7), Marathon (#10) and Outagamie (#11) counties.
  - Cranberry in Wood (#7), Monroe (#12), and Jackson (#17).
- Counties without ranking have no registered surface water withdrawals.



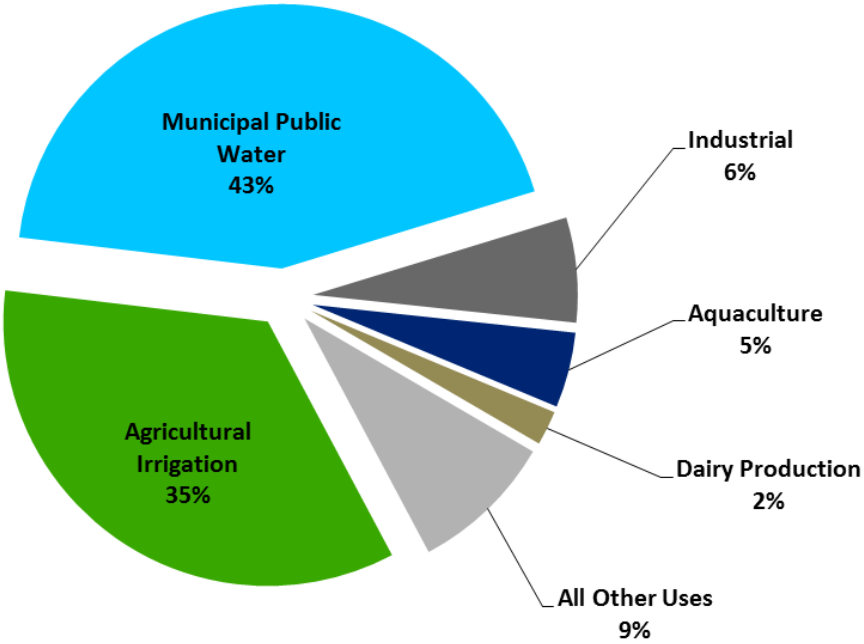
2014 Groundwater Annual Withdrawals



2014 Total Groundwater Withdrawals by Water Use

224 billion gallons statewide

- 12% of all statewide withdrawals were from groundwater. These totaled 224 billion gallons from over 11,000 high capacity wells active in 2014.
- Municipal Public Water Supplies regained the top spot as largest withdrawer of groundwater. These are typically owned by cities and deliver water for residential, commercial, institutional and industrial uses. Municipal suppliers withdrew 98 billion gallons, up 6% from 92 billion in 2013 mostly due to winter freeze losses.
- Agricultural irrigation dropped to the second largest withdrawer of groundwater in the state. Total irrigation withdrawals decreased 24% from 101 billion gallons in 2013 to 77 billion gallons in 2014. Irrigation demand decreased with more rain and cooler temperatures than in 2013.



