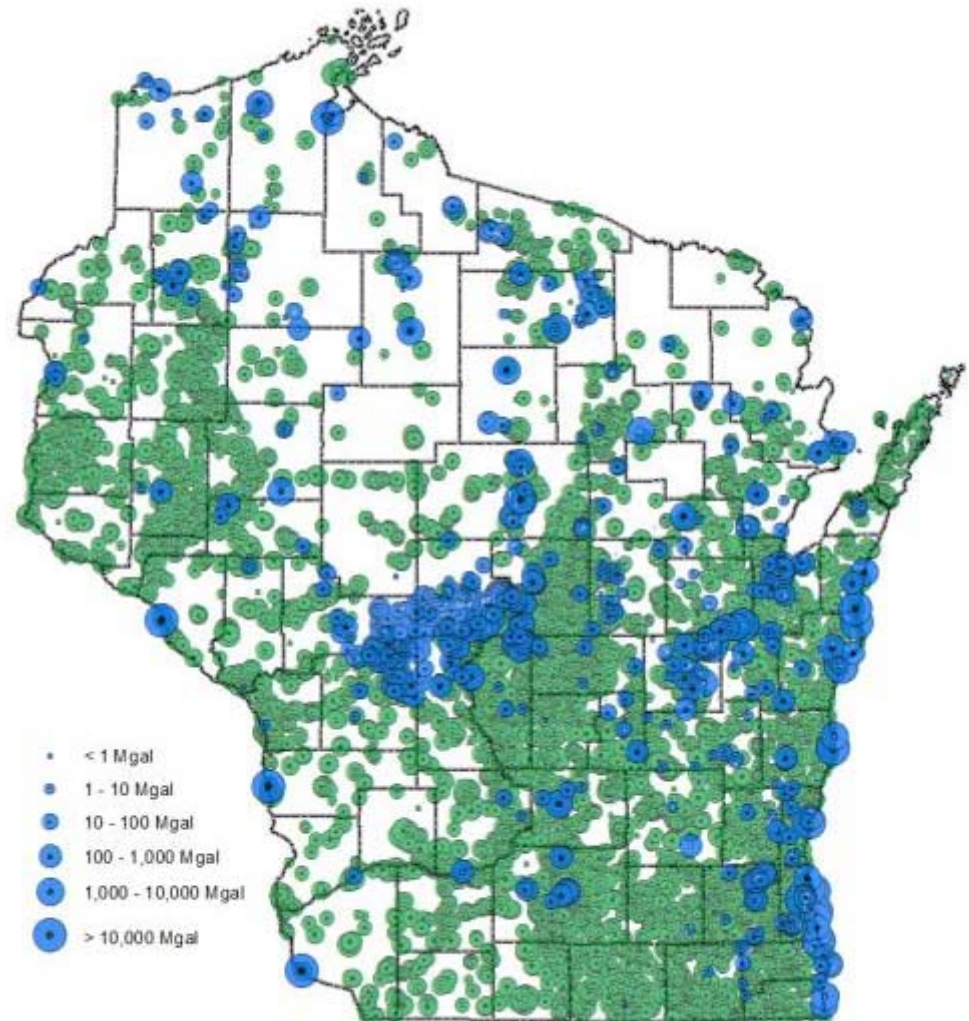




Wisconsin Water Use: Withdrawal Reporting and Inventory

Presented to
American Water Resource Association
Wisconsin Section Conference
Brookfield, WI 3-8-2013

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Wisconsin Department of Natural Resources



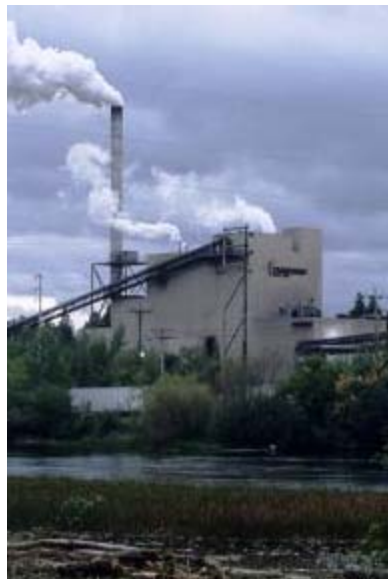


Water Withdrawal: Definition

Taking water from a
surface or ground
water source

making it
unavailable for
other purposes,

even if only
temporarily.





(Re)Starting a Reporting Program: Groundwater Protection Act and Great Lakes Compact

- 2003 Groundwater Protection Act
 - 2003 WI Act 310, § 281.34
 - Required reporting for properties capable of withdrawing >100 kgpd of groundwater
 - Environmental review of well applications in Groundwater Protection Areas
- Great Lakes Compact in 2007
 - 2007 WI Act 227, § 281.346
 - Water use program created
 - Register all properties capable of withdrawing >100 kgpd of groundwater or surface water
 - Water Use fees of \$125 per property
 - Scaled per gallon fee above 50 Mgy in GLB
 - \$1000 small business cap
- Lake Beulah WI Supreme 2011 Court Case
 - DNR expanded environmental review to avoid impacts to all waters of the state
 - Not formalized in rule or statute

