



Water and Land Health 101: Thinking Like A Watershed

Rebecca Power

University of Wisconsin-Madison Division of Extension

Wisconsin Lakes Partnership Convention 2019

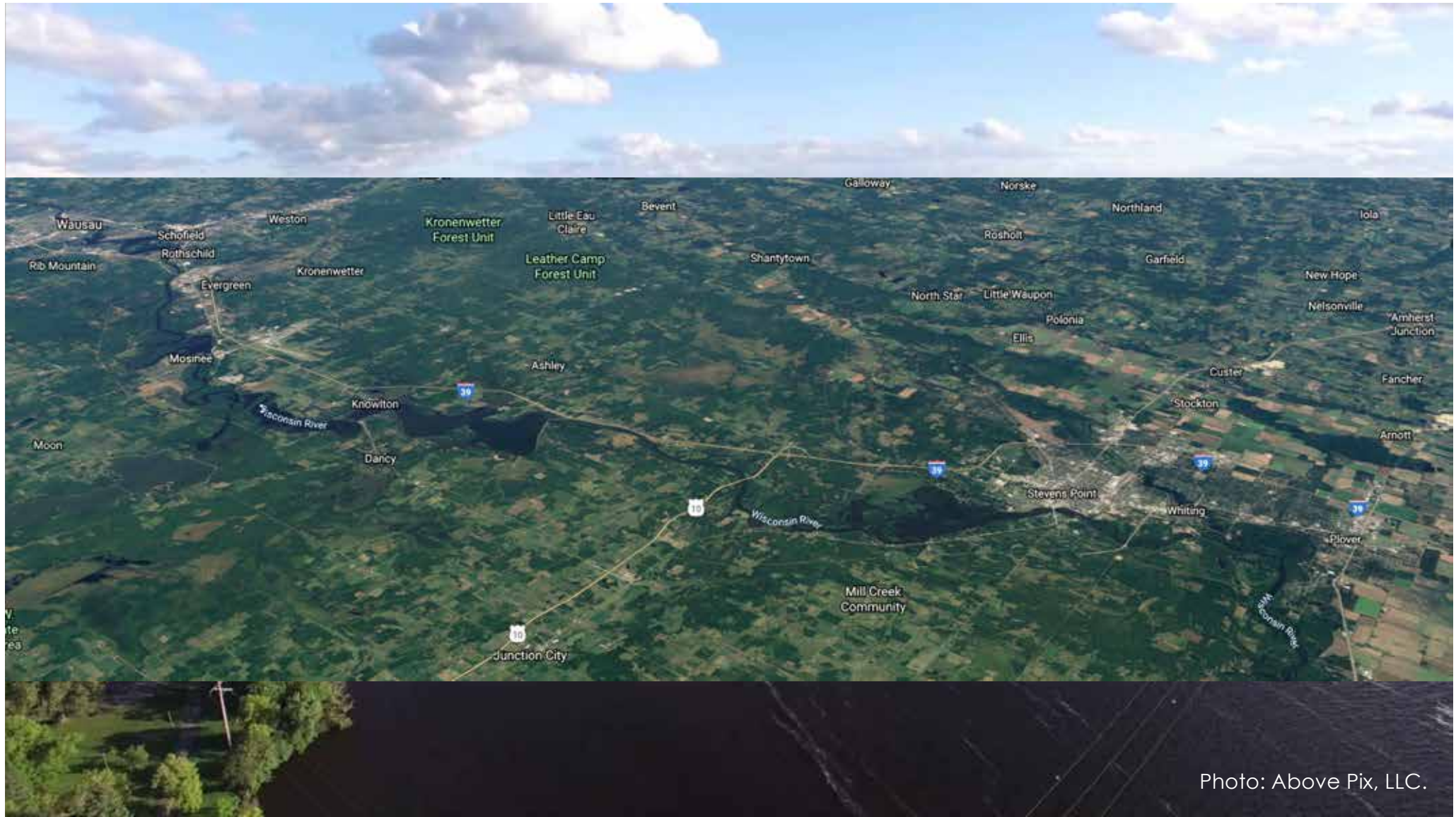
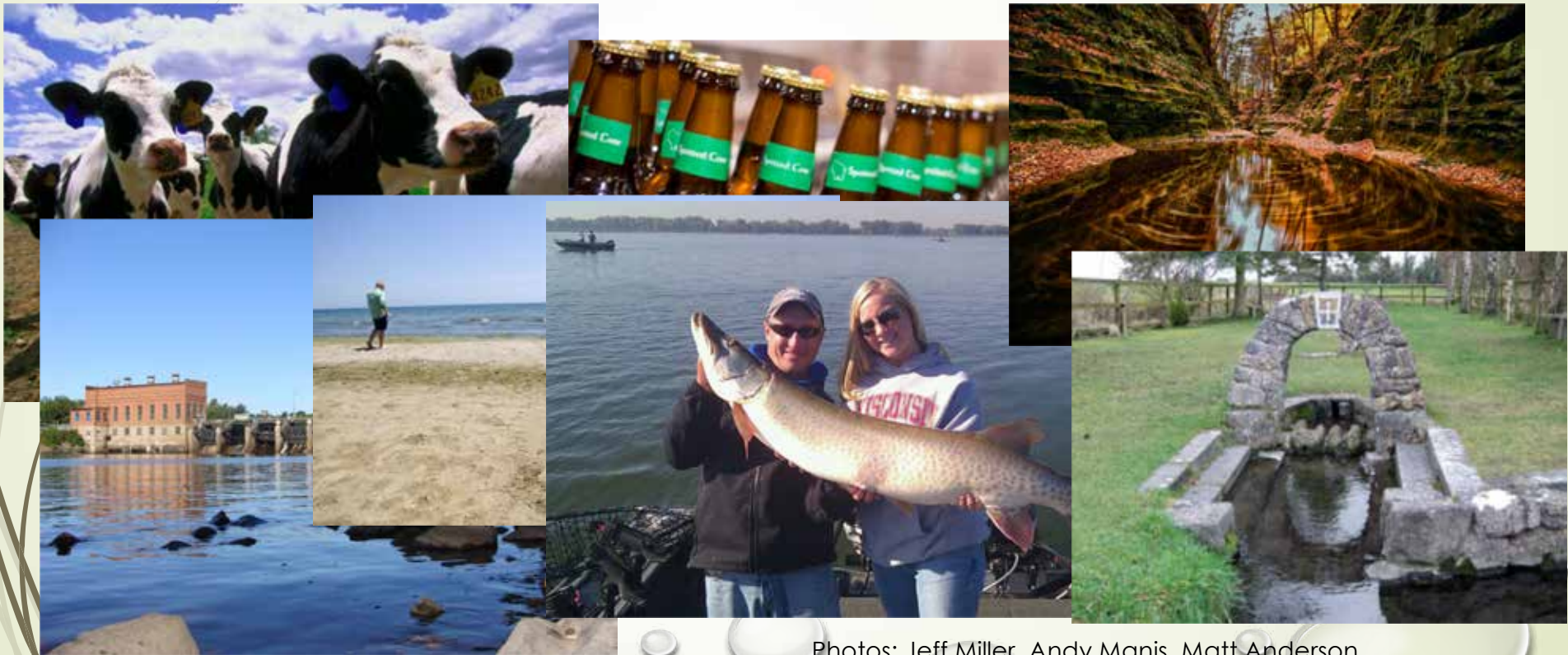



Photo: Above Pix, LLC.

Wisconsin Land and Water: Lenses We Look Through



Photos: Jeff Miller, Andy Manis, Matt Anderson



“Water is the most critical resource issue of our lifetime and our children’s lifetime. The health of our waters is the principal measure of how we live on the land.”