2014 Total Groundwater Withdrawals by County

Top number indicates ranking of total withdrawal by county (#1 = highest, #71 = lowest).
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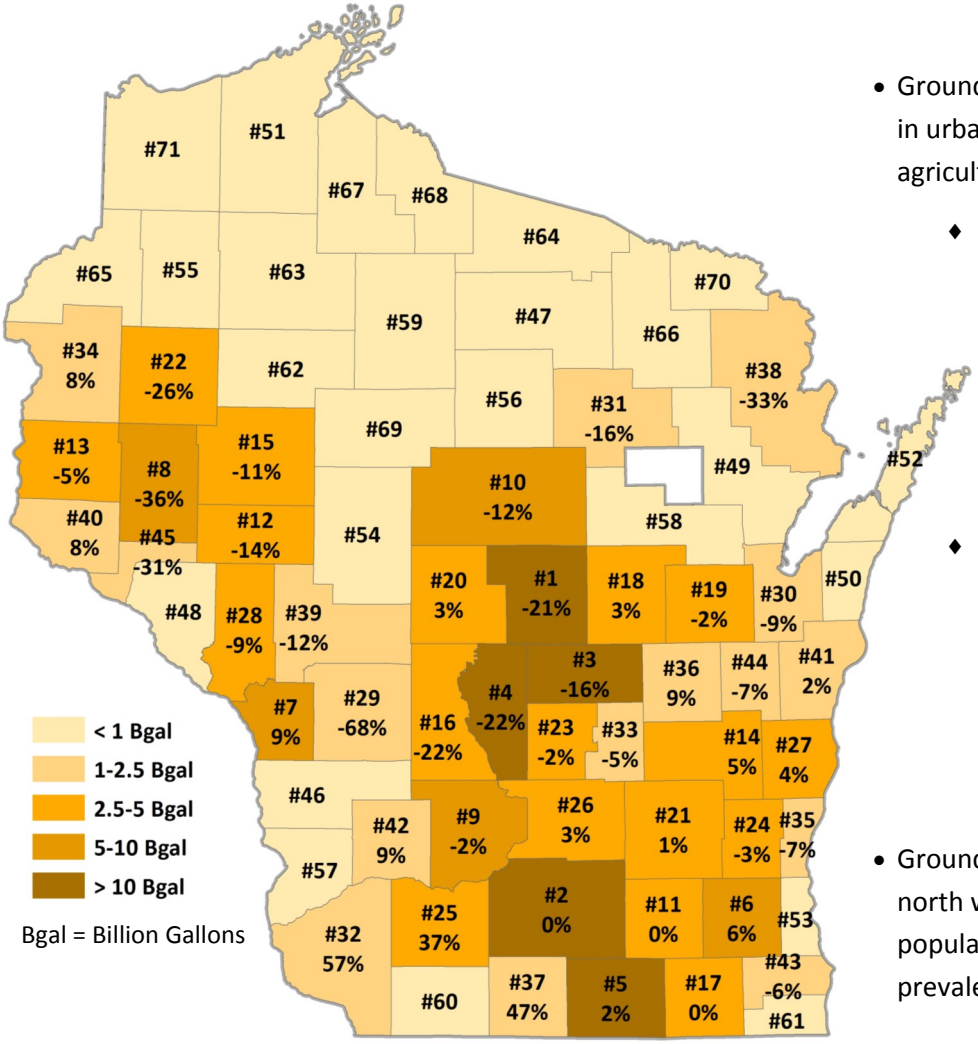
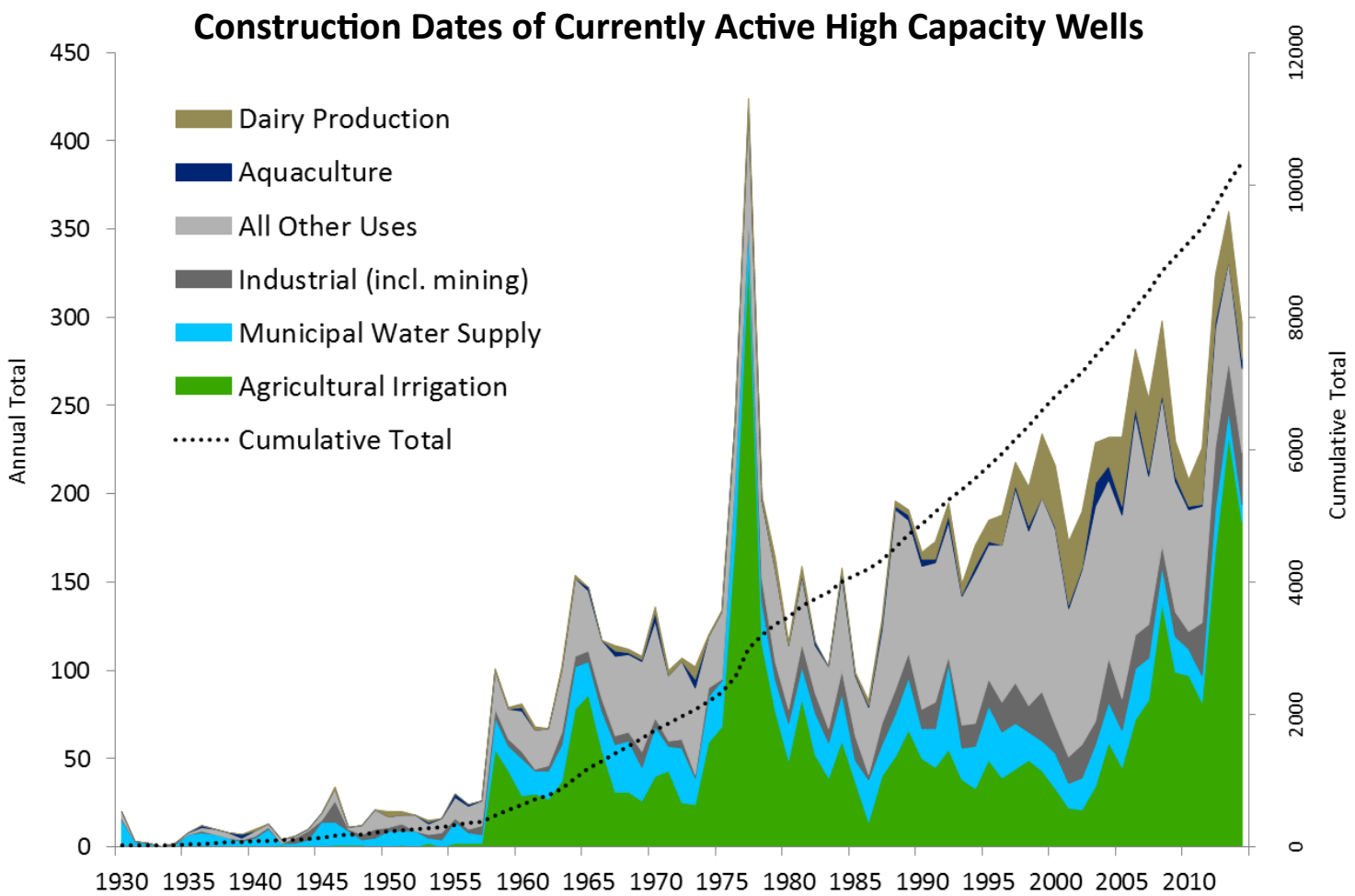