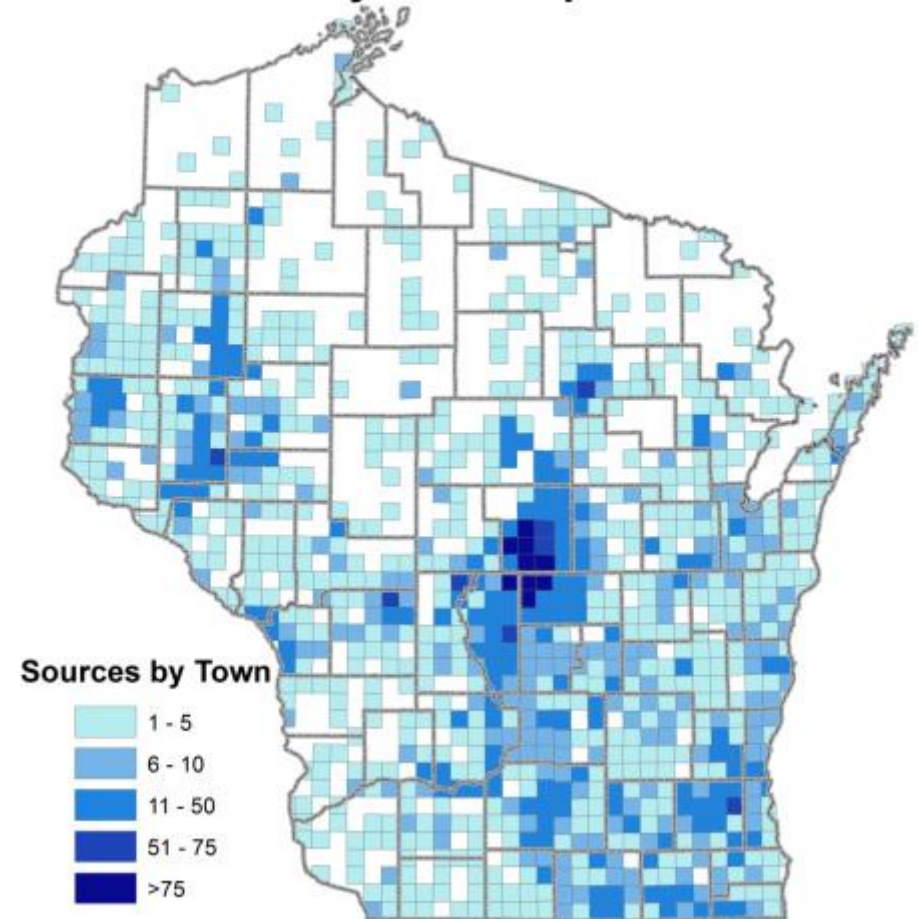




Groundwater Sources Inventory: Data Migration and Source Registration

- Municipal and high capacity wells regulated for over 100 years
 - WI Board of Health up to 1969
 - WDNR from 1969 to present
 - High capacity wells automatically registered
- Implementing reporting and registration requirements required:
 - Creation of a new system based on surface and groundwater withdrawals
 - Migrating multiple file types and records to one registration system
 - Determining status of wells
 - Determining current ownership
- Current registered GW Sources
 - ≈7,600 High Capacity Wells
 - ≈4,150 Low Capacity Wells

**2012 Active High Capacity Wells
by Township**

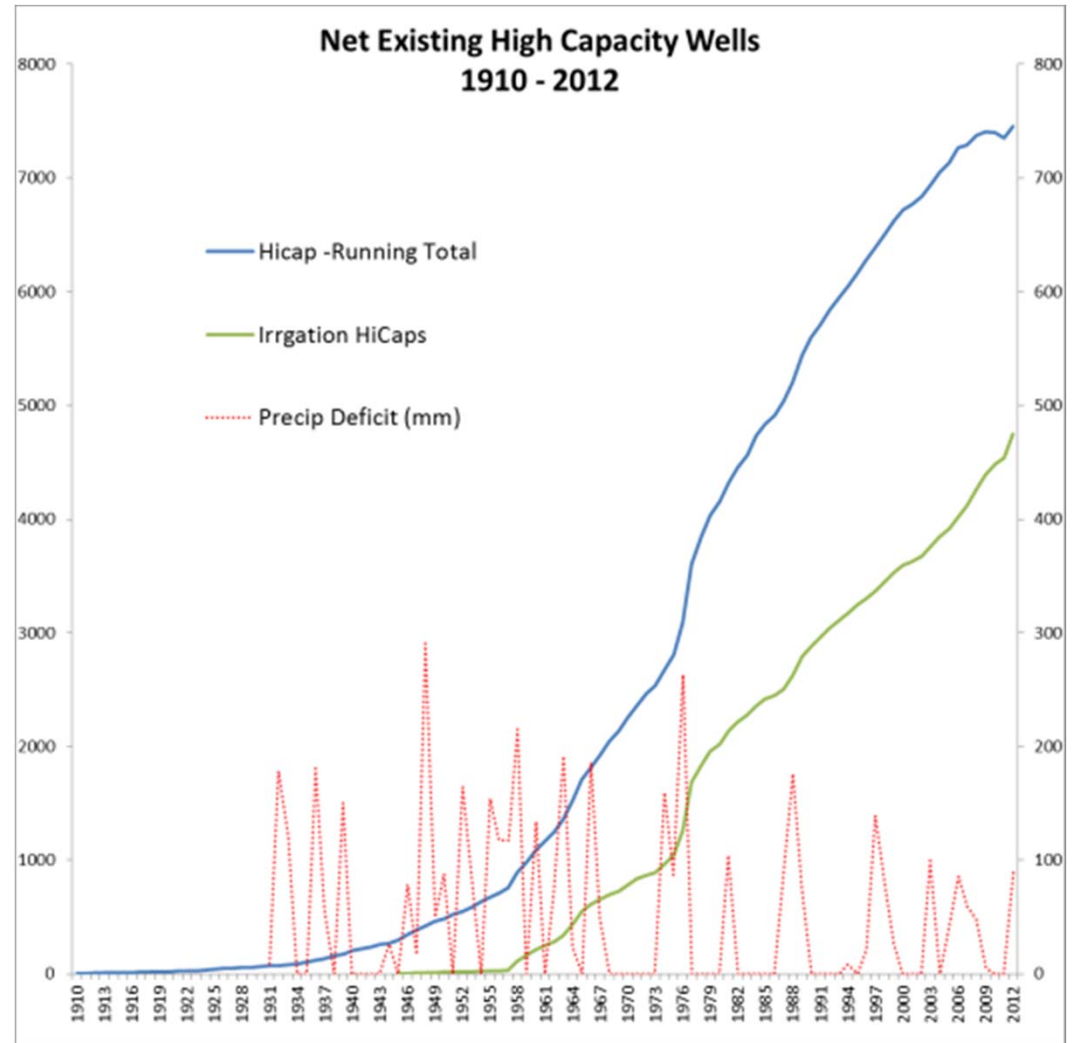




Groundwater (GW) Sources:

Growth in Construction of High Capacity Wells

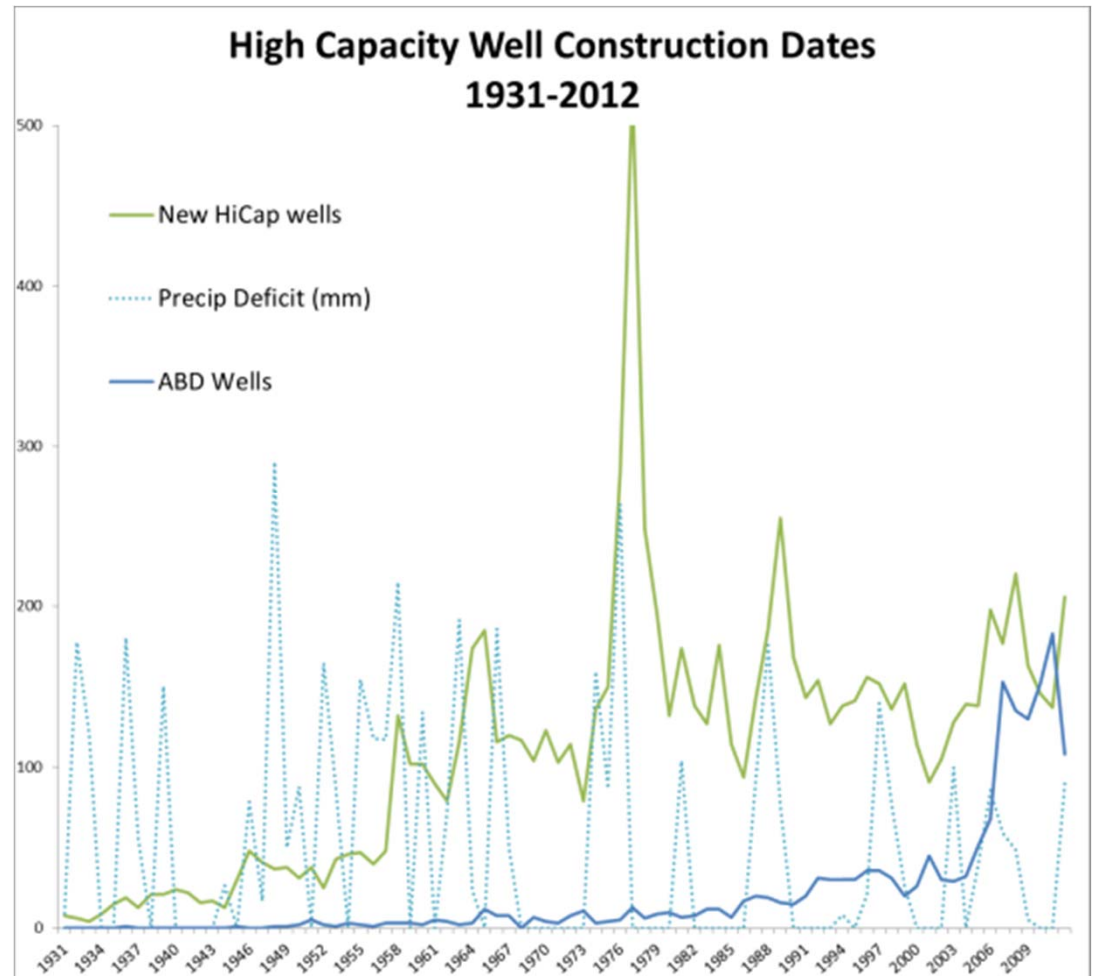
- Expansion of High Capacity wells
 - 1910 – 4 wells
 - 1935 – 125 wells
 - 1960 – 1087 wells
 - 1985 – 4836 wells
 - 2010 – 7398 wells
 - Average 150 new wells per year since 1960
- Groundwater irrigated agriculture
 - Emerges during prolonged dry period in 1950's and 1960's
 - Average 90 new irrigation wells per year since 1960
 - Irrigation wells comprise 70% of the growth in high capacity wells after 1960





Groundwater (GW) Sources: Drivers of well construction and abandonment

- Drought and High Capacity Wells
 - High capacity well completions usually spike in year following drought
 - Record year for completions in 1977 following 3 year drought in '74 to '76.
- New wells and the 2012 Drought
 - 307 high capacity wells approved in 2012
 - Over 100 application still under review
 - Lake Beulah decision has increased time for review
 - Application procedures are currently being evaluated and revised through LEAN process.
- Abandonments
 - High capacity well abandonments undergo a sustained spike starting in 2007
 - New reporting efforts
 - Fee collection