Luna Leopold

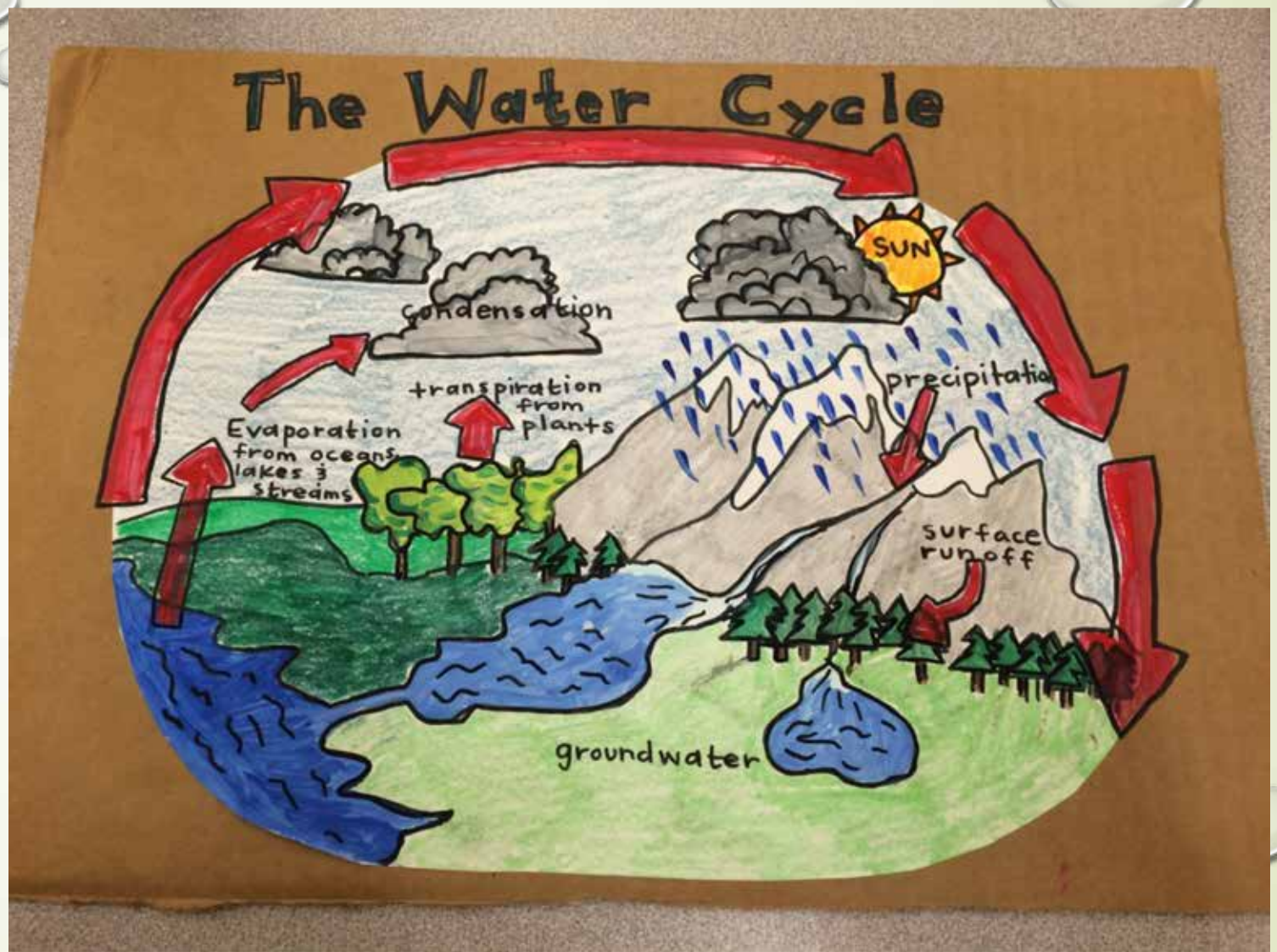
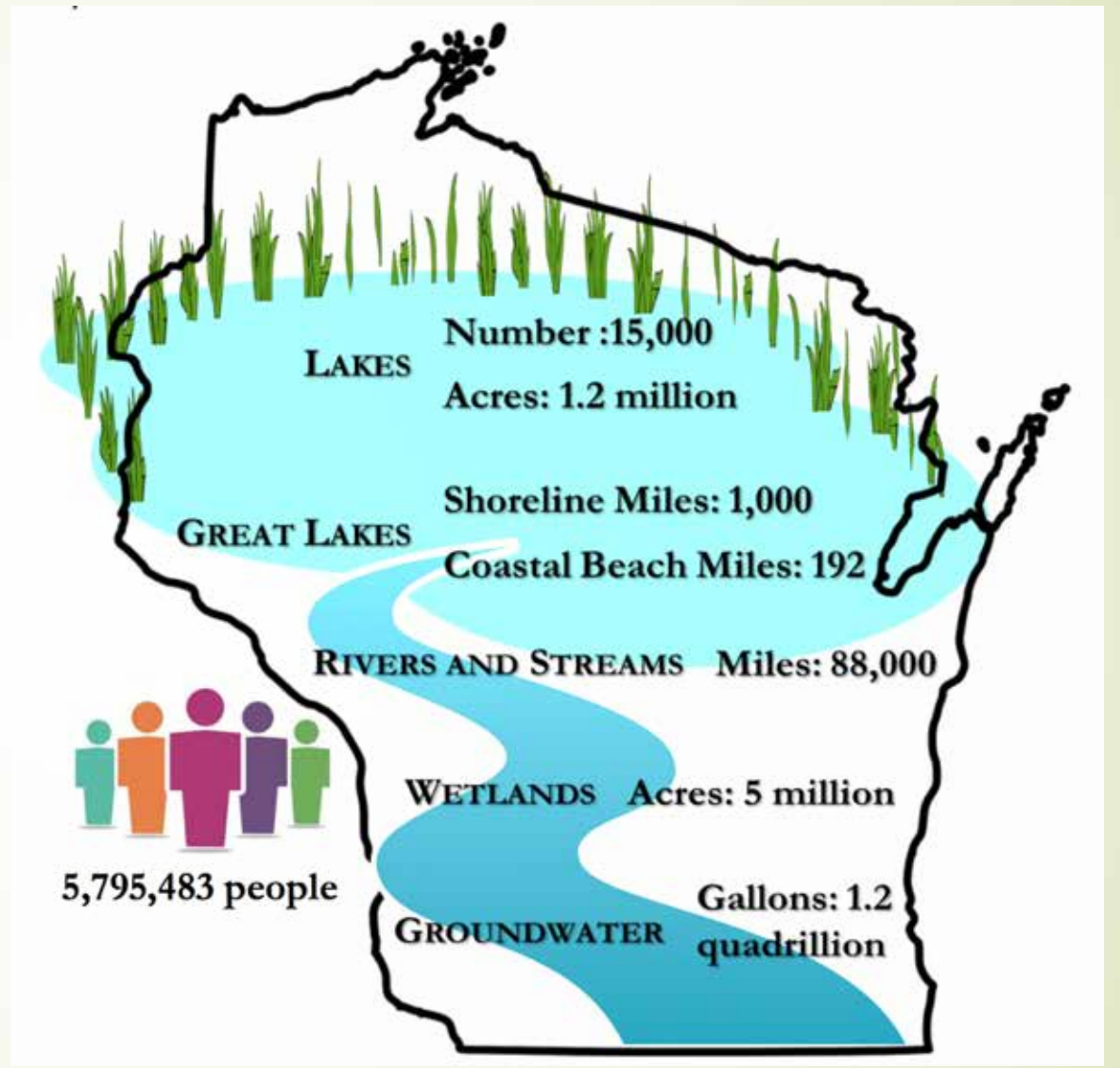
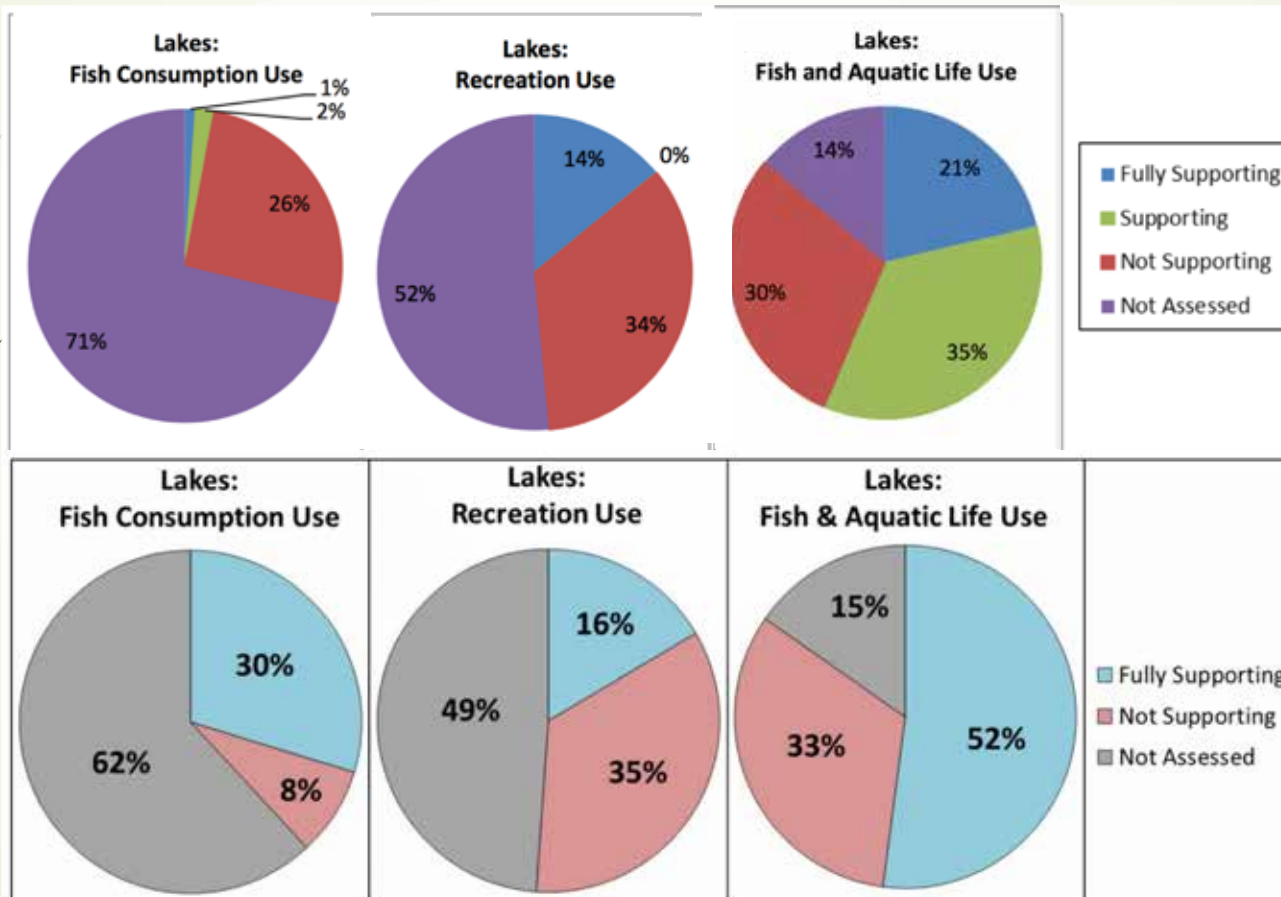