- Groundwater withdrawals are most concentrated in urban areas not supplied by surface water and agricultural areas with high irrigation demand.
  - Portage (#1), Waushara (#3), and Adams (#4) comprise much of the central sands area of the state. This area is a globally significant vegetable and potato producing region. Withdrawals decreased for a second straight year in each of these counties.
  - Dane (#2), Rock (#5), and Waukesha (#6) have large urban/suburban populations that rely on groundwater to meet their needs residential, commercial and industrial water needs. Withdrawals increased slightly or remained steady in each of these counties.
- Groundwater withdrawals are smallest in the far north where land use is more forest based, populations are lower, and agriculture is less prevalent.

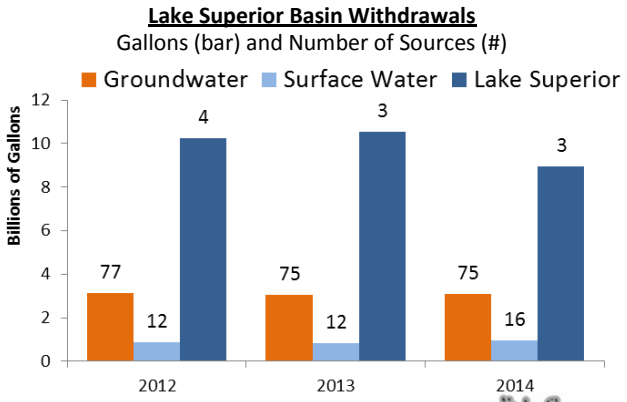
High Capacity Well Trends

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. Many municipal wells are greater than 1500 gpm, most irrigation wells are about 1000 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 wells 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.



