Groundwater Use in Wisconsin:

Where, What, How much and Why does it matter

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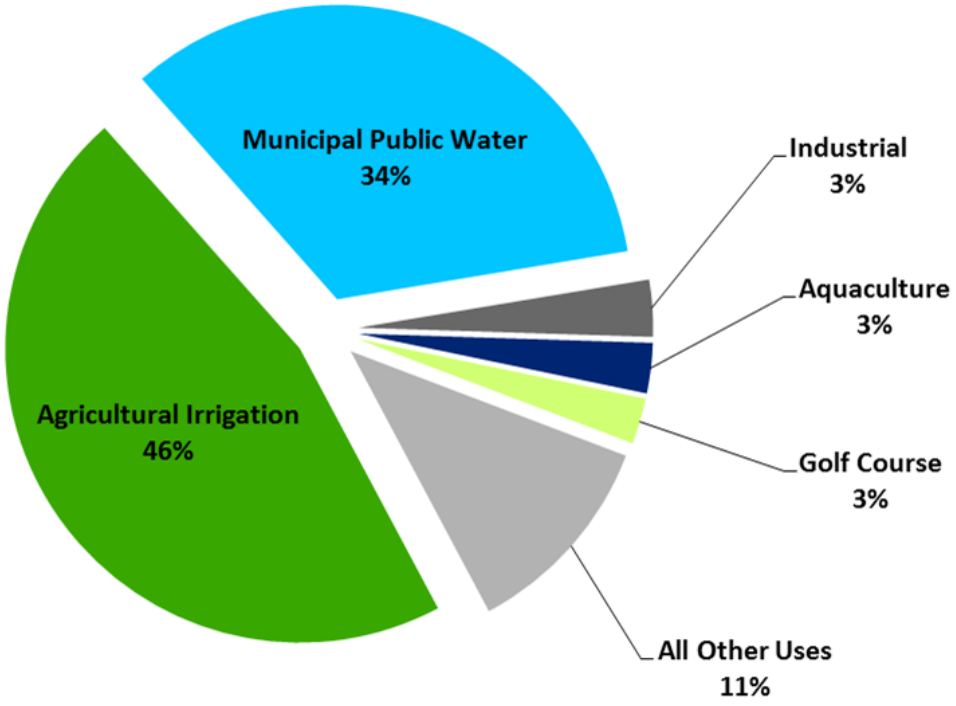
Groundwater Coordinating Council
DATCP

Groundwater Use in Wisconsin:
2012 Withdrawals

292,303,941,228 groundwater gallons from 13,000 sources in in 2012, up 37% from 2011.

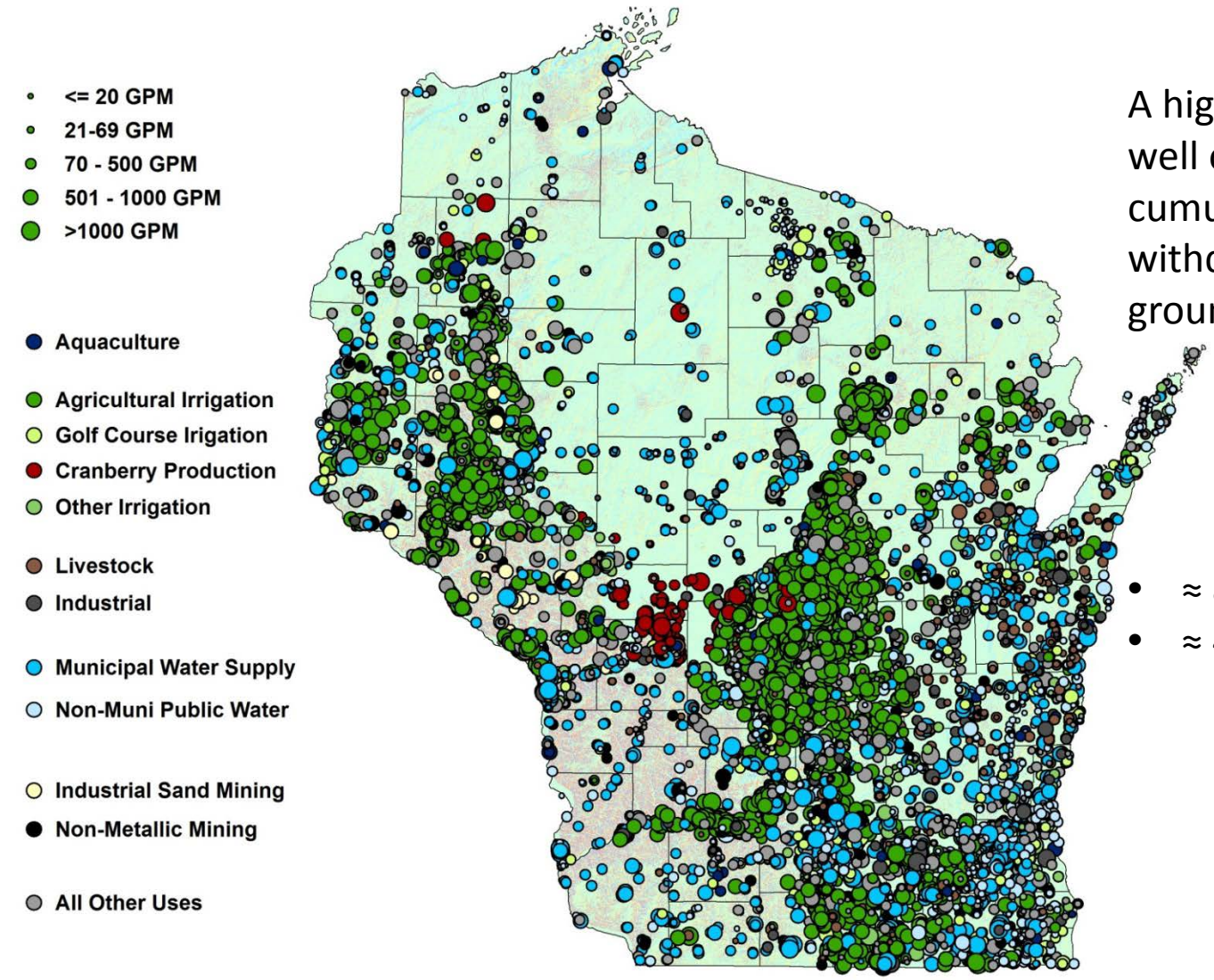
- Agricultural Irrigation surpassed municipal public water in 2012 due to the drought.
- Could cover the land area of Wisconsin with ¼ inch of water.
- Enough water to fill Lambeau Field over 600 times.

≈800,000 additional non-hicap wells statewide serving homes, farms and businesses withdraw roughly 50-75 billion gallons per year.



Wisconsin Groundwater Withdrawals:

High Capacity Wells by Use



A high capacity well is any well on a property with the cumulative capacity to withdraw 100,000 gpd of groundwater.

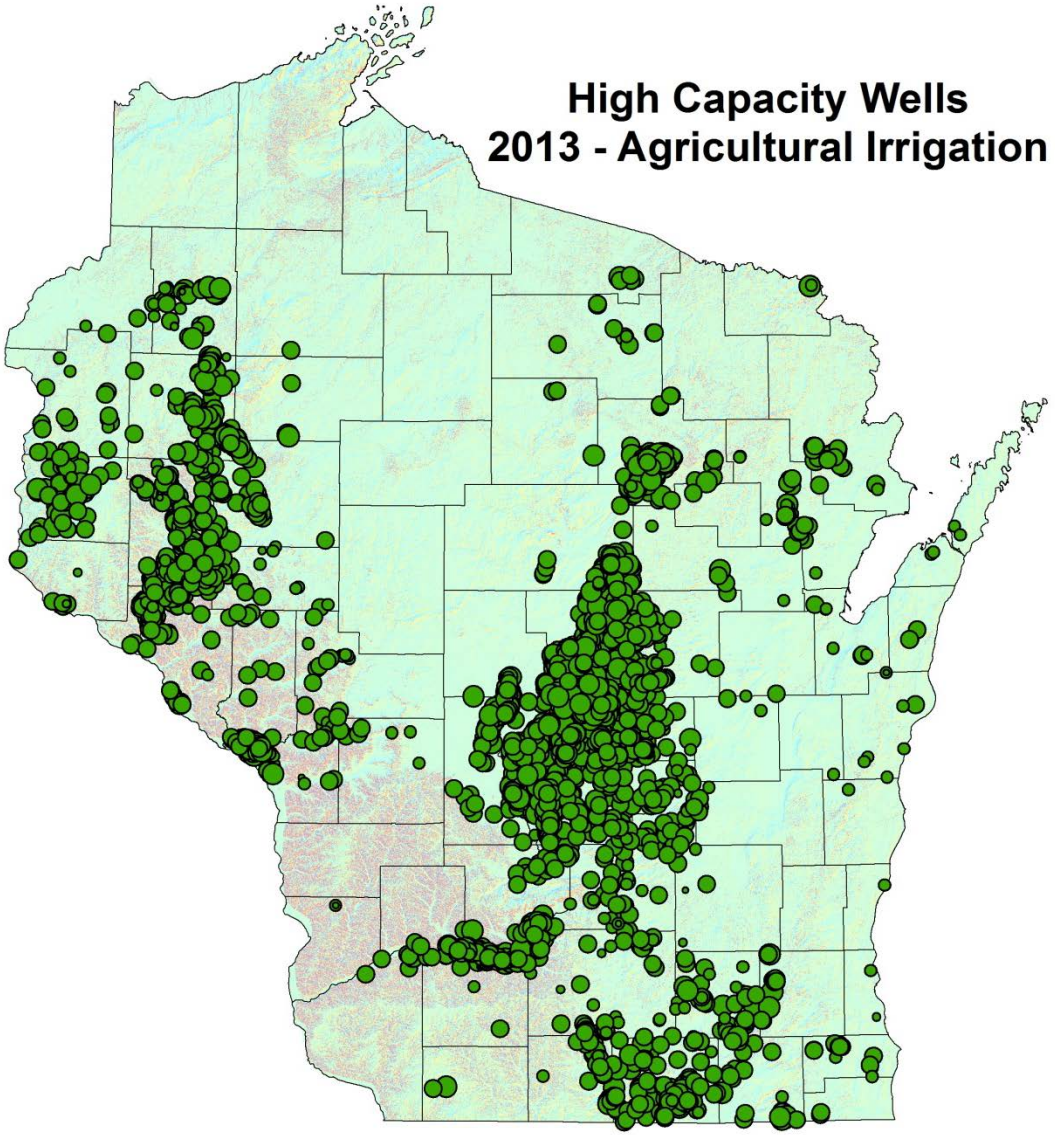
- ≈ 8000 ≥70 gpm
- ≈ 4000 <70 gpm

Wisconsin Groundwater Withdrawals:

Water Use by Sector - Agricultural Use

135 Billion groundwater gallons from 3,888 wells for agricultural irrigation in 2012. This is up 83% from 2011.

- 46% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 34.8 mg in 2012, 19.0 mg in 2011.
- Could cover Dane County in about of 5.5” water.
- Equal to average annual flow in the Rock River at Beloit.
- The equivalent of the volume of water in Lake Mendota.