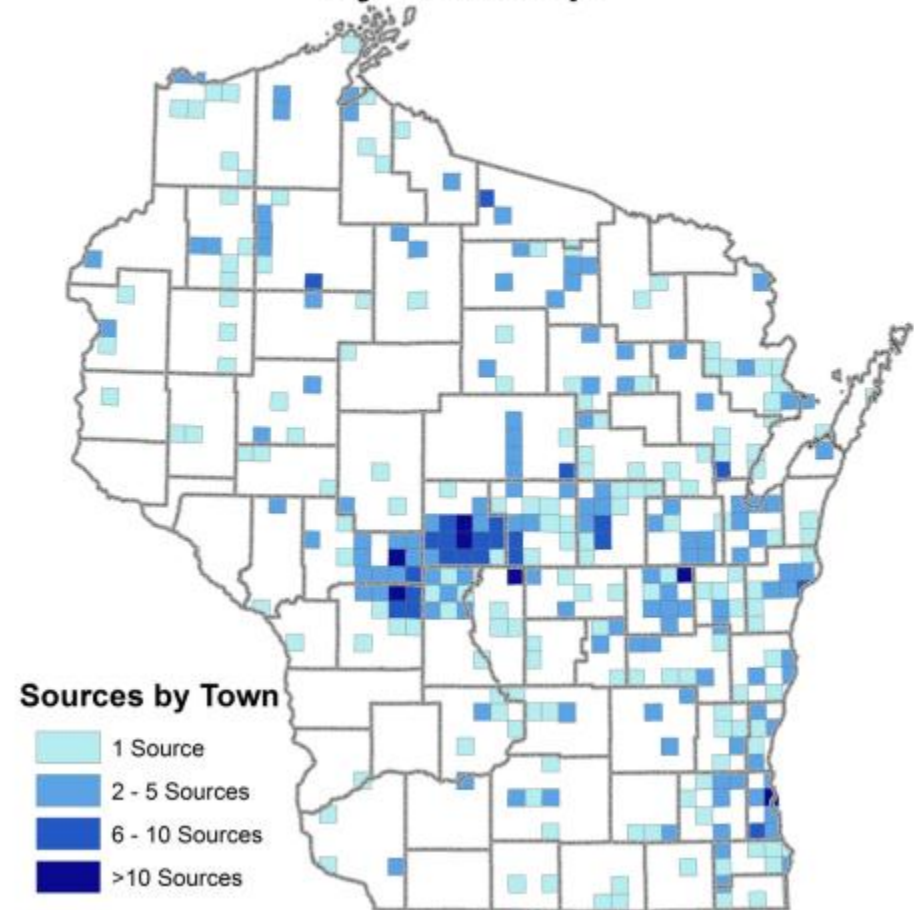




Surface Water Sources: Outreach, Collaboration and Source Registration

- Surface water (SW) withdrawals have been regulated in the past by other programs
 - Chapter 30 irrigation
 - CWA 316(b)
 - Municipal systems
- Other withdrawals have not been regulated
 - Cranberry producers
 - Paper manufacturing
 - Non-metallic mining
 - Aquaculture
 - Disconnected ponds
- Registration challenges
 - Migrating historical data from other programs into one registration system
 - Outreach
 - Disconnected ponds
- Current registered GW Sources
 - 822 SW withdrawals

**2012 Surface Water Sources
by Township**





Reporting and Fees:

Improving inventory data through repeated contact

State of Wisconsin
Department of Natural Resources
Water Use Section - DG/5
<http://dnr.wisconsin.gov/water/dnr/>

Water Withdrawal Report
Interim Form - 2011 (12/2011)

Notice: Personally identifiable information provided on this form is not intended to be used for any other purposes but may be made available to requesters under Wisconsin's Open Records law (s. 19.35, Wis. Stats.)

1. Property Information		Property #11096
OWNER # 3670	OPERATOR # 3670	
LONE ROCK (VILLAGE OF) - UTILITY COMMERCIAL ST LONE ROCK WI 53556 Phone: E-Mail:	LONE ROCK (VILLAGE OF) - UTILITY COMMERCIAL ST LONE ROCK WI 53556 Phone: E-Mail:	
PROPERTY NAME		

2. *Source Information		Source # 11624
a. Source Name Assigned by Owner:	b. Hcap Well # (If Applicable): 85043	
c. Unique Well # (If Applicable): 86754	d. Public Water System ID (If Applicable): 15300615	
e. PLSS: QQ Q Section Township N Range		

*Report each groundwater or surface water source separately. Each source has a unique #. All sources on the same property have the same property #.

3. Water Withdrawal Reporting for 2011		
a. Measurement Code:	Month	Gallons Pumped or Withdrawn <small>If zero gallons, please indicate with a single "0"</small>
b. Water Use Code:	Example	--- 1 2 3 4 5 6 Gallons
c. Comments:	January	--- Gallons
	February	--- Gallons
	March	--- Gallons
	April	--- Gallons
	May	--- Gallons
	June	--- Gallons
	July	--- Gallons
	August	--- Gallons
	September	--- Gallons
	October	--- Gallons
	November	--- Gallons
	December	--- Gallons
d. <input type="checkbox"/> This source is approved exclusively for single family residential uses and the withdrawal capacity is less than or equal to 20 GPM. e. <input type="checkbox"/> I did <u>not</u> withdraw from this source in 2011. If you checked 'e', choose from the reasons below: <input type="checkbox"/> Filled & Sealed Well <input type="checkbox"/> Temporarily Capped Well <input type="checkbox"/> Well Not Drilled <input type="checkbox"/> Do Not Know of this Well or Source <input type="checkbox"/> No Need for Water This Year <input type="checkbox"/> Surface Water Source Temporarily Offline <input type="checkbox"/> Surface Water Source Permanently Terminated		