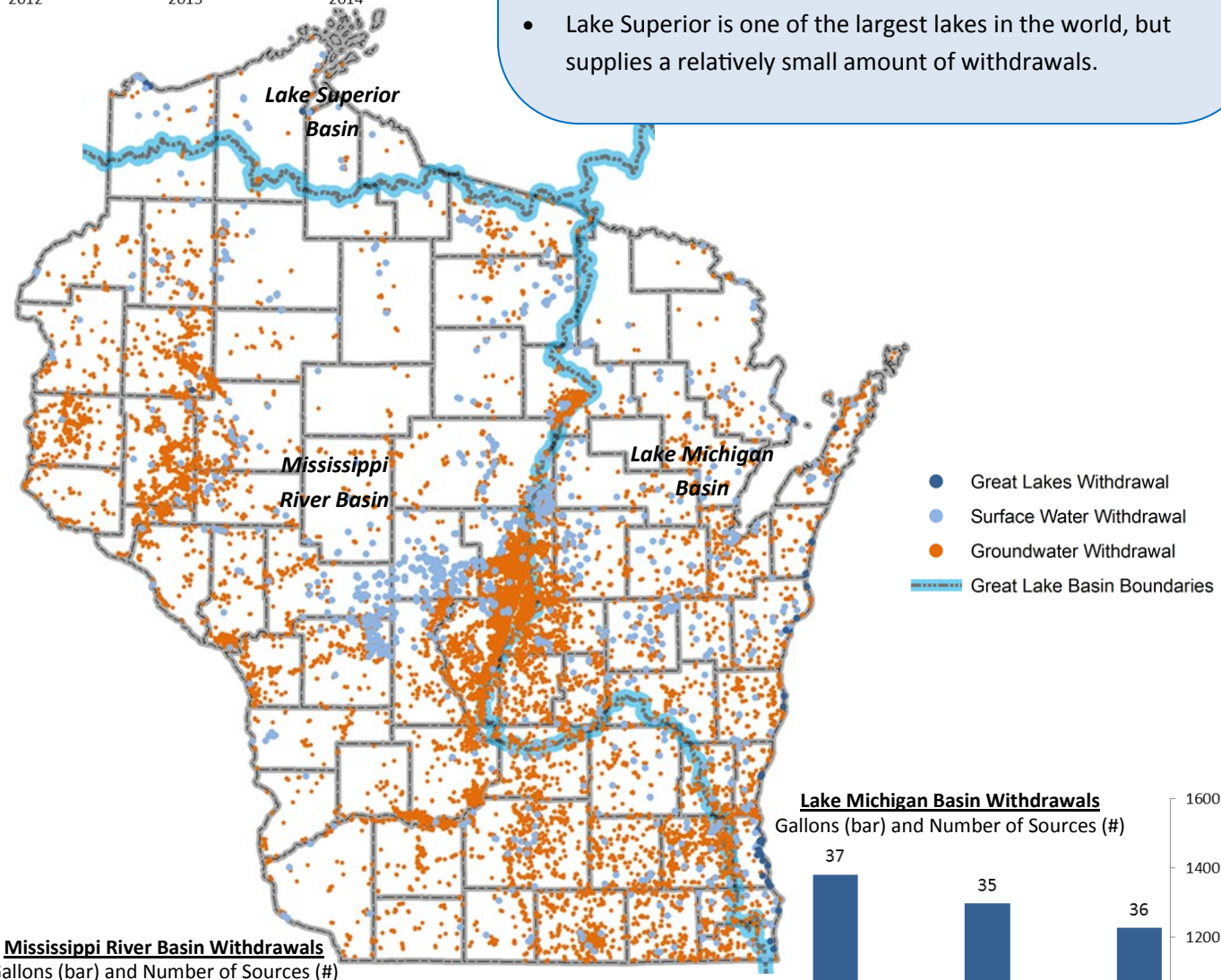
* Does not include approximately 3,950 registered small wells located on high capacity well properties mostly used for domestic purposes. Includes only currently active wells. Wells constructed and subsequently abandoned are not counted.