Photo: Micha Baker

Wisconsin Water by the Numbers

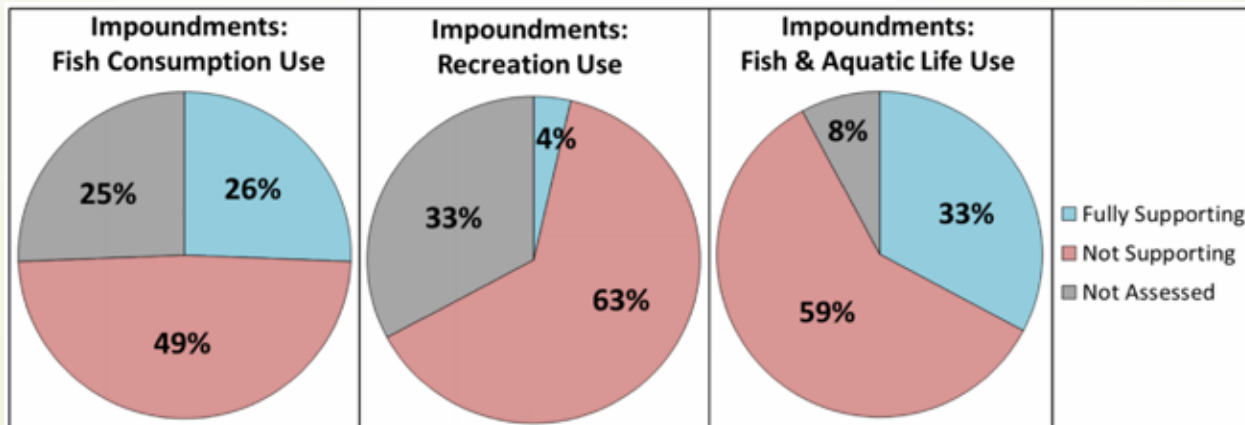
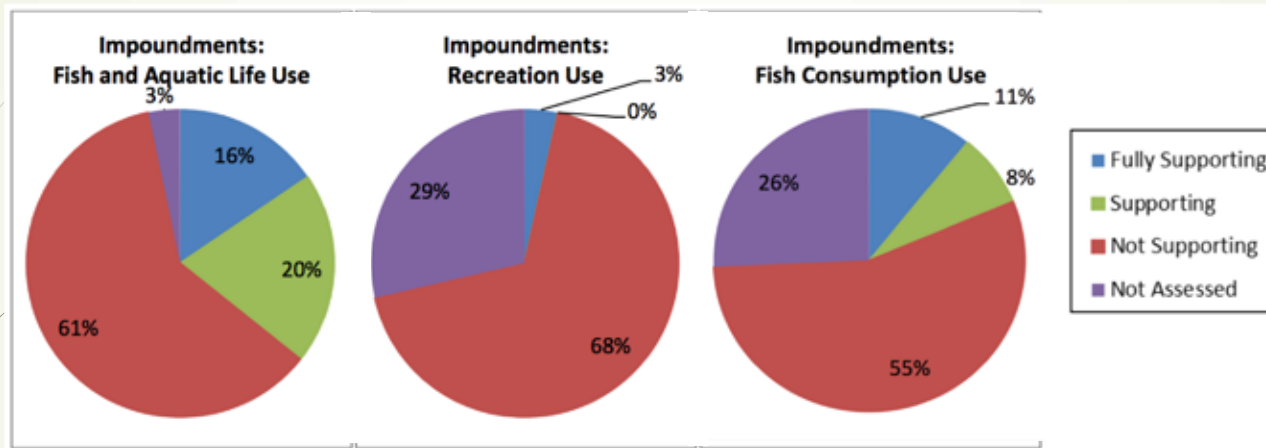


Condition Assessments



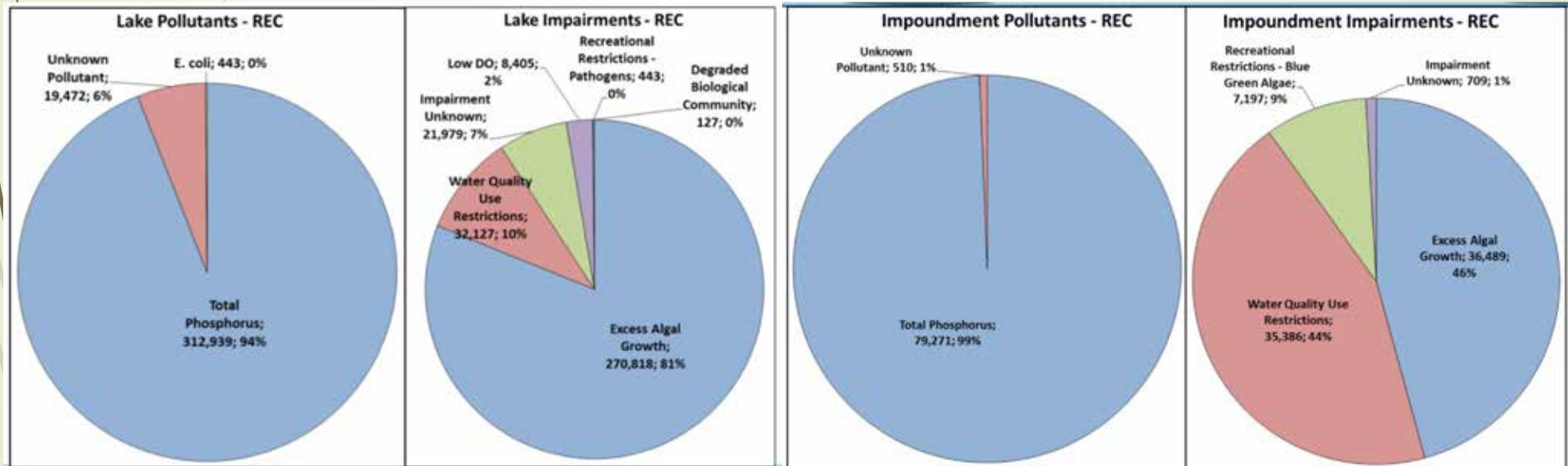
Source:
Wisconsin DNR,
Wisconsin Water
Quality Reports to
Congress,
2016 and 2018.

Condition Assessments



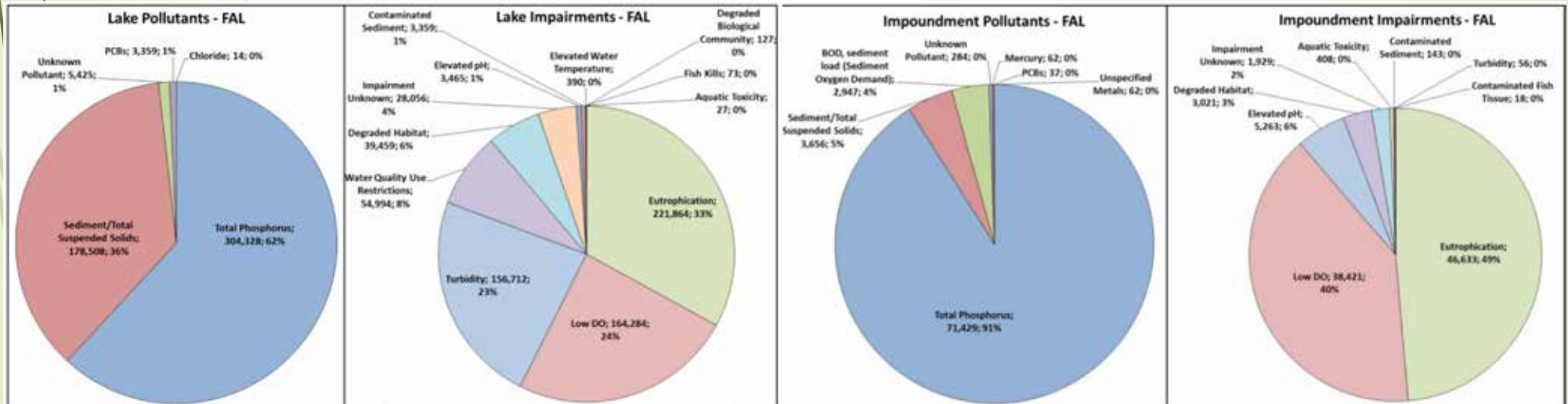
Source:
Wisconsin DNR,
Wisconsin Water
Quality Reports to
Congress,
2016 and 2018.

Water Pollutants and Impairments



Source: Wisconsin DNR, Wisconsin Water Quality Report to Congress 2018.