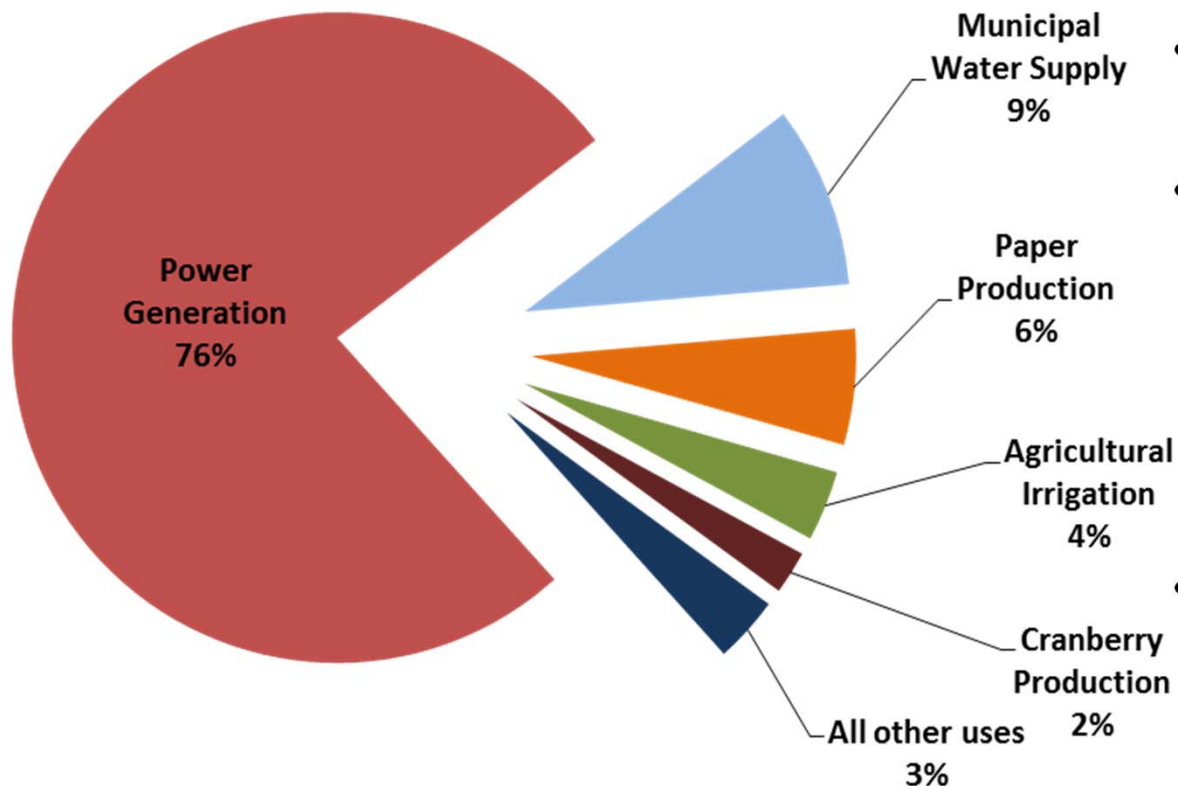
4. Certification and Signature		
I hereby certify that I am the owner or authorized representative of the owner of the property which is the subject of this water use report. I certify that the information contained in this form and attachments is accurate and complete.		
Name - Print		
<input type="checkbox"/> Owner <input type="checkbox"/> Agent of Owner (if not, operator) <input type="checkbox"/> Operator		
Signature	Company	Date

Mail signed form to: WDNR; Water Use Section - DG/5; PO Box 7921; Madison, WI 53707-7921
If you reported your water use online, do not mail in this form.

- Withdrawal reporting was reinstated by WDNR in 2008
 - Response rates have increased each year.
 - ≈70% in 2010
 - =91% in 2011
 - Already >80%, 11,000 sources for 2012
- Water use fees were first charged in 2010
- Fees along with repeated reporting requests have greatly improved quality of inventory and reporting data
- Current registered **properties**:
 - ≈5,900 total
 - ≈5,250 – have only GW sources
 - ≈450 – have only SW sources
 - ≈200 have both GW and SW sources



2011 Results: Total Statewide Withdrawals

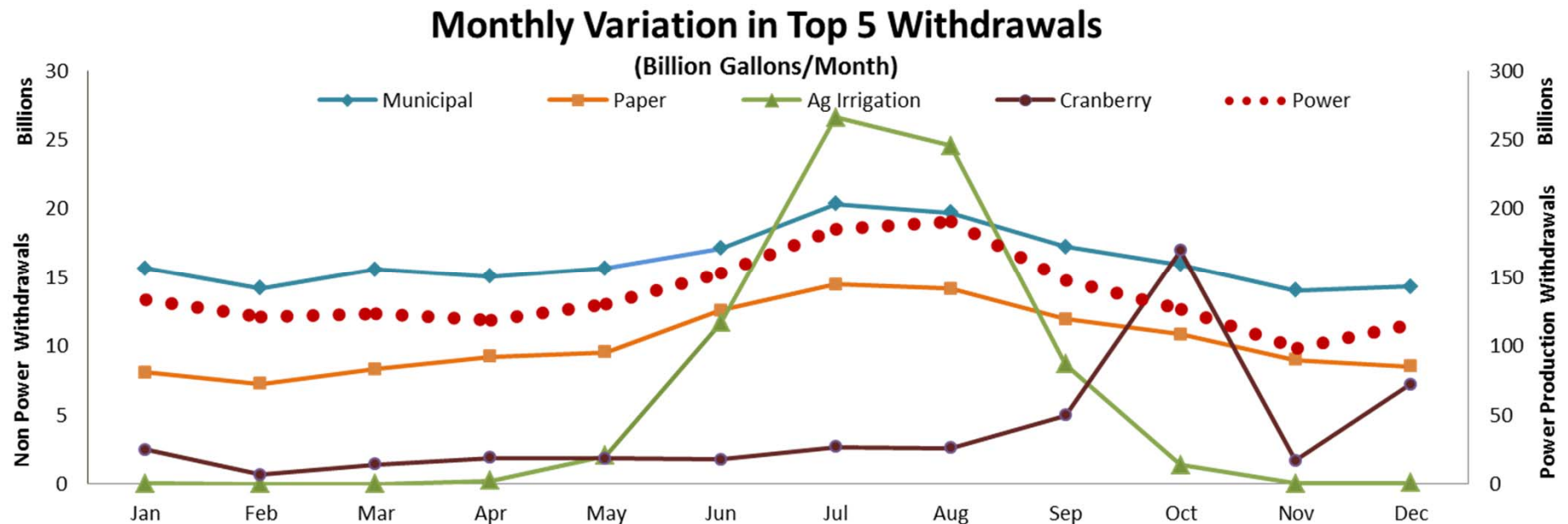


- Total 12,580 Sources
 - 826 SW
 - 11,754 GW
- Total volume withdrawn = 2.156 trillion gallons
- 11,418 reports received
 - Top sector response rates:
 - Power = 100%
 - Municipal = 98%
 - Paper Man. = 98%
 - Aquaculture = 97%
 - Lowest response rate was Non-Ag/non-Golf irrigation = 86%
- Unreported withdrawals were estimated based on capacity and use category
 - Estimated withdrawal volume for unreported sources accounted for 0.59% of total volume
 - Unreported sources were more likely to be low capacity wells