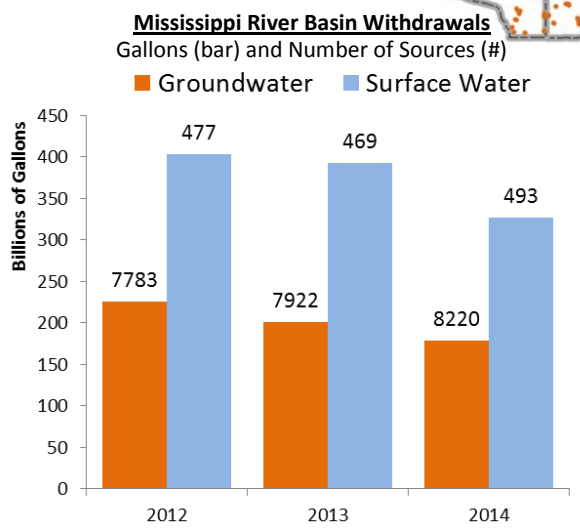


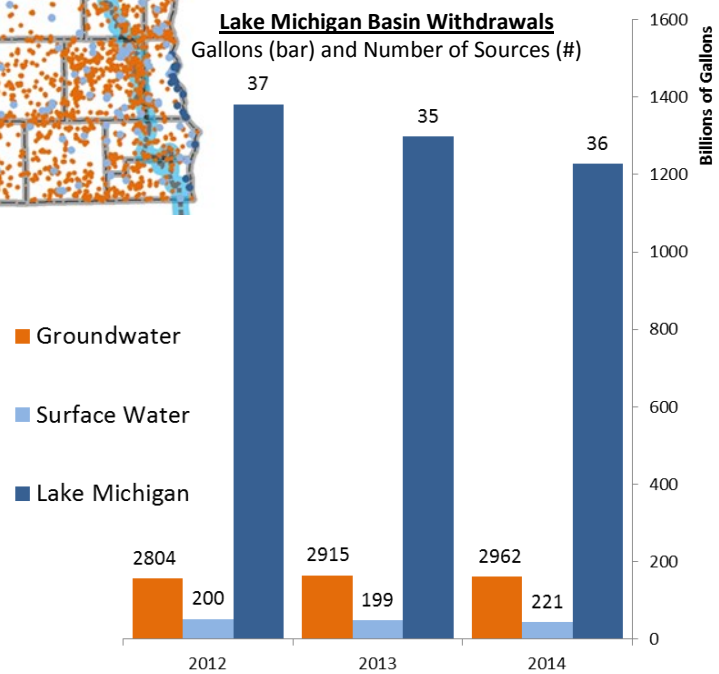
Withdrawal Variation through Time and Location