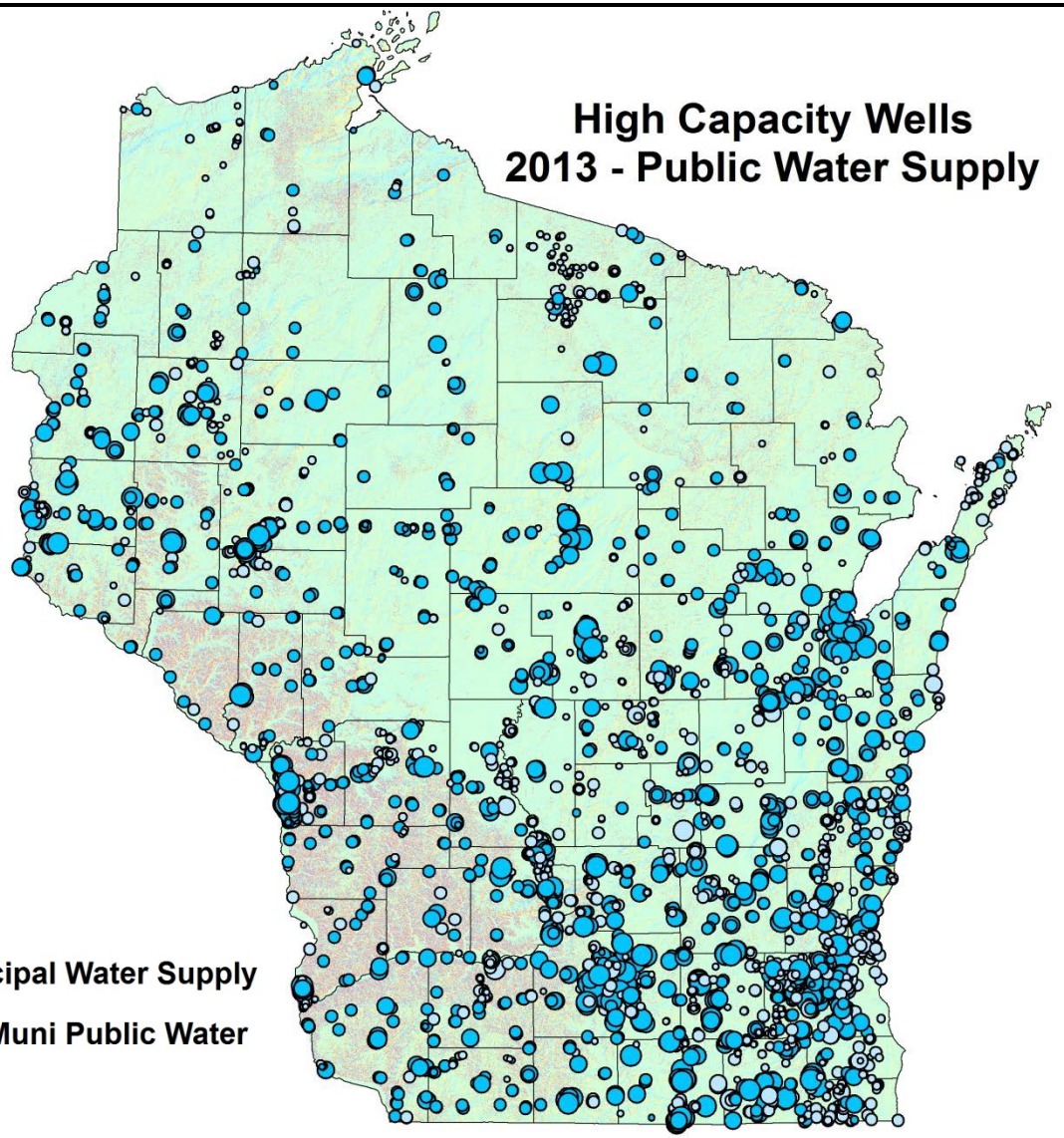


Wisconsin Groundwater Withdrawals:

Water Use by Sector – Public Water Supply

105 Billion groundwater gallons from 3677 wells for Public Water in 2012. This is up 8.1 % from 2011.

- 33.9% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 26.7 mg in 2012, 24.8 mg in 2011.
- PSC concluded that conservation programs help keep this increase from being higher.

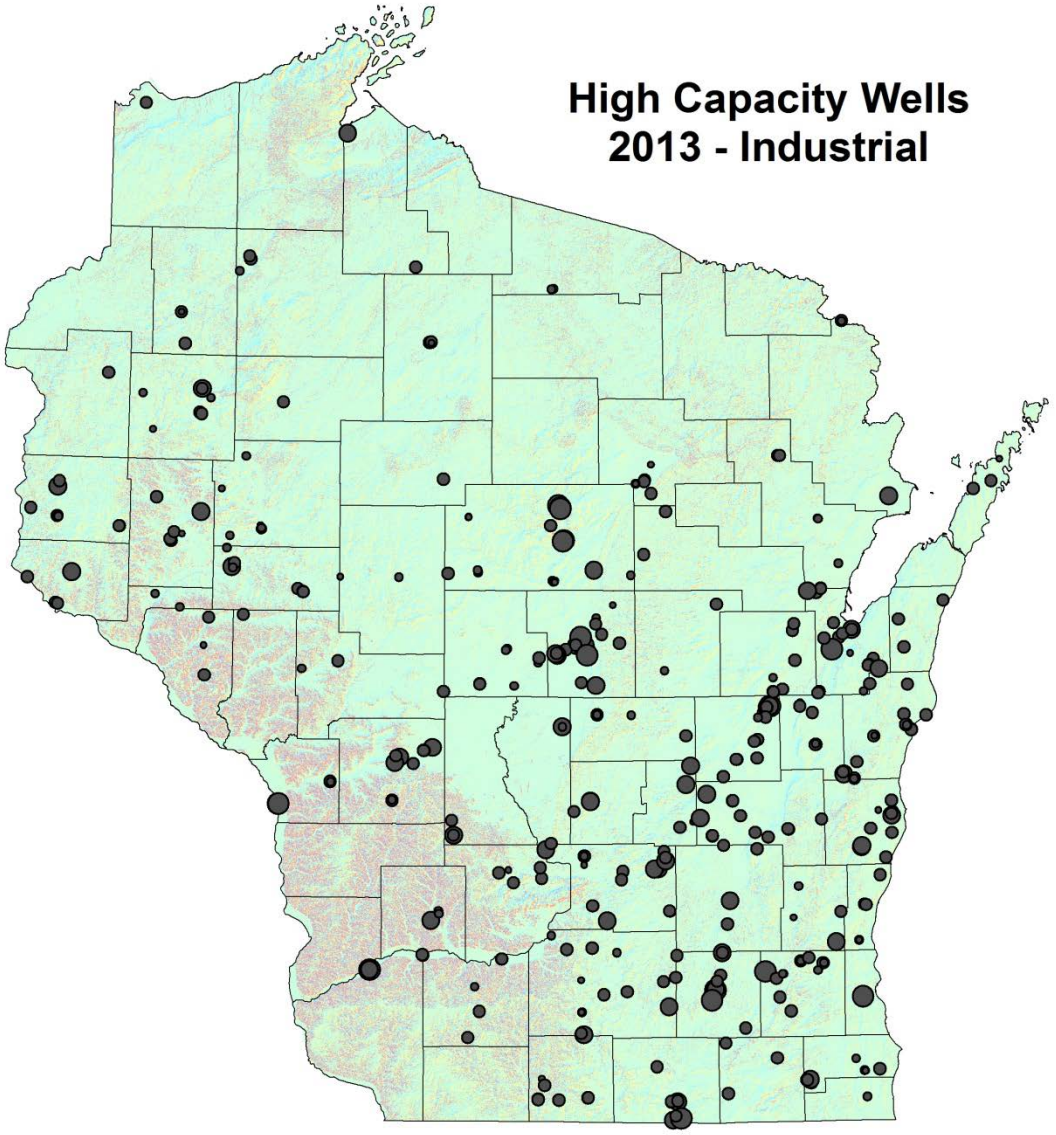


Wisconsin Groundwater Withdrawals:

Water Use by Sector – Industrial Use

9.1 Billion groundwater gallons from 425 wells for industrial use in 2012. This is down 4.1% from 2011.

- 3.1% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 19.5 mg in 2012, 20.0 mg in 2011.
- Does not include surface water withdrawals.

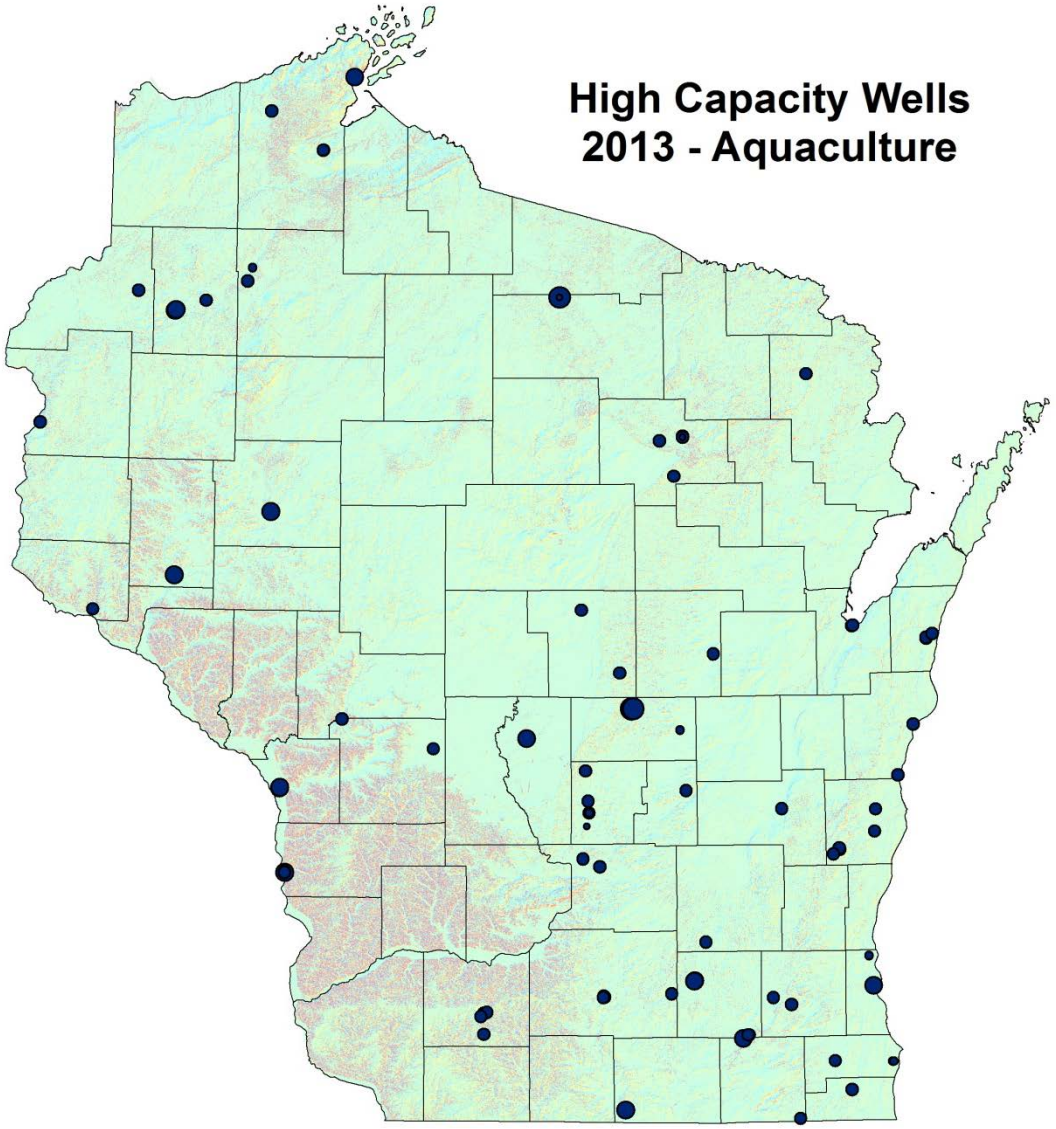


Wisconsin Groundwater Withdrawals:

Water Use by Sector - Aquaculture

8.1 Billion groundwater gallons from 141 wells for aquaculture in 2012. This is down 2.3% from 2011.

- 2.8% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 54.8 mg in 2012, 56.1 mg in 2011.
- 25% of the sources are operated by state or federal entities.