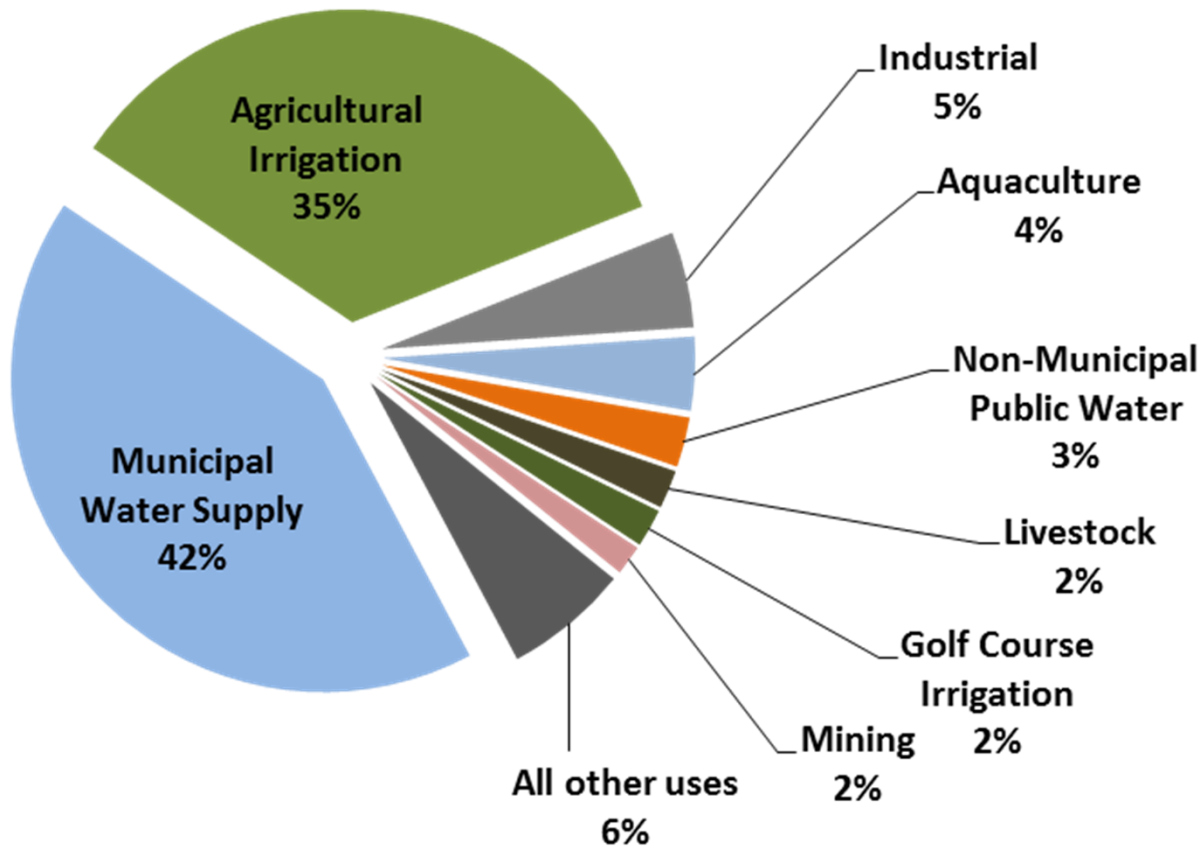
2011 Reporting Results: Monthly Variation

- Increased temperatures drive power, paper and municipal demand during the summer months
- Growing season drives agricultural irrigation in July and August
- Harvest and frost flooding for cranberries drives water demand in fall