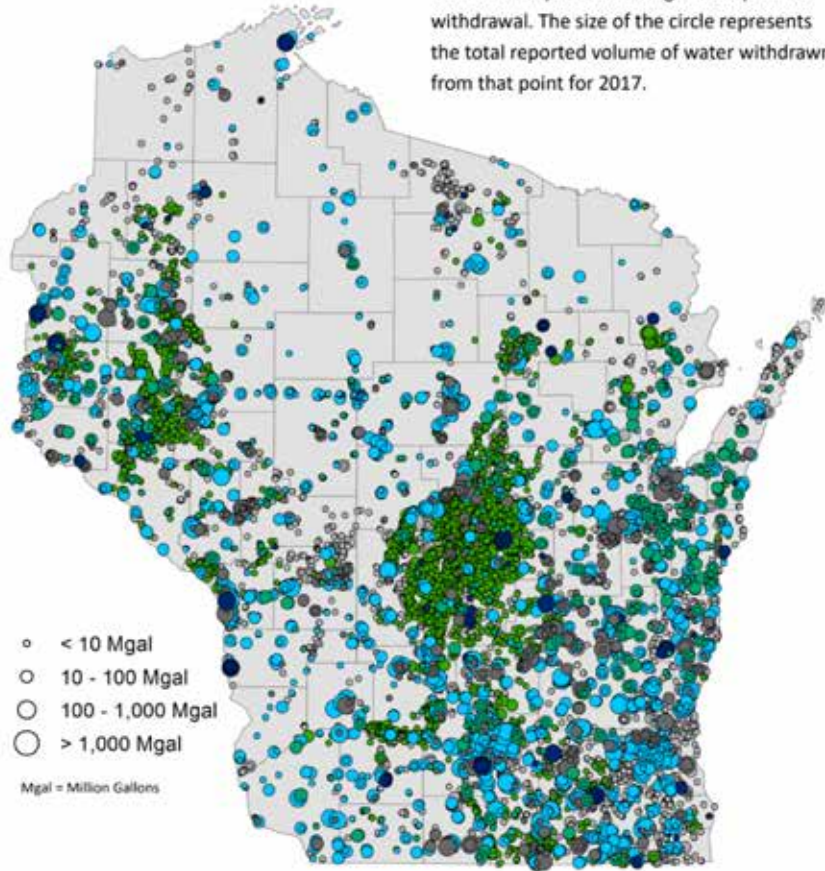
Water Pollutants and Impairments



Source: Wisconsin DNR, Wisconsin Water Quality Report to Congress 2018.

2017 Groundwater Annual Withdrawals

Each circle represents a single 2017 point of withdrawal. The size of the circle represents the total reported volume of water withdrawn from that point for 2017.

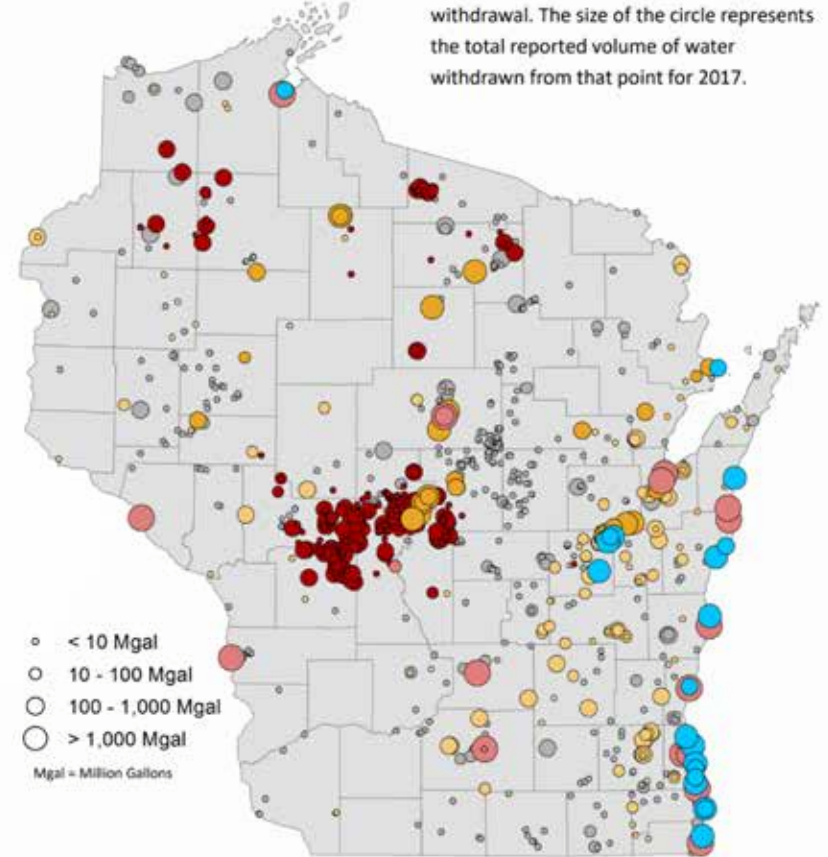


- < 10 Mgal
 - 10 - 100 Mgal
 - 100 - 1,000 Mgal
 - > 1,000 Mgal
- Mgal = Million Gallons

- Municipal Water Supply
- Industrial (incl. mining)
- Dairy Production
- Agricultural Irrigation
- Aquaculture
- All other uses

2017 Surface Water Annual Withdrawals

Each circle represents a single 2017 point of withdrawal. The size of the circle represents the total reported volume of water withdrawn from that point for 2017.



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

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



Photos: Jeff Miller, Andy Manis, Matt Anderson



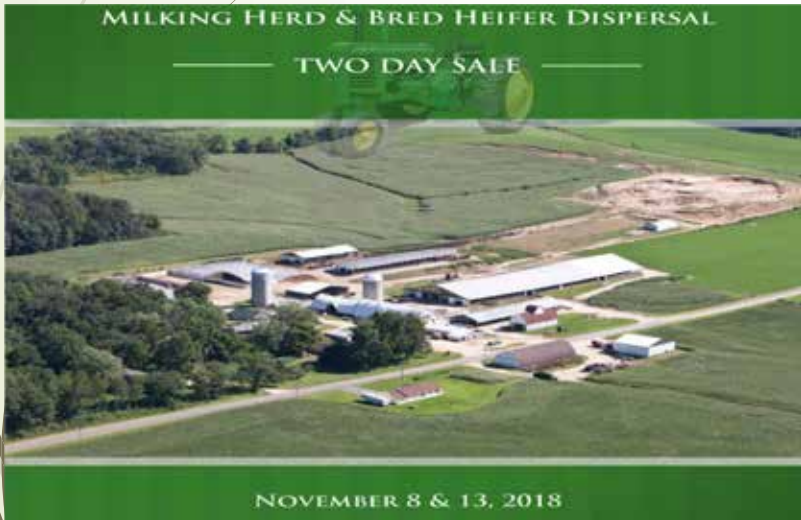
Wisconsin Agriculture

- ▶ Wisconsin contributes \$88.3 billion annually to our state's economy.
- ▶ Wisconsin is home to 68,500 farms on 14.3 million acres.
Average farm size in Wisconsin = 209 acres.
- ▶ Annually, 413,500 jobs or 11.9% of the state's employment.
- ▶ Dairy industry contributes \$43.4 billion to Wisconsin's economy each year.
- ▶ Wisconsin exported \$3.5 billion of agricultural products in 2017 to 147 countries.

<https://datcp.wi.gov/Pages/Publications/WIAgStatistics.asp>

Loss of Wisconsin Dairy Farms

- Over 600 farms lost in 2018
- The most since 2013



Photos: John Oncken, Wisconsin State Farmer

▶ **1** A Community Worth Investing In

▶ **2** Industrial and Commercial Development Opportunities

▶ **3** Economic Development Opportunities

The City of Hillsboro provides strong **Community Development Authority** programs. Explore the opportunities at the link below.

<http://www.hillsborowl.com/hcda>

The City of Hillsboro's **Downtown Plan** can be found at the link below.

[http://www.hillsborowl.com/vertical/sites/%7B9ABE0409-98C0-4400-9A71-03349E88BF98%7D/uploads/Hillsboro_Downtown_Revitalization_Plan_FINAL\(1\).pdf](http://www.hillsborowl.com/vertical/sites/%7B9ABE0409-98C0-4400-9A71-03349E88BF98%7D/uploads/Hillsboro_Downtown_Revitalization_Plan_FINAL(1).pdf)

▶ **4** Enterprise Drive Available Lots

▶ **5** Business Statistics from the Hillsboro, WI Area



PHOTO: Daily Adams, WISCONSIN STATE JOURNAL

Table 6: Wisconsin resident participation rates of the 25 most popular nature-based recreation activities.²⁵

Participation Rate	Activity
74%	Picnicking/tailgating/cookout
68%	Hiking/walking/running on trails
65%	Visiting a beach/beach walking
55%	Bird/wildlife watching at home
54%	Swimming in lakes/ponds/rivers
52%	Visiting a nature center
45%	Motor boating
40%	Lake fishing from shore or a pier
39%	Bird/wildlife watching away from home
37%	Lake fishing from a boat/canoe/kayak
37%	Nature photography
34%	Bicycling on rail-trails/developed trails
34%	Canoeing/kayaking
32%	Tent camping
32%	Dog walking on trails
31%	Gathering berries, mushrooms, etc.
29%	Target firearm shooting
23%	Ice fishing
23%	Visiting a dog park
21%	Hunting big game on private land
21%	RV/pop-up camping
21%	Stream/river fishing from shore/wading
21%	Water skiing/tubing/wakeboarding
20%	River fishing from a boat/canoe/kayak
19%	Target archery outdoors



- Wisconsin consumer spending on outdoor recreation totaled \$17.9 billion, resulting in 168,000 jobs, \$5.1 billion in wages and salaries, and \$1.1 billion in tax revenue.
- The Wisconsin State Park system draws an est. 14 million visitor-days, resulting in over \$1.0 billion in annual expenditures in local communities.
- \$19 million in trip and equipment expenditures associated with waterfowl hunting in Wisconsin.
- \$1.6 billion annual total spending and economic impact generated by trout fishing in the Driftless Area (much of which is in Wisconsin).