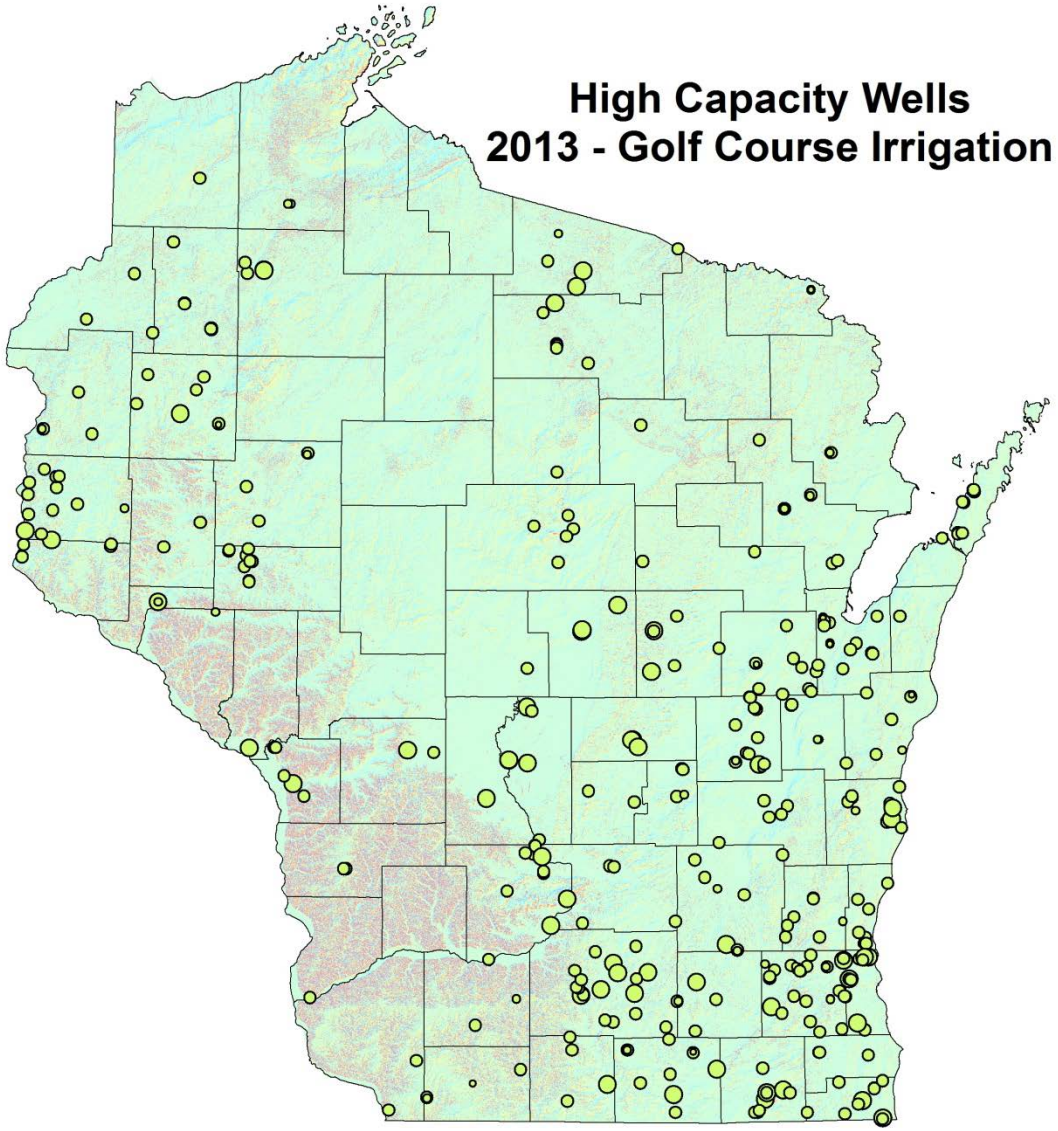


Wisconsin Groundwater Withdrawals:

Water Use by Sector – Golf Course Irrigation

7.4 Billion groundwater gallons from 400 wells for golf course irrigation in 2012. This is up 80.3% from 2011.

- 2.5% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 16.8 mg in 2012, 9.3 mg in 2011.
- Highest concentrations are near urban or tourism areas.
- Working with golf course superintendents to benchmark efficiencies.

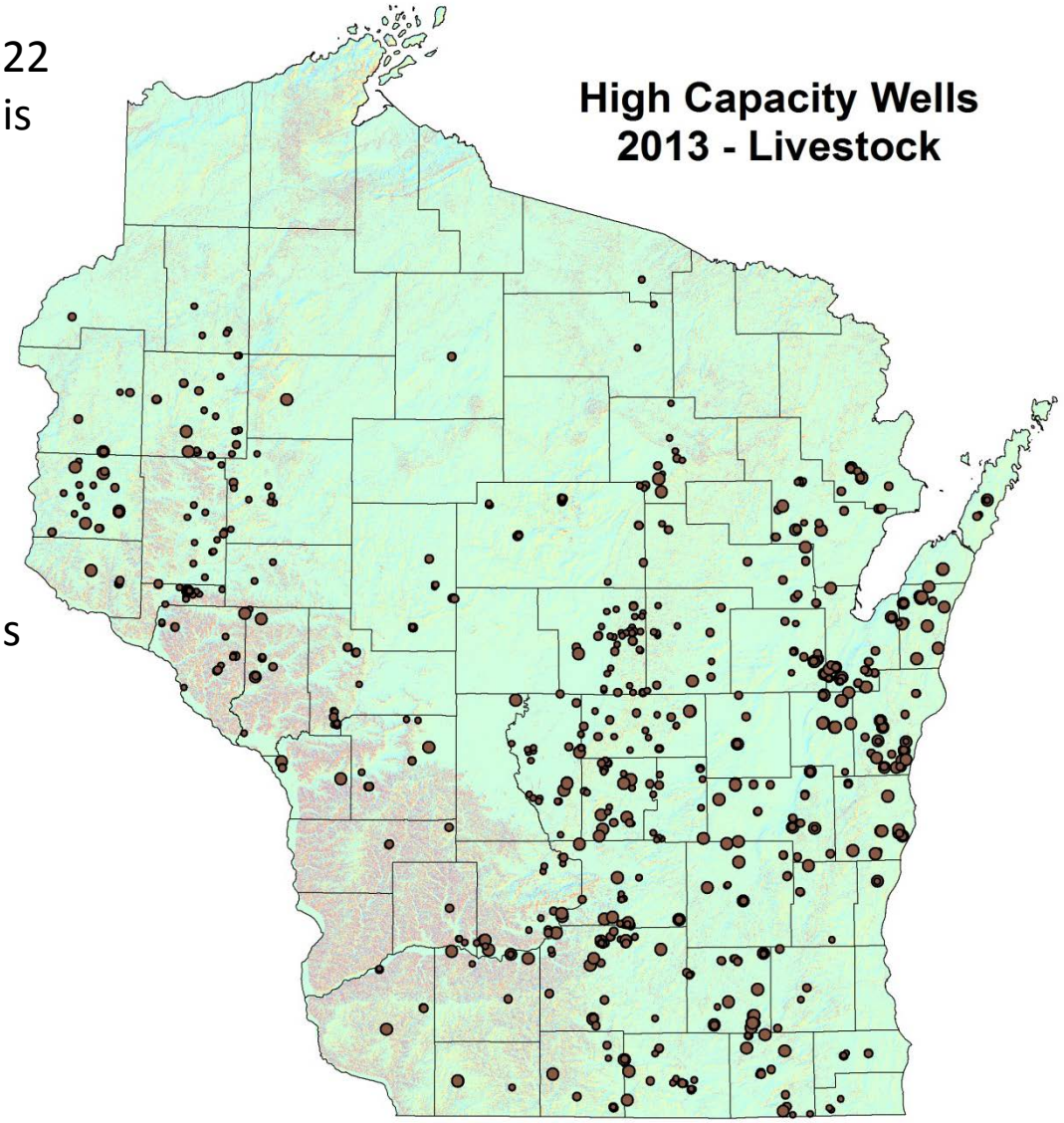


Wisconsin Groundwater Withdrawals:

Water Use by Sector - Livestock

5.0 Billion groundwater gallons from 822 wells for livestock farming in 2012. This is up 28.0% from 2011.

- 1.7% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 5.8 mg in 2012, 4.5 mg in 2011.
- May be large CAFOs with large wells or small dairy wells on farms with irrigation wells.
- Average about 35 g/d/milking cow (25g/d/au). At this rate a farm doesn't 'need' a hicap well until it exceeds 2500 cows