2011 Groundwater Withdrawals: 213 Billion Gallons Statewide

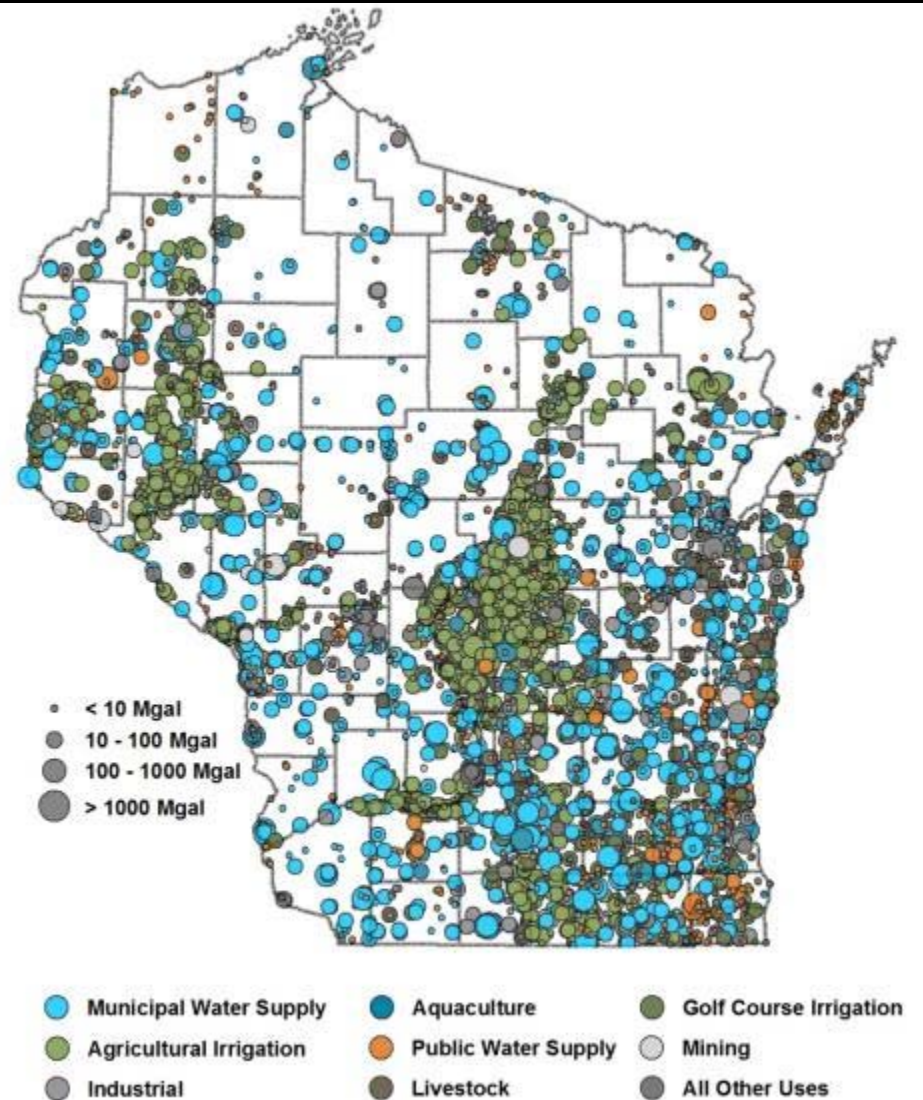




2011 Reporting Results: Groundwater Withdrawal Locations

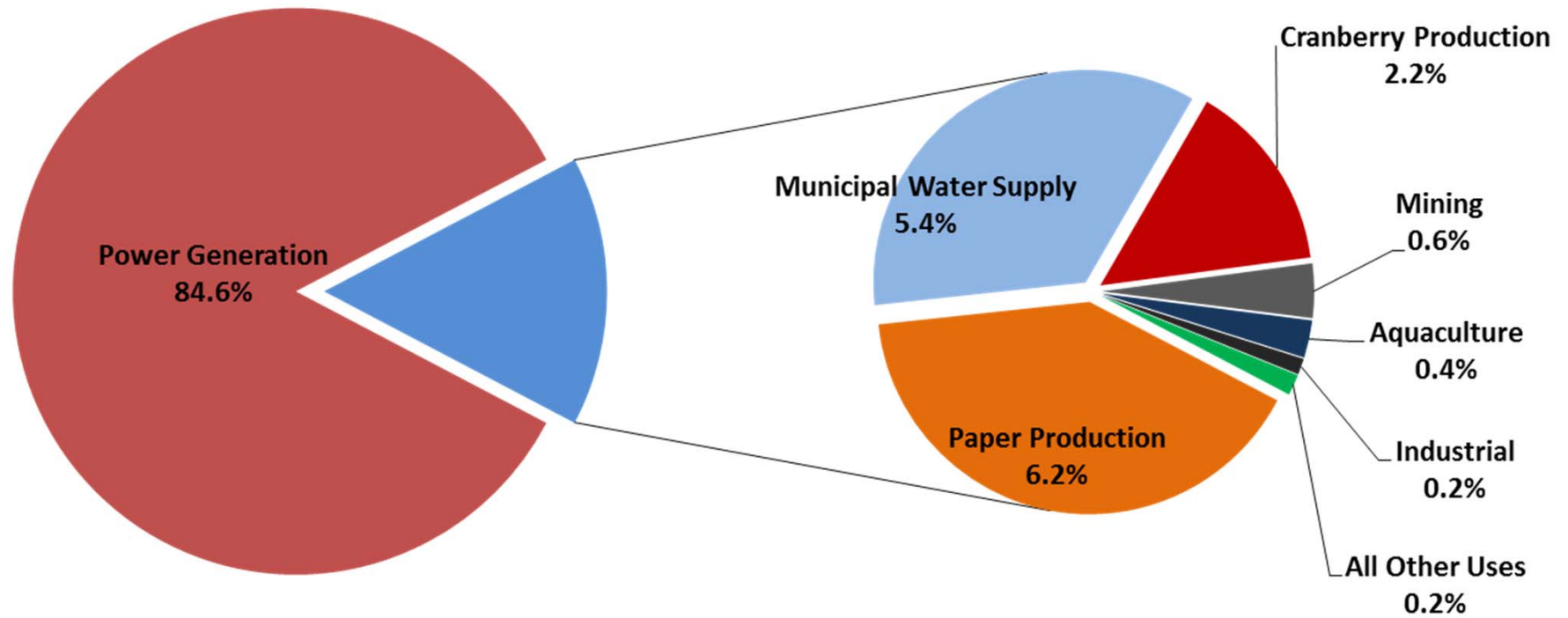
- Groundwater withdrawals totaled 213 billion gallons from 11,754 sources
- Most concentrated in urban areas and vegetable-producing regions

Sector	Sources	%	2011 Total BGY
Municipal Water Supply	1625	42%	90
Agricultural Irrigation	3772	35%	74
Industrial	610	5%	11
Aquaculture	140	4%	8
Non-Muni Public Water	1768	3%	5
Livestock	723	2%	4
Golf Course Irrigation	444	2%	4