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

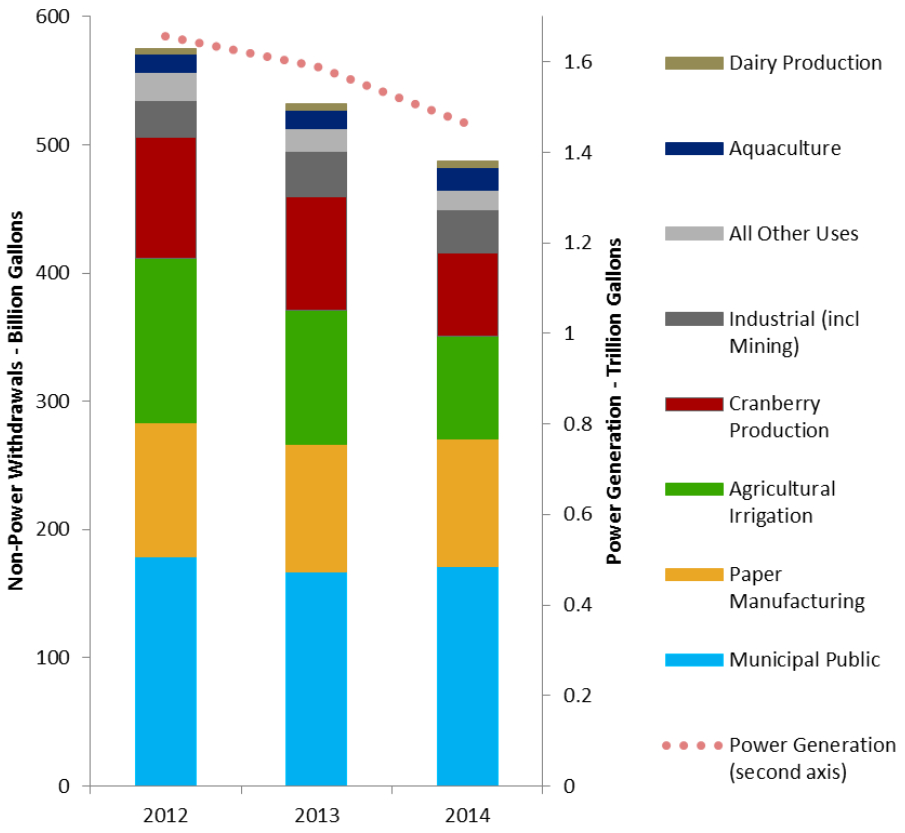
- Lake Michigan is the single largest water source in Wisconsin supplying over 1.2 trillion gallons to only 36 sources.
- Although the total number of wells increased in the Mississippi River Basin between 2012 and 2014, the total amount of water withdrawn decreased.
- Lake Superior is one of the largest lakes in the world, but supplies a relatively small amount of withdrawals.







Annual Withdrawals by Category 2012 to 2014



- Total withdrawals in Wisconsin decreased two years in a row from a high in 2012.
- Power plant withdrawals decreased due in part to cool summers in 2013 and 2014 compared to 2012.
- Withdrawals for agricultural irrigation and cranberry production decreased two years in a row. This was due mostly to the cooler, wetter growing seasons.
- Dairy production (+8%) and industrial (+19%) withdrawers were two sectors with a net withdrawal increase from 2012 to 2014.
- Paper production and municipal public withdrawals have remained relatively steady in since 2012

2014 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.
- For 2014, there were 14,797 registered high capacity withdrawal sources in the state: 13,758 wells and 1,039 surface water sources.
- Owners reported 16% of the registered sources were unused in 2014.
- Owners supplied reports for 97.6% of the state's registered sources.

Water Use	Total Active Sources	Total 2014 Withdrawal (Bgal)	Active Ground Water Sources	2014 Ground Water Withdrawal (Bgal)	Active Surface Water Sources	2014 Surface Water Withdrawal (Bgal)
Agricultural Irrigation	3,785	79.7	3,645	77.8	140	2.0
All Other Uses	2,339	7.2	2,302	5.9	37	1.4
Non-Municipal Public	1,660	4.2	1,660	4.2		
Municipal Public	1,659	171.9	1,635	97.2	24	74.6
Dairy Production	679	4.7	679	4.7		
Industrial (no mining)	491	347.0	465	11.2	26	335.8
Golf Course Irrigation	418	3.8	364	3.4	54	0.4
Cranberry Production	413	65.1	139	3.3	274	61.8
Non-Metallic Mining	301	18.6	176	3.2	125	15.4
Aquaculture	160	17.5	142	10.3	18	7.2
Power Generation	68	1,132.7	38	1.0	30	1,131.7
Paper Manufacturing	53	99.4	12	2.2	41	97.3

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 606.266.2299