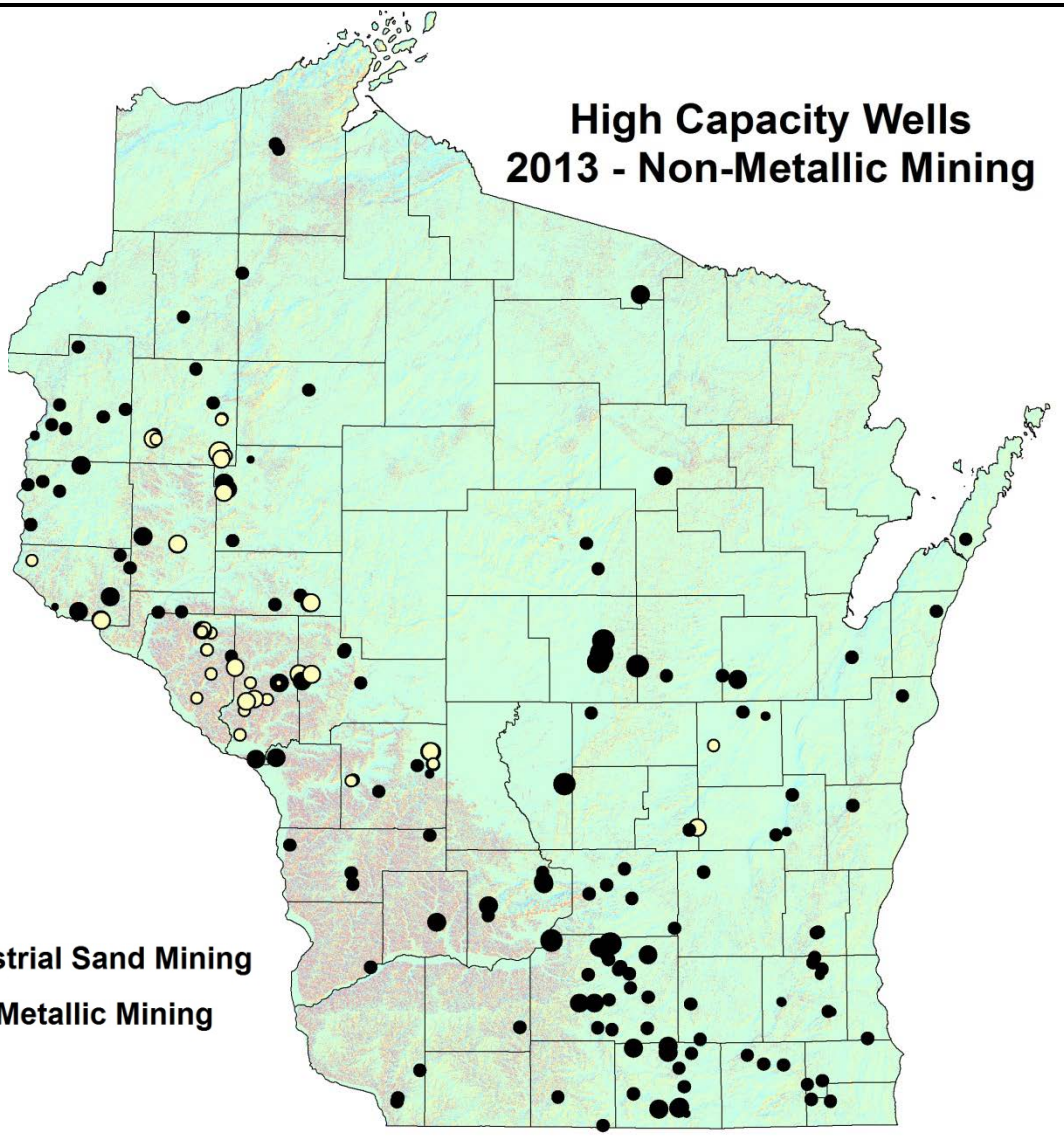


Wisconsin Groundwater Withdrawals:

Water Use by Sector – Non-Metallic Mining

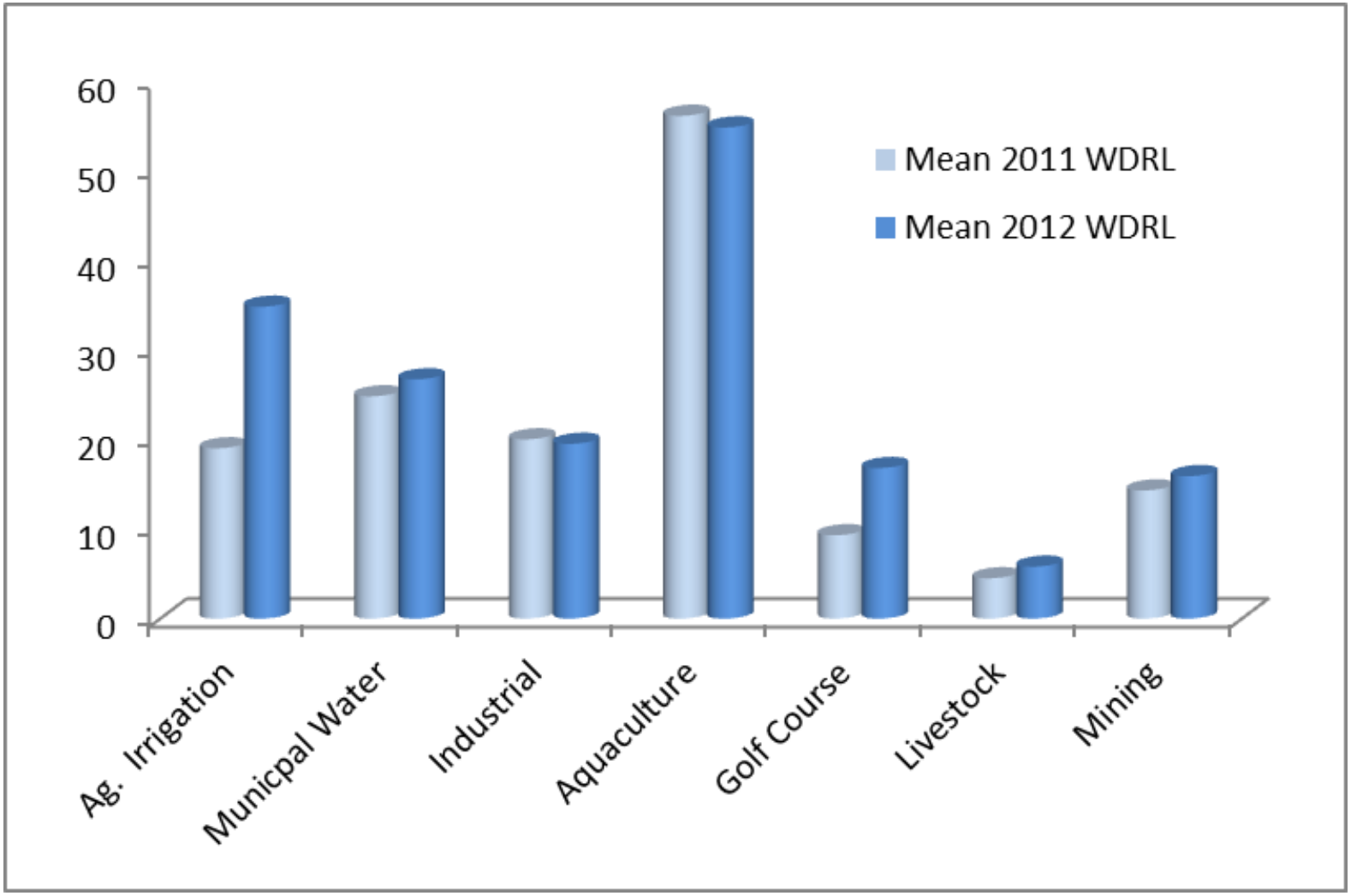
3.3 Billion groundwater gallons from 157 wells for non-metallic mining in 2012. This is up 11.5 % from 2011.

- 1.1% of the 2012 statewide groundwater withdrawal.
- Average withdrawal was 15.9 mg in 2012, 14.3 mg in 2011.
- 30 of the 56 wells used for industrial sand production have been approved since January 2012.