Source: Wisconsin DNR. Wisconsin Statewide Comprehensive Outdoor Recreation Plan (SCORP) 2019-2023

We're probably undervaluing healthy lakes and rivers

Economists often ignore the human health benefits of keeping water bodies clean

BY LAUREL HAMERS 8:00AM, OCTOBER 14, 2018



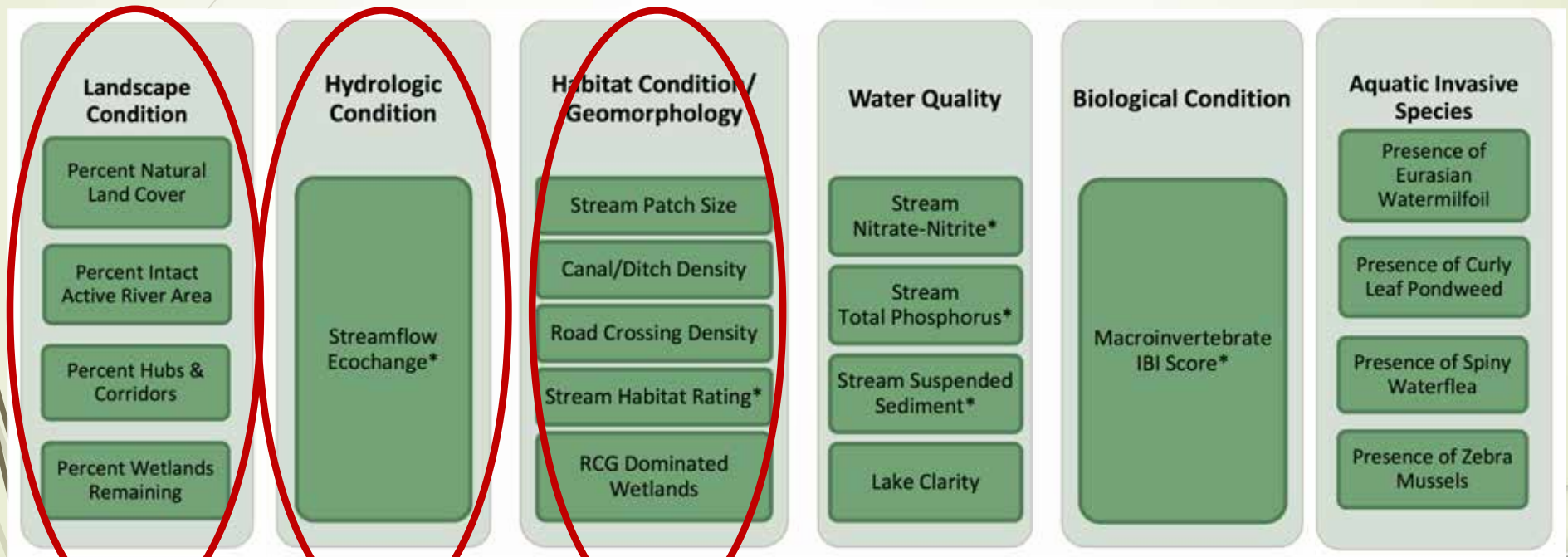
WAR ON WETLANDS Wetlands such as Wisconsin's Horicon Marsh (shown) are natural water purifiers. A recent legal dispute has emerged over whether to count this environmental service as a benefit of protecting wetlands.

Hamers, 2018




Assessing Watershed Health


Wisconsin Integrated Assessment of Watershed Health




Source: Wisconsin DNR. Wisconsin Integrated Assessment of Watershed Health, 2014.


Protection Priority

 25% Most Healthy & 25% Most Vulnerable

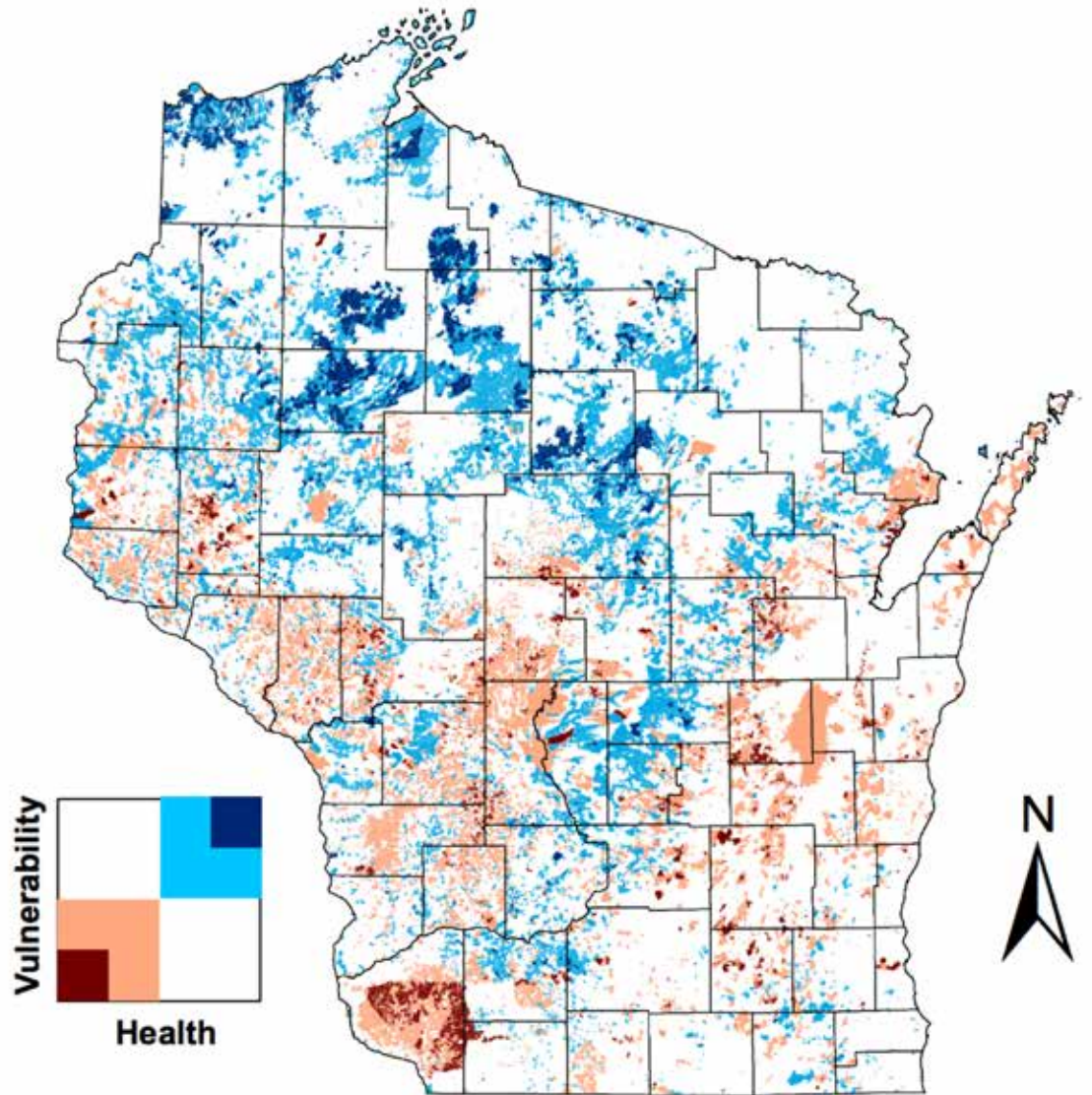
 50% Most Healthy & 50% Most Vulnerable

Restoration Priority

 25% Least Healthy & 25% Least Vulnerable

 50% Least Healthy & 50% Least Vulnerable

0 25 50 100 Miles





Wisconsin River Total Maximum Daily Load

- ▶ “A TMDL establishes the maximum amount of a pollutant allowed in a waterbody and serves as the starting point or planning tool for restoring water quality.” USEPA

Source: Wisconsin DNR. <https://dnr.wi.gov/topic/TMDLs/WisconsinRiver/>

Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin Final Report December 21, 2018



12/21/2018

Including Adams, Clark, Columbia, Dane, Forest, Jackson, Juneau, Langlade, Lincoln, Marathon, Monroe, Oneida, Portage, Price, Richland, Sauk, Shawano, Taylor, Vernon, Vilas, Washburn, and Wood Counties, Wisconsin