2011 Surface Water Withdrawals: 1.94 Trillion Gallons Statewide

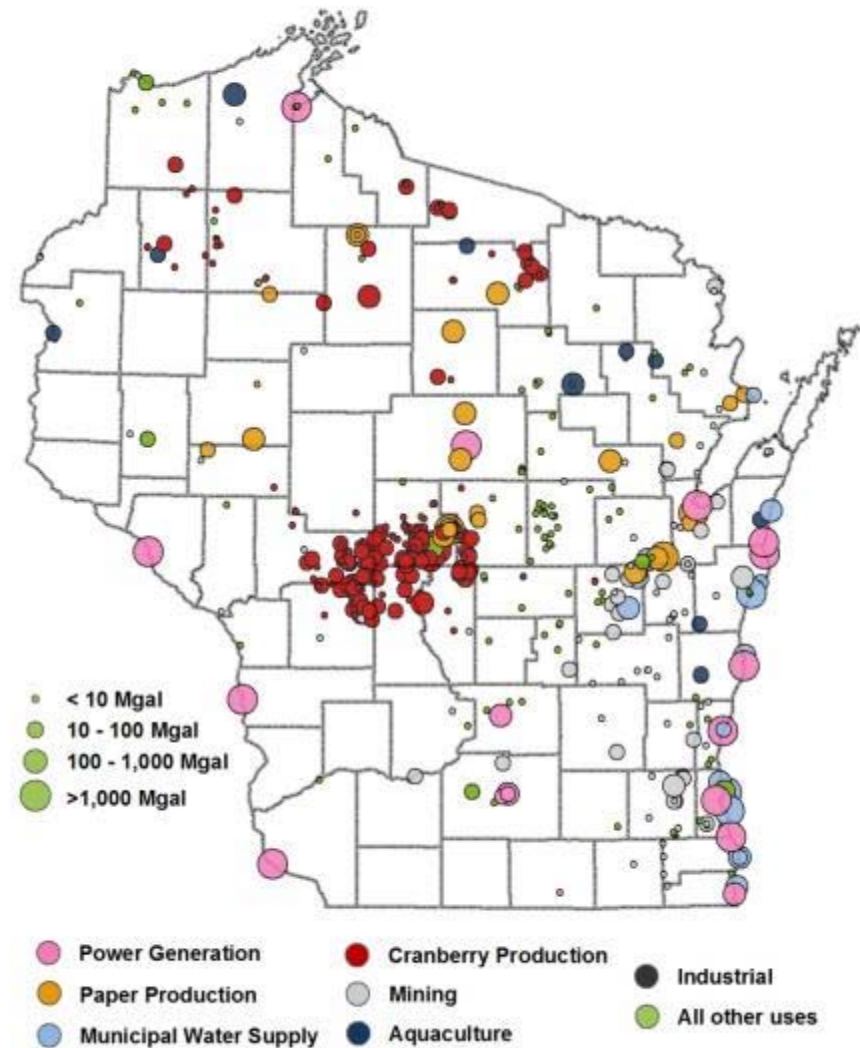




2011 Reporting Results: Surface Water Withdrawals

- Surface water withdrawals totaled 1,942 trillion gallons from 826 sources
- Most concentrated along Lake Michigan shoreline, Fox and Wisconsin rivers and in cranberry growing areas.
- Dominated by power production

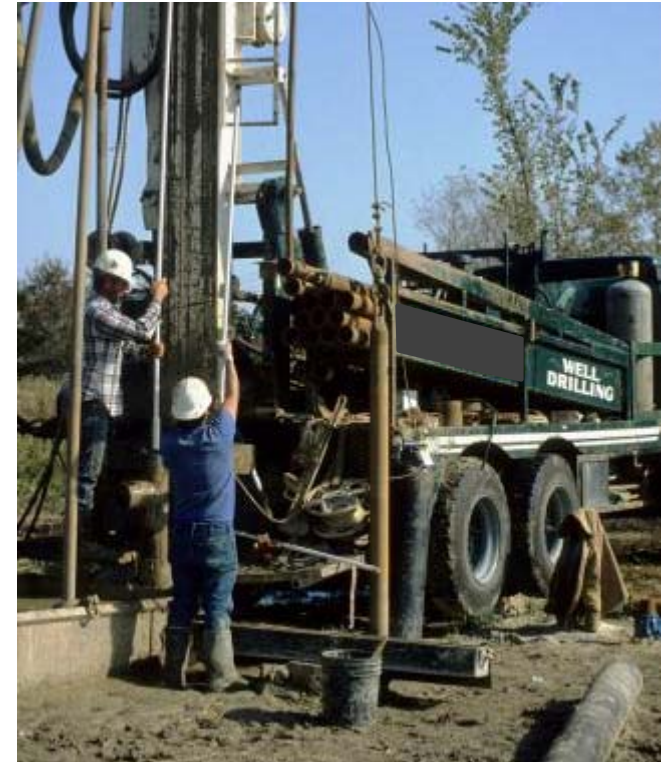
Sector	Sources	%	2011 Total BGY
Power Generation	30	84.6%	1,644
Paper Production	49	6.2%	121
Municipal Water Supply	40	5.4%	105
Cranberry Production	287	2.2%	43
Mining	166	0.6%	12
Aquaculture	19	0.4%	9





Reporting and Inventory: Quality Assurance and Known Unknowns

- QAQC- Current
 - Outlier analysis - withdrawal vs. capacity
 - Source error detection and correction
- QAQC- Planned
 - Benchmarking reported withdrawals against known withdrawals
 - Collaborating with selected users to test validity of estimate parameters
 - Cooperation with USGS Water Use research
 - Outlier analysis - withdrawal vs. capacity by sector and spatial extent
- Disconnected pond withdrawals
 - Limited DNR regulation of withdrawals
 - Limited knowledge of non-registered pond withdrawals
 - Inconsistent regulations in different counties
- Unregulated construction and approval violations
 - Drill first, apply later
 - Horizontal wells





Reporting and Inventory: Data availability and future plans

- Data aggregated at section level is publicly available upon request
- Data for specific sources, areas or sectors is available through a signed data request
 - Requests can be facilitated through user provided GIS extents
 - GIS source and withdrawal shapefiles can also be provided upon written request
- Currently integrating county parcel data with well ownership data
- Testing different methods for providing online section level data
 - WDNR public GIS viewer
 - Google Earth (.kmz files)





Thank You!

For more information:
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