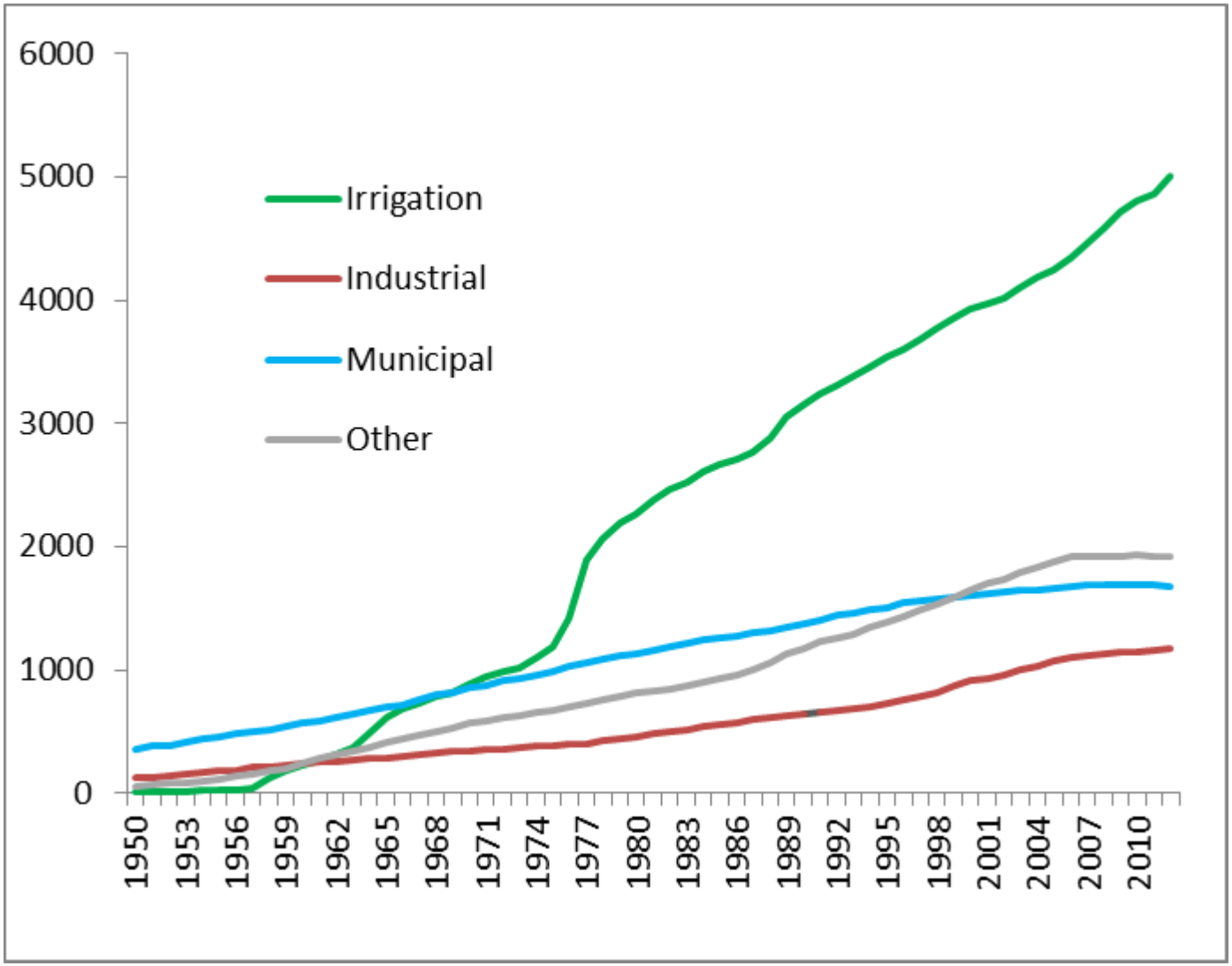
Wisconsin Groundwater Withdrawals

Average Withdrawal Volume per Well 2011-2012



Wisconsin Groundwater Withdrawals

Growth in High Capacity Wells



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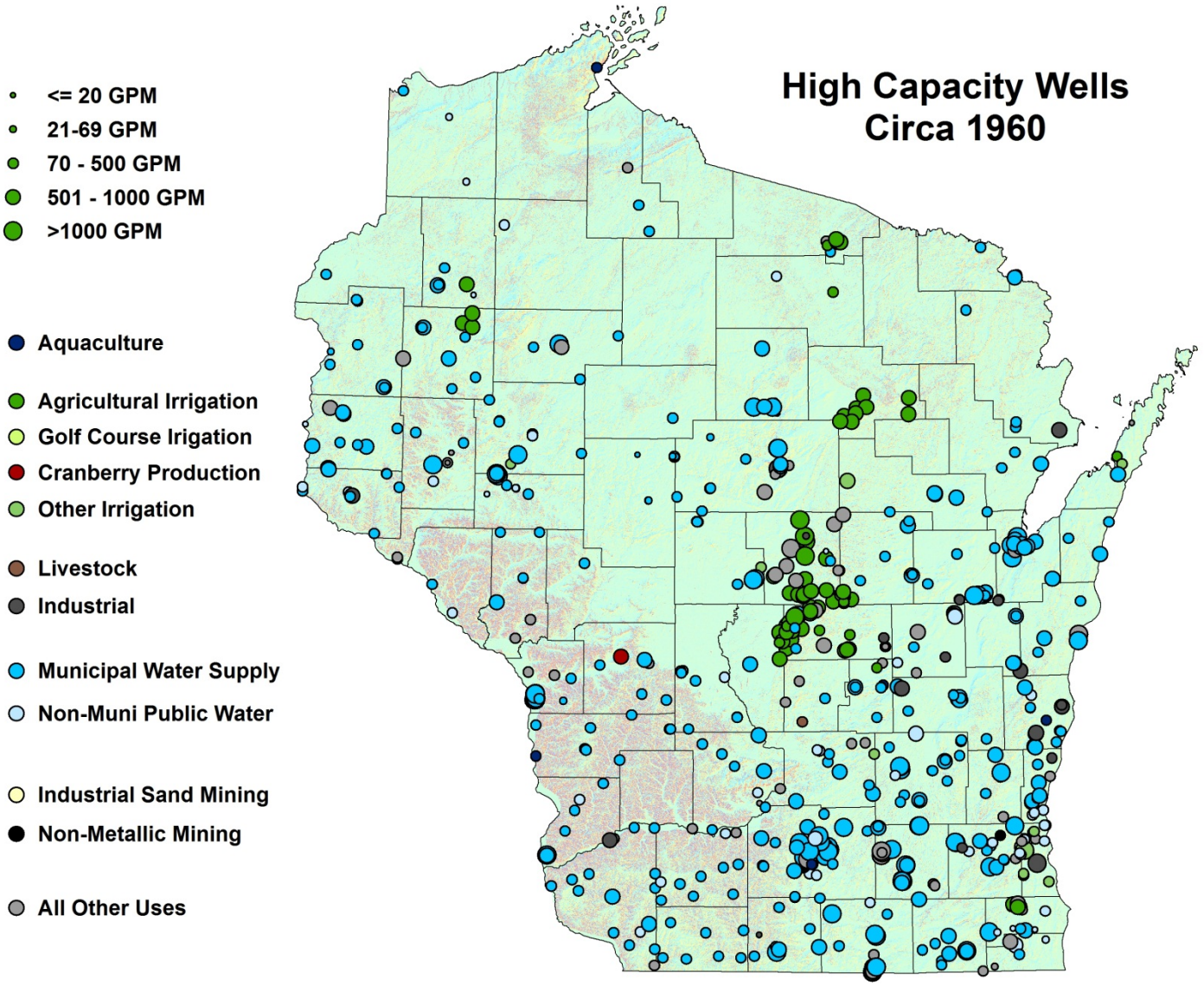

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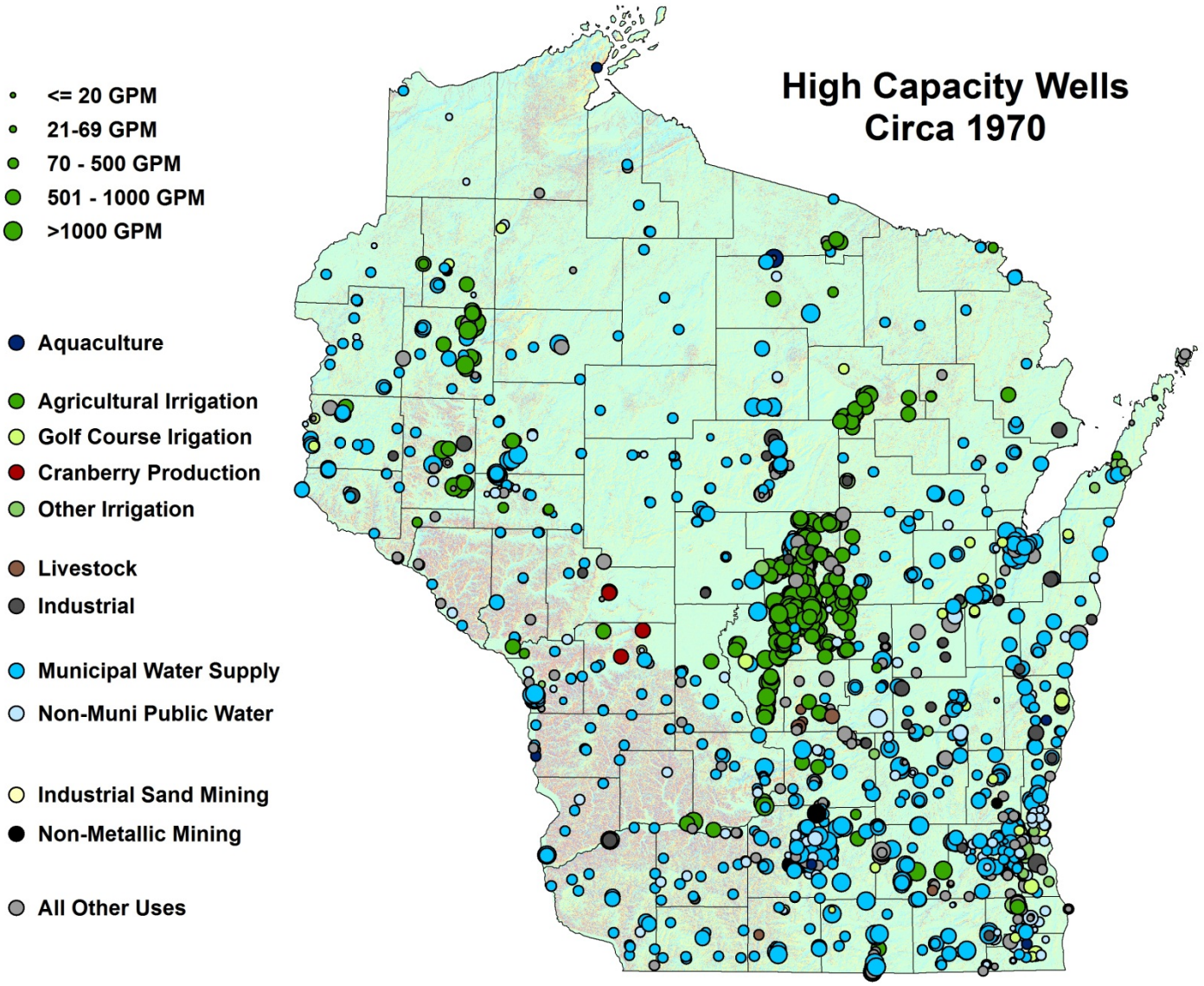

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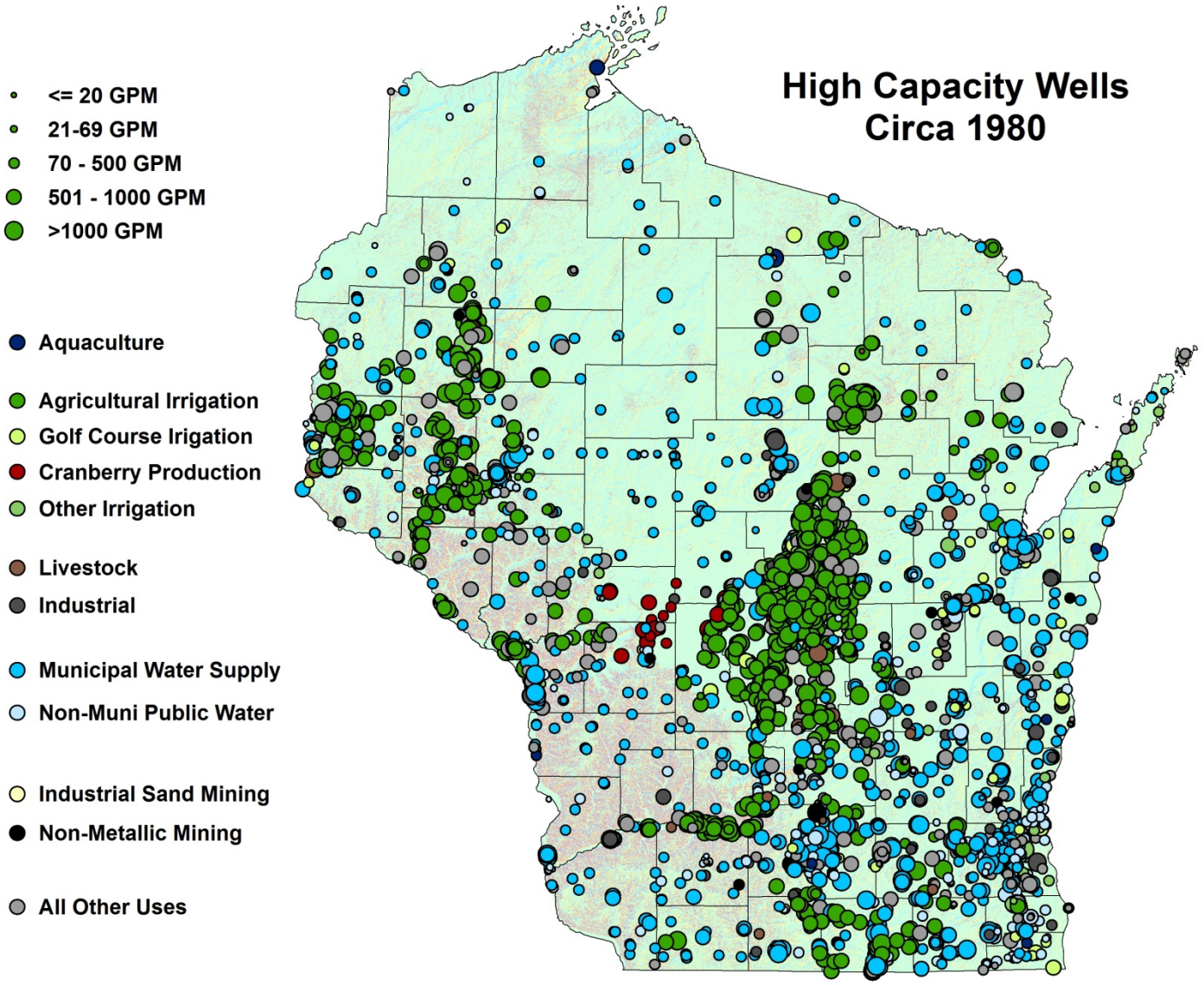