Prepared For:
U.S. Environmental
Protection Agency
Region 5
77 W. Jackson Blvd.
Chicago, IL 60604

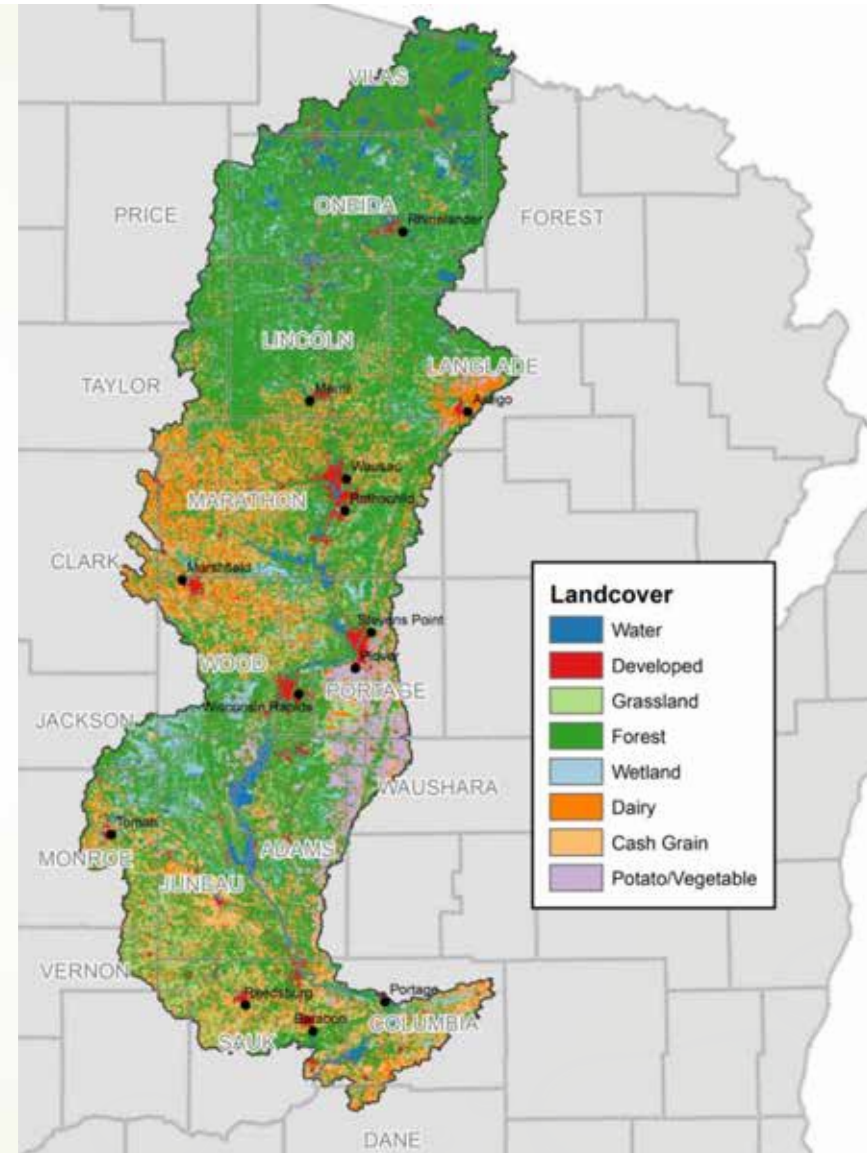


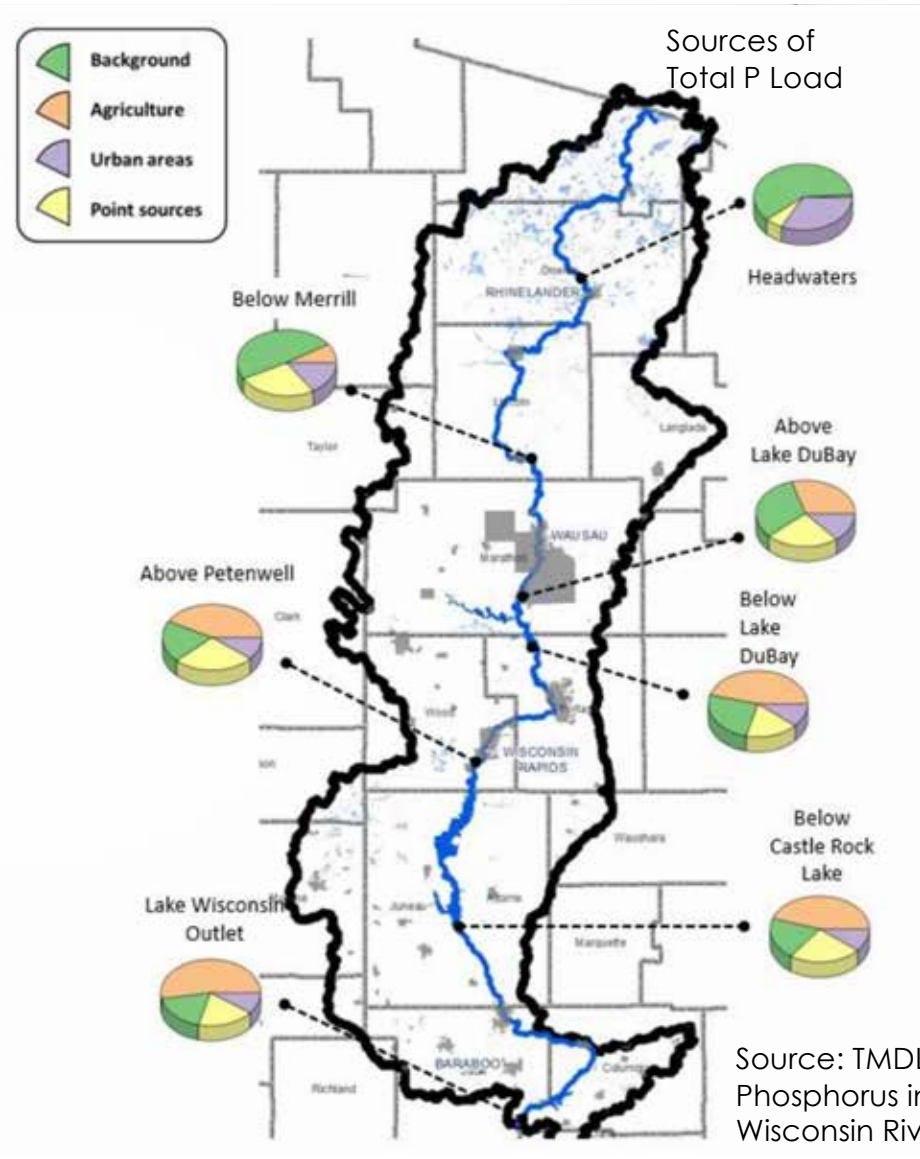
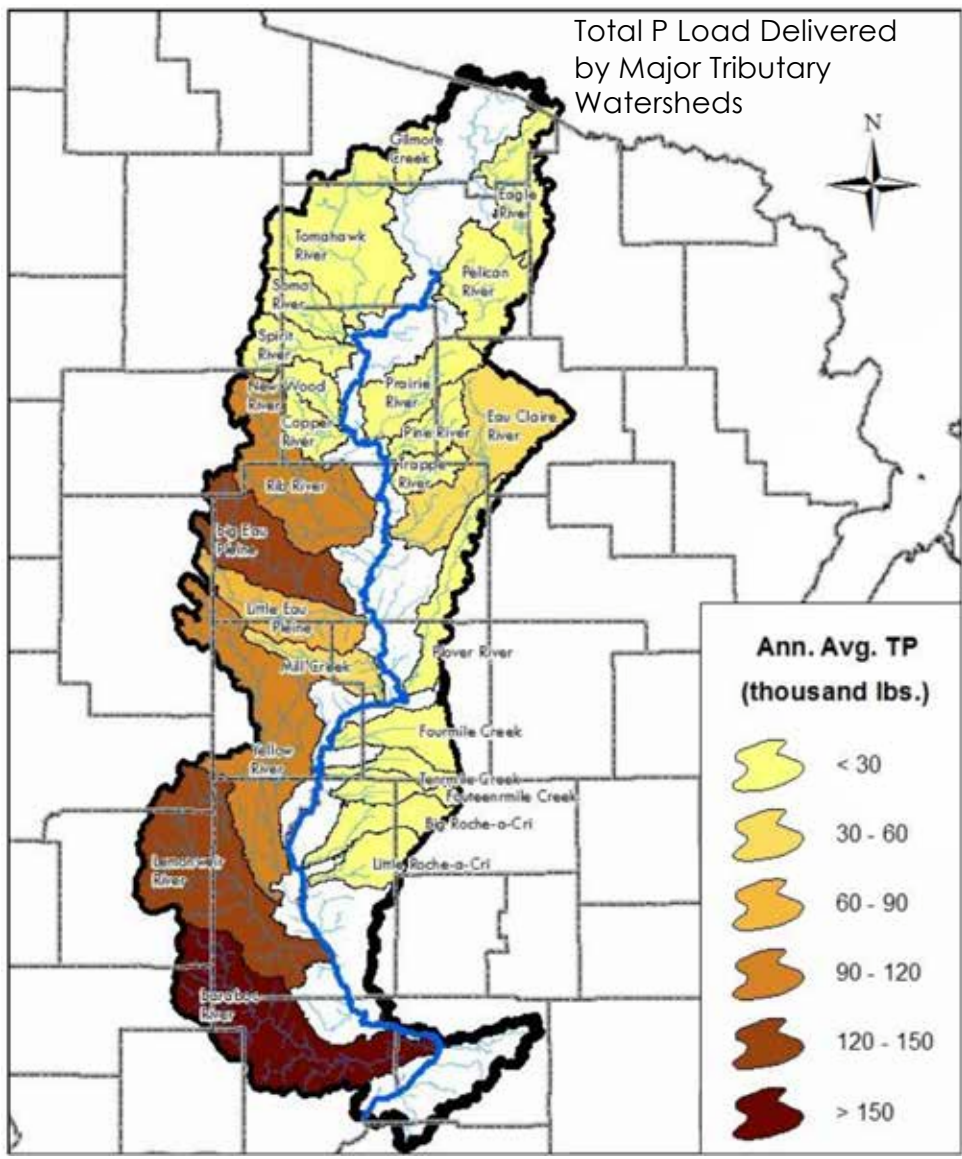
Prepared By:
WI Department of
Natural Resources
101 S. Webster St
PO Box 7921
Madison, WI 53707-7921