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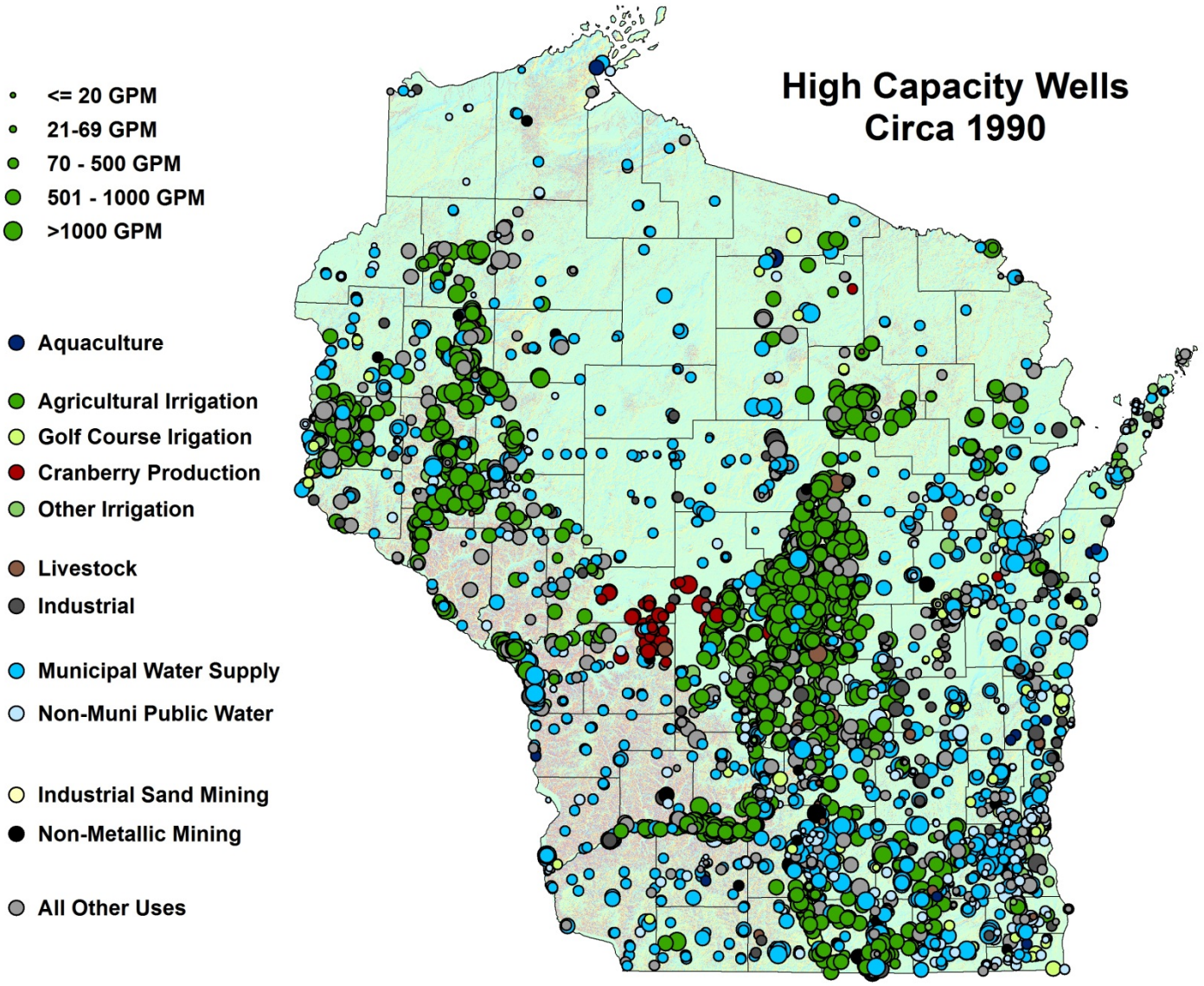

Wisconsin Groundwater Withdrawals

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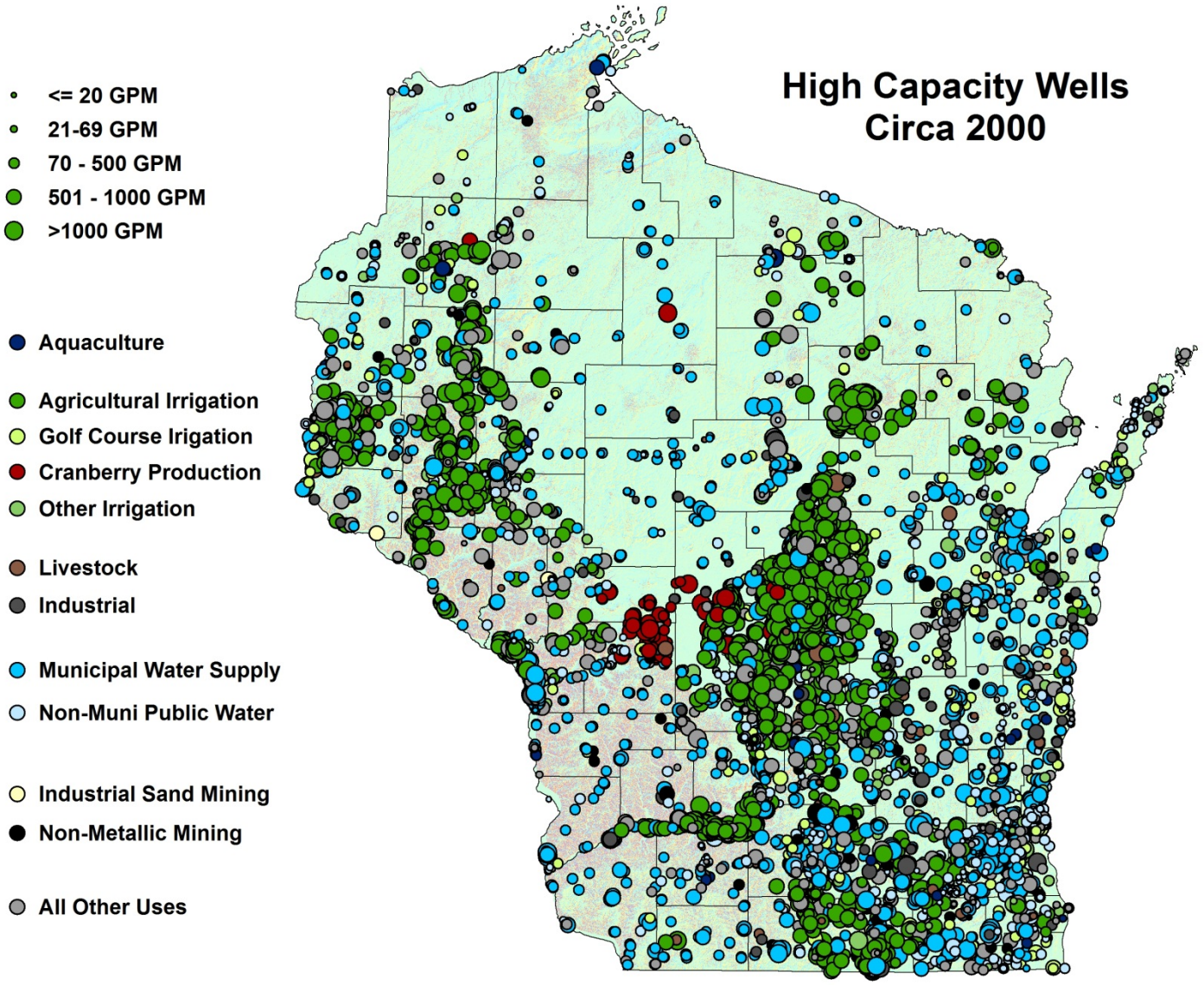

Wisconsin Groundwater Withdrawals

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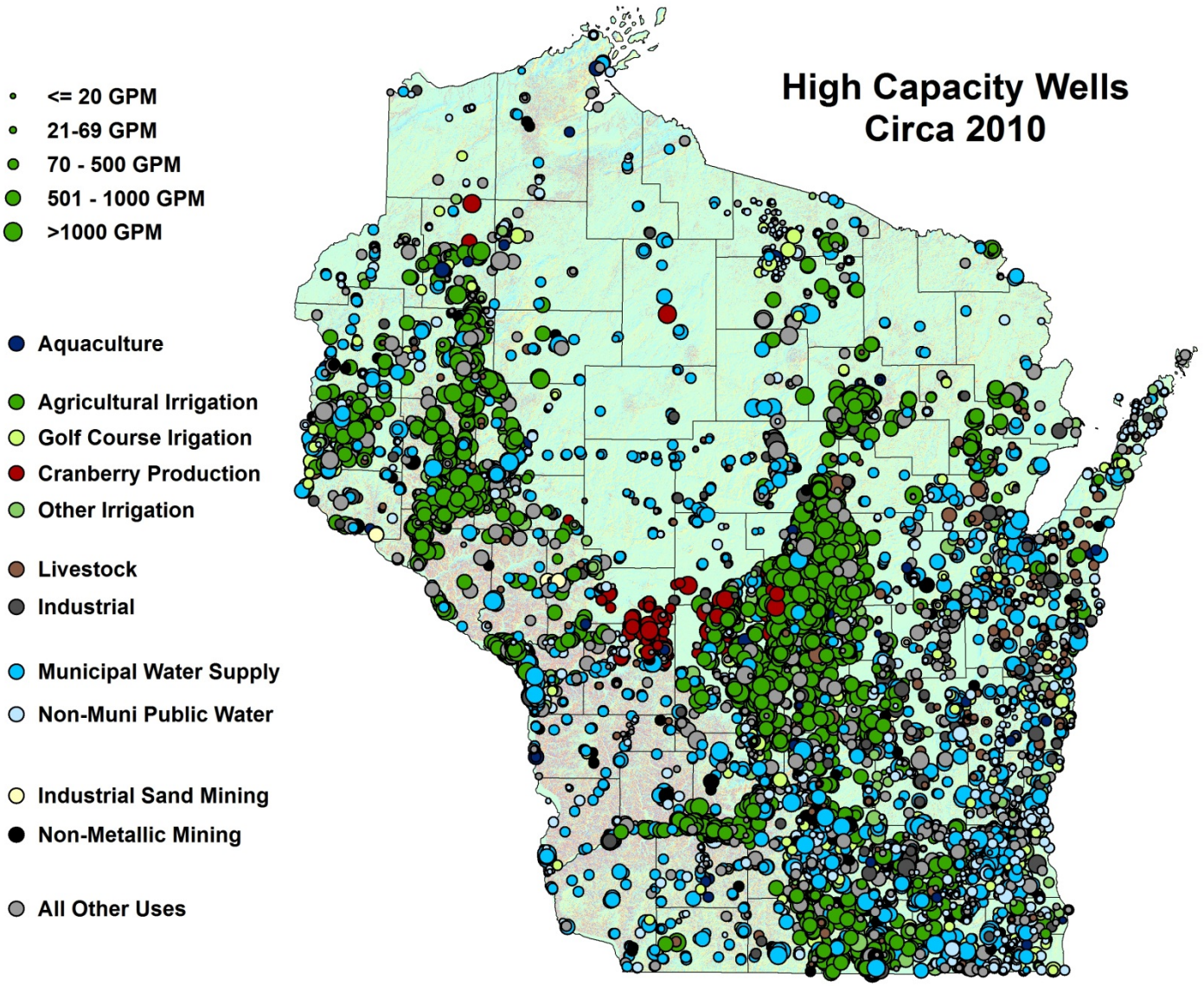
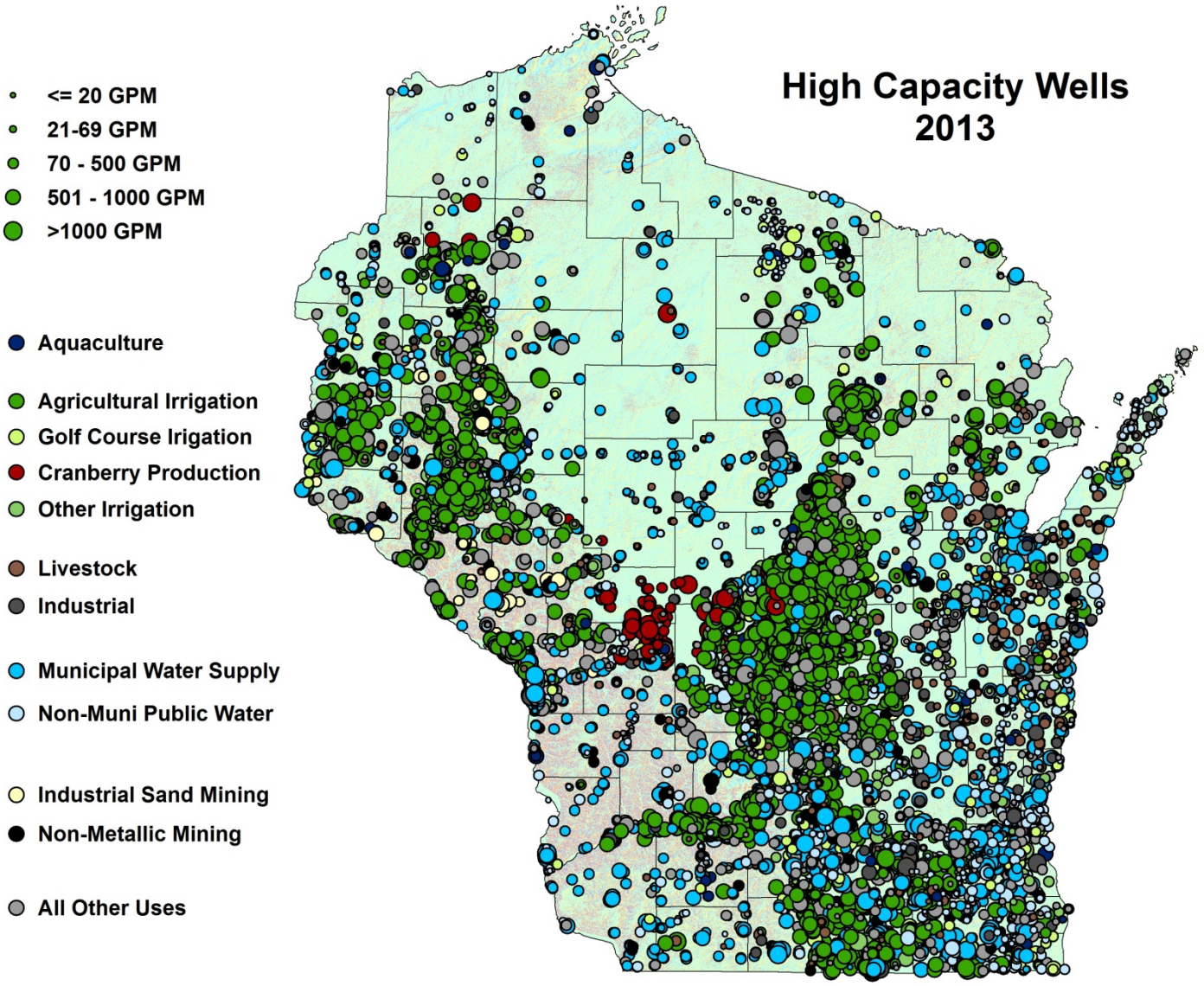


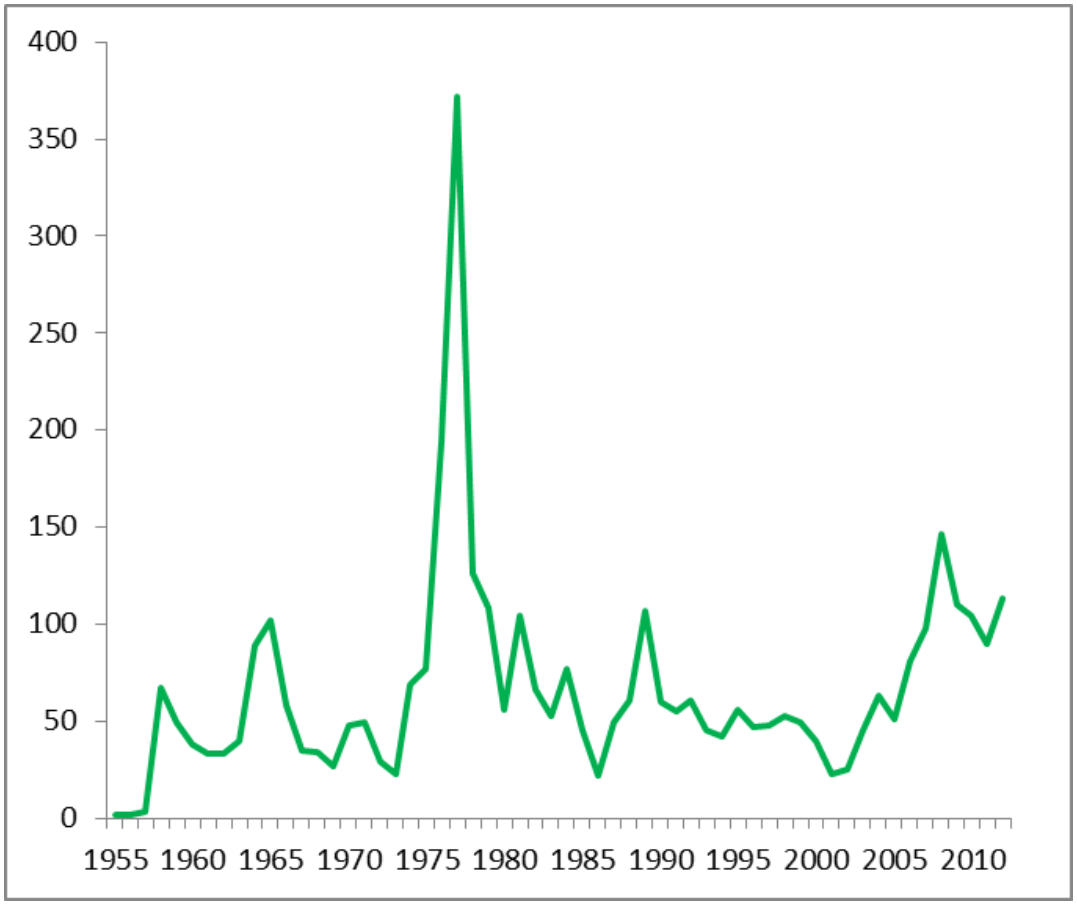
Wisconsin Groundwater Withdrawals

Growth in High Capacity Wells



Focus - Agricultural Irrigation in Wisconsin:

Well Construction through Time



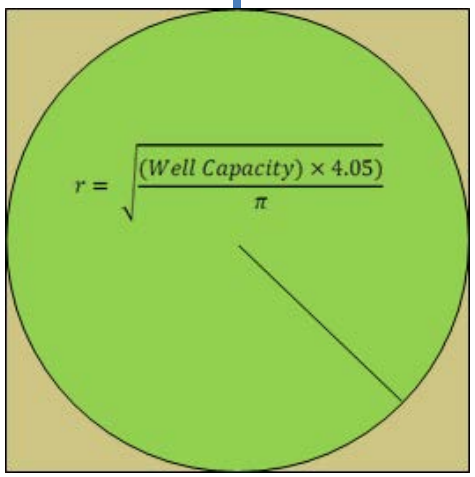
HiCap Well Construction

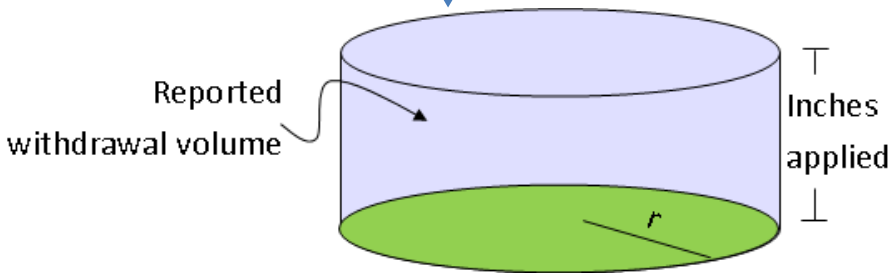
Year	Irrigation Well Approvals
2007	91
2008	152
2009	111
2010	75
2011	101
2012	203
2013 (to October 1)	258

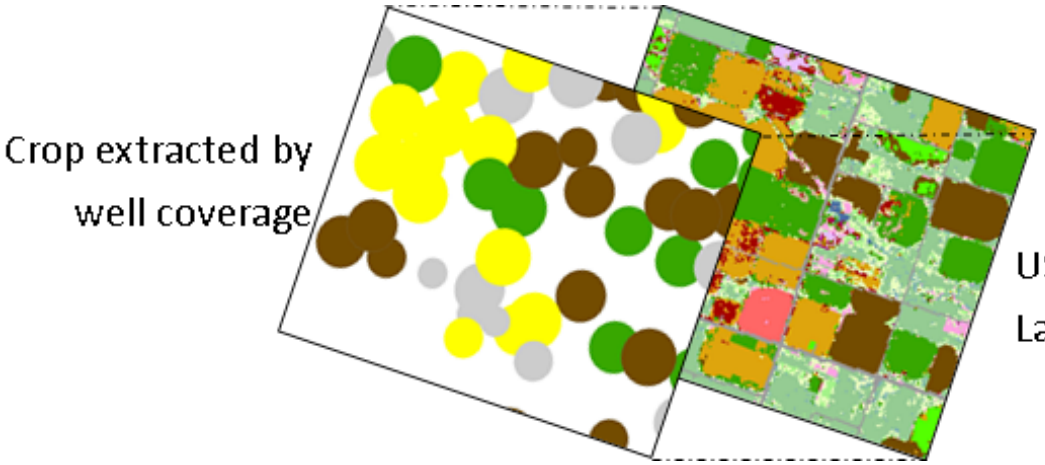
HiCap Well Approvals

Focus - Agricultural Irrigation in Wisconsin:

Determining How Much of What We Irrigate



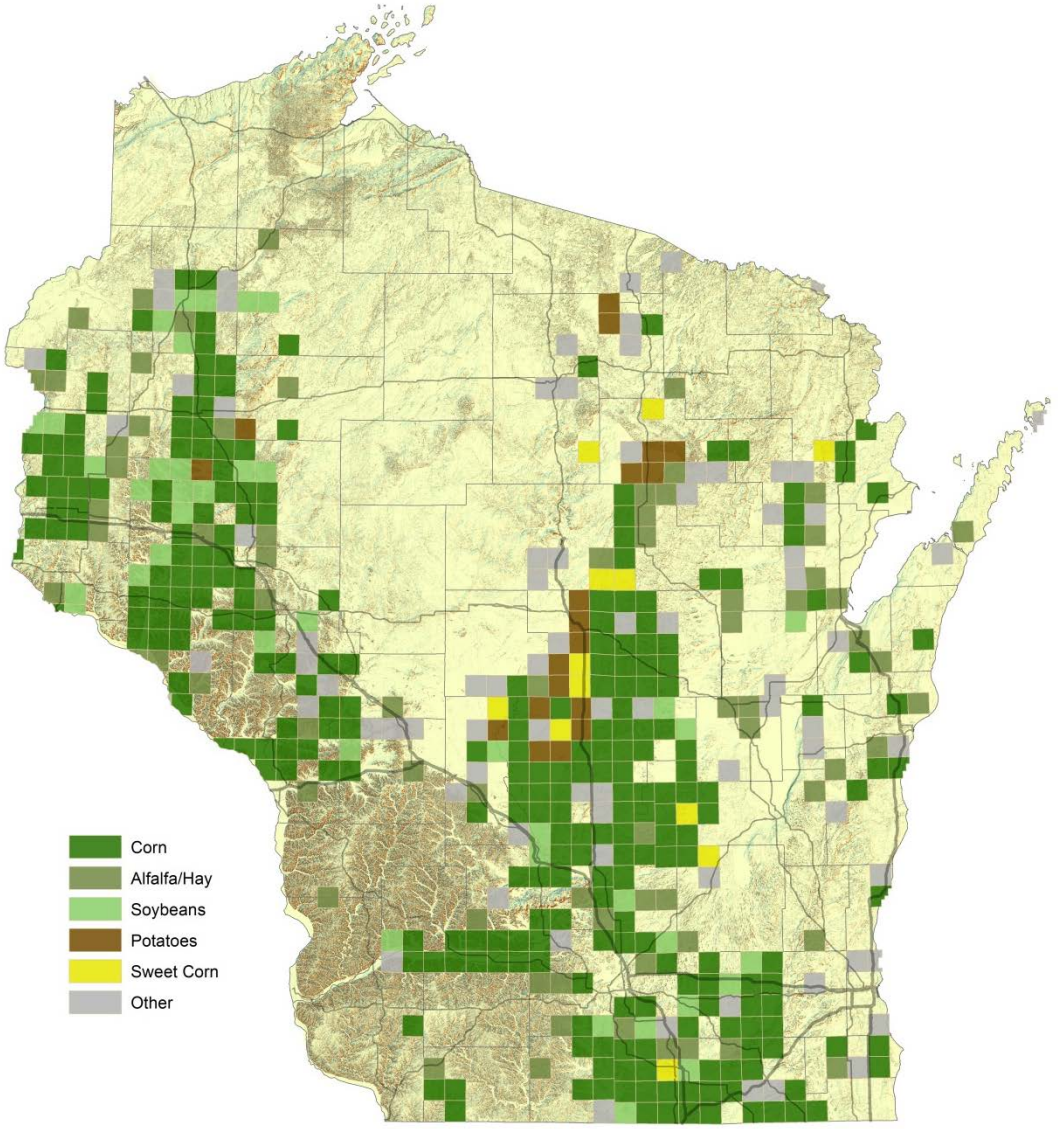




Focus - Agricultural Irrigation in Wisconsin:

What We Irrigate

- Potatoes and other produce in the central sands.
- Alfalfa and Soy in the northeast and southeast.
- Corn… everywhere.



Focus - Agricultural Irrigation in Wisconsin:

How much we irrigate

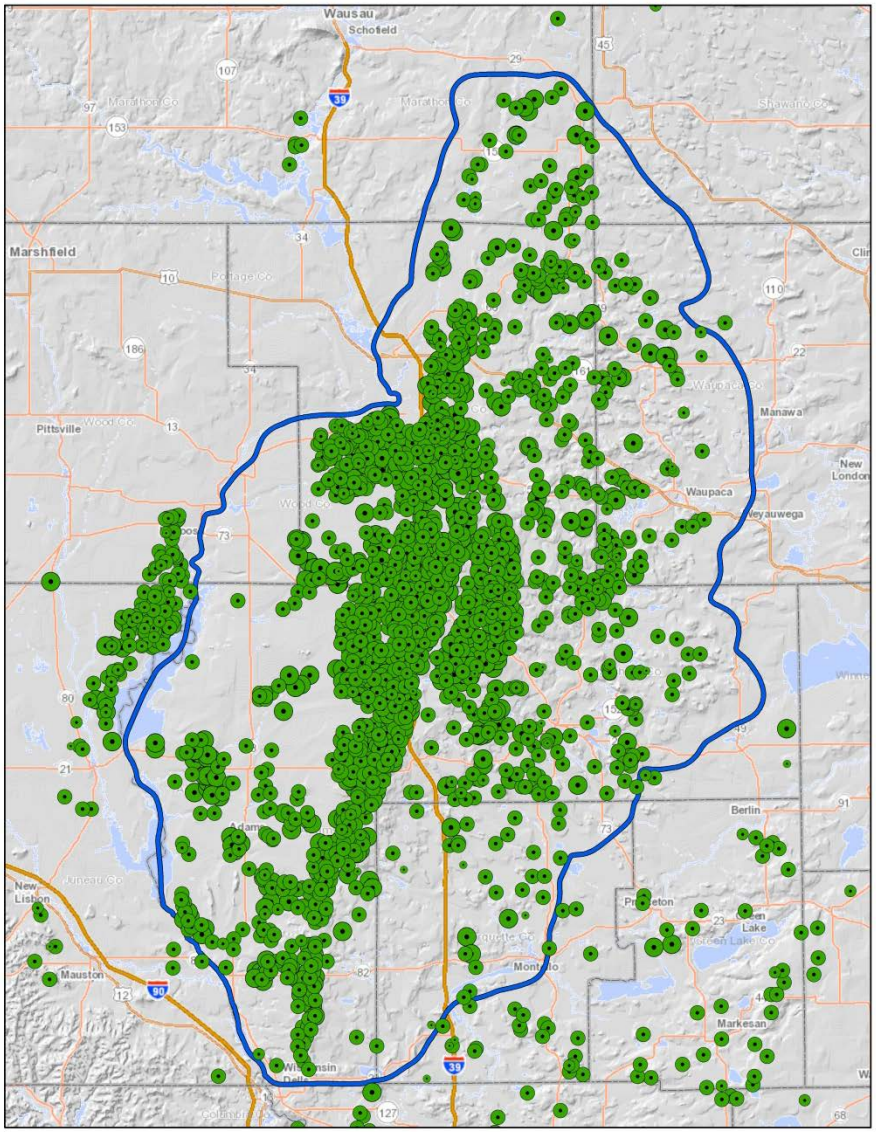
		2012		2011	
	Est. Acreage	**Irrigation (in)**	**Total Water (in)**	**Irrigation (in)**	**Total Water (in)**
Overall	**462,726**	**11.0**	**18.3**	**5.9**	**18.3**
Alfalfa-Hay	30,574	9.2	16.5	3.7	16.0
Beans	32,729	9.5	16.7	5.8	18.2
Corn	180,108	11.2	18.4	5.6	18.0
Potatoes	73,691	14.8	22.0	9.3	21.7
Soybeans	36,763	9.0	16.3	5.0	17.4
Sweet Corn	45,224	11.9	19.2	7.4	19.7
Other	63,637	9.3	16.5	5.1	17.5

Central Sands Strategic Analysis:

Understanding Withdrawals in the Central Sands

Densest location of irrigated agriculture in Wisconsin… half of all irrigation wells.

Densest irrigation is at the edge of the terminal moraine… but there is room to expand.

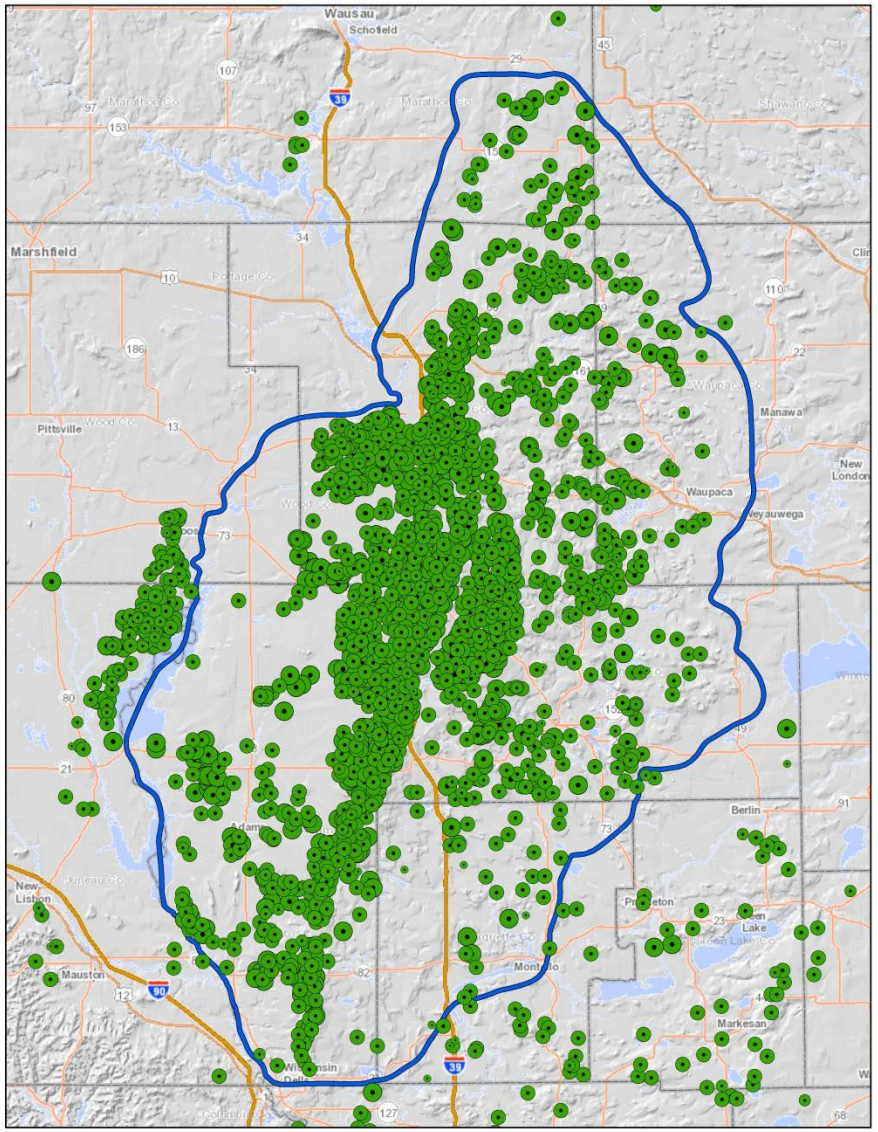


Total groundwater irrigation withdrawals in 2012 in the CWSGA were 86 billion gallons . This was up from 46 bGal in 2011.

Central Sands Strategic Analysis:
Document Development

The strategic analysis will be written by DNR staff and will describe the environmental, economic and social issues affected by groundwater withdrawals:

- Summarize the “state of the science”.
- Summarize existing monitoring and management efforts and the current regulatory framework.
- Provide a public process for the development of possible solutions for the long-term management and protection of both groundwater and surface water resources in the central sands.
- Outline will be put out for public comment in December



Conclusion

- What do we want this landscape to look like in 25, 50 and 100 years?
- What do we need to do to get there?
- What tools do we have and what tools do we need?