Wisconsin River Total Maximum Daily Load

Source: Wisconsin DNR. <https://dnr.wi.gov/topic/TMDLs/WisconsinRiver/>





Source: TMDL for Total Phosphorus in the Wisconsin River Basin.

Point Sources



Nonpoint - Urban Stormwater

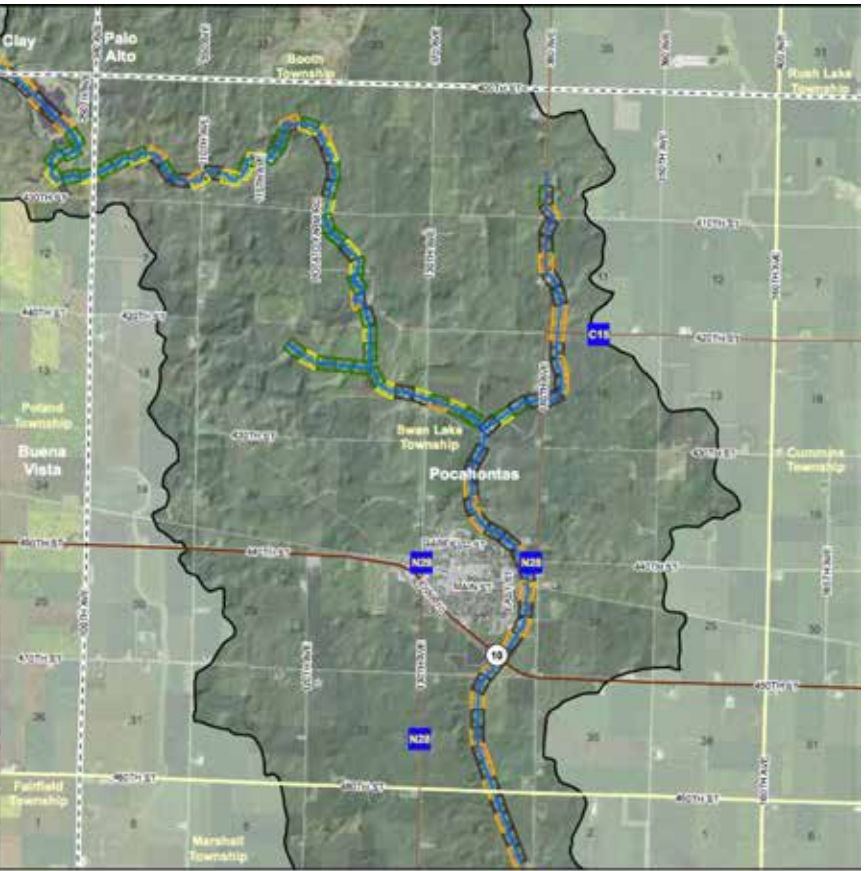
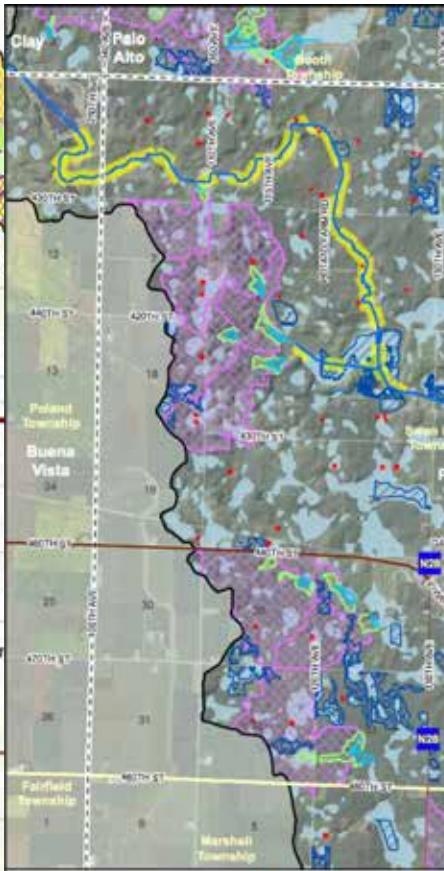


Photos: UW-Madison and City of Madison

Nonpoint - Agriculture



Photo: UW-Extension



- Legend**
- Watershed Boundary
 - Streams
 - Saturated Buffers (25)
 - Bioreactors (30)
 - Drainage Water Management (1,200 ac)
 - Nitrate Removal Wetlands (15)
 - Wetland Buffers
 - Wetland Drainage Areas
 - Cover Crops Priority Fields (17,500 ac)
 - Soil Health, Reduced Tillage & Nutrient Management (Entire Watershed)

- Legend**
- Watershed Boundary
 - Incised Streams
 - Bioreactors
 - Saturated Buffers
 - Drainage Water Management
 - Nitrate Removal Wetland
 - Wetland Buffers
 - Wetland Drainage Area
 - Depressions (Perennial)

- Legend**
- Watershed Boundary
 - Incised Streams
 - Contour Buffer Strips
 - Grassed Waterways
 - Water and Sediment Control Basins

- Legend**
- Watershed Boundary
 - Incised Streams
 - Riparian Function
 - Multi Species Buffer
 - Deep Rooted Vegetation
 - Stiff Stemmed Grasses
 - Stream Bank Stabilization

Successful Watershed Management



Successful Watershed Management

Successful watershed management: a system that achieves water-related environmental, social, and economic goals in a designated time frame, with the goals and the time frame agreed upon by a representative group of stakeholders.



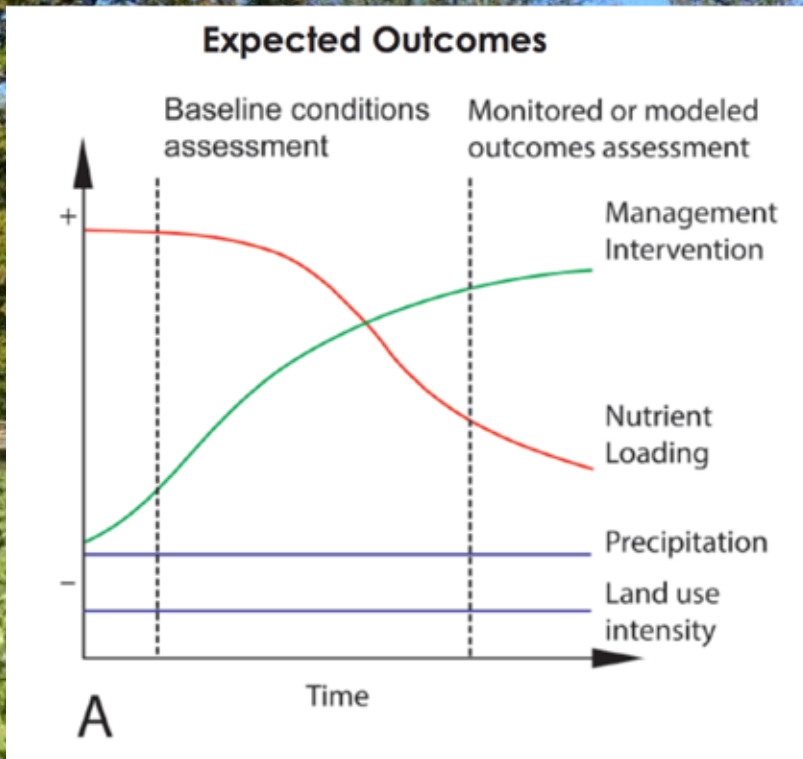
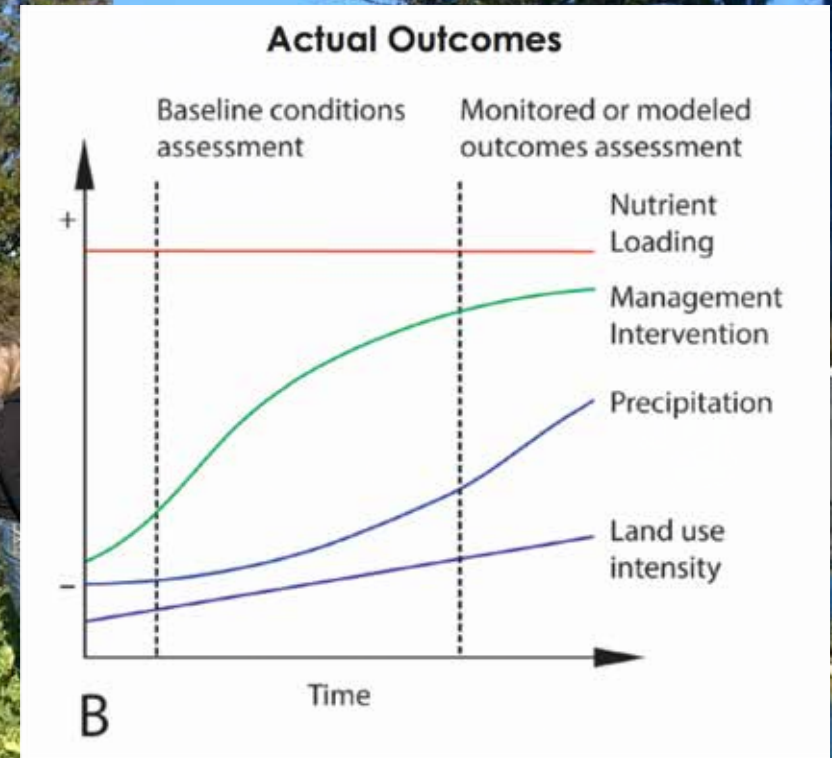


Photo: Michael Fields Agricultural Institute



Gillon, Booth, and Rissman 2015

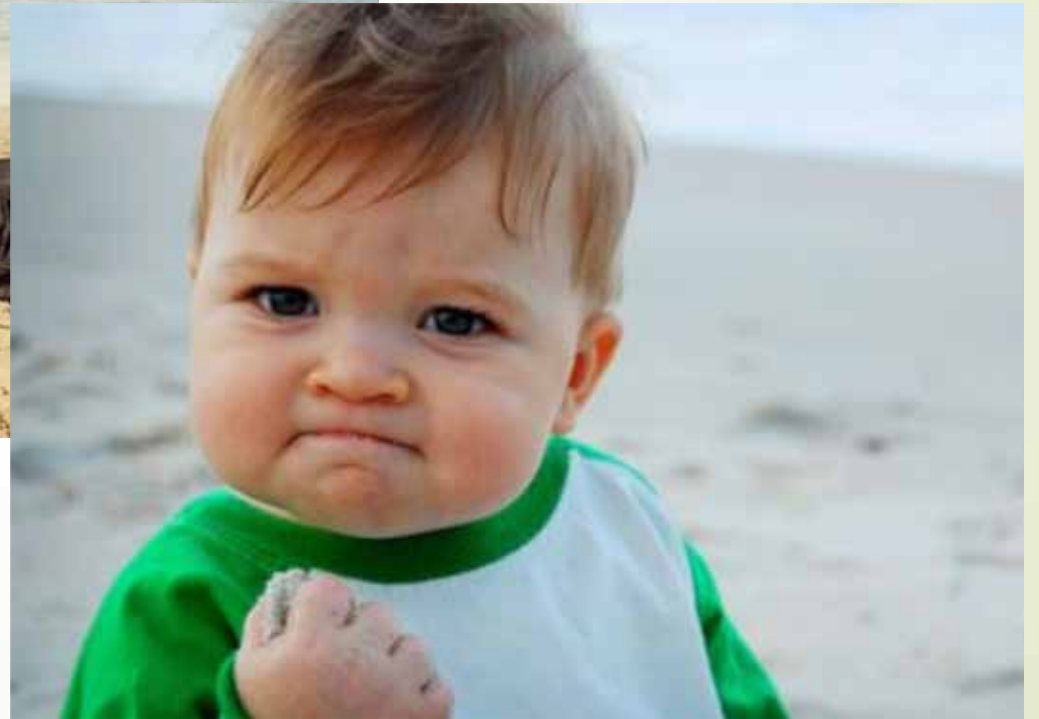
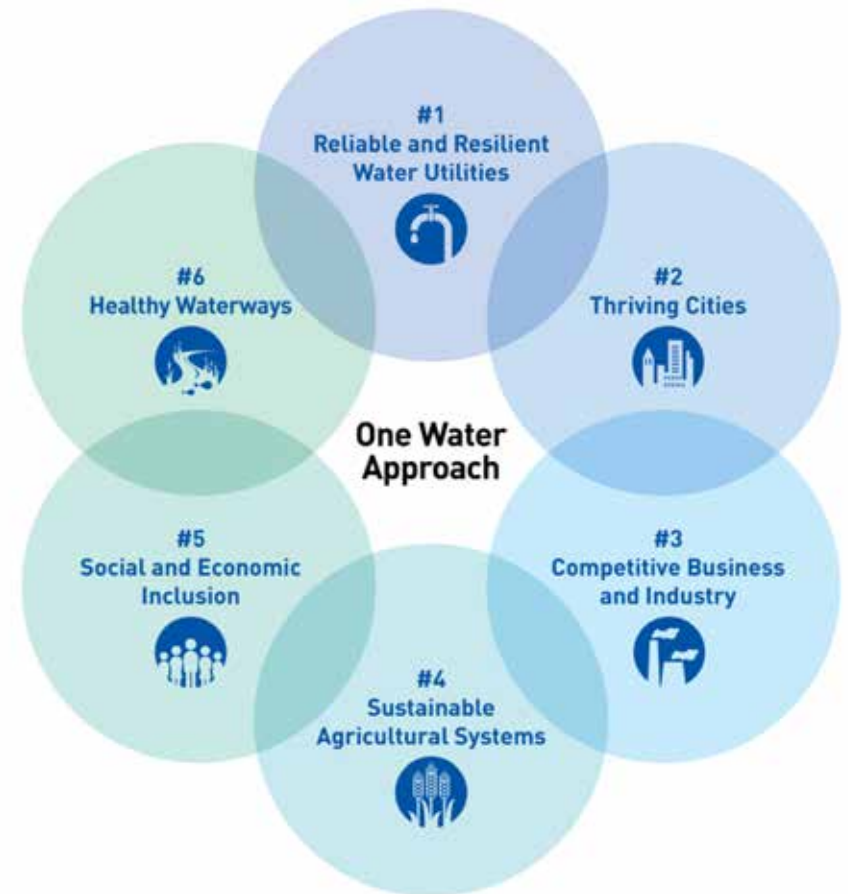
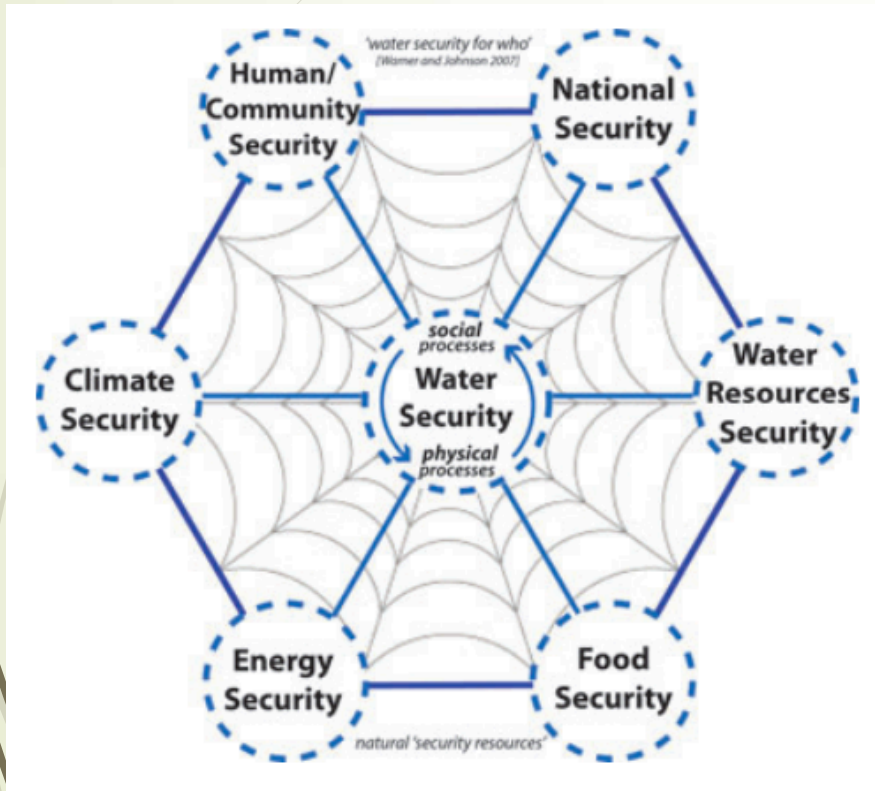




Photo: Rock River Coalition

Social Change: Water



Social Change: Government vs Governance



Necessary Elements for Successful Watershed Management



Human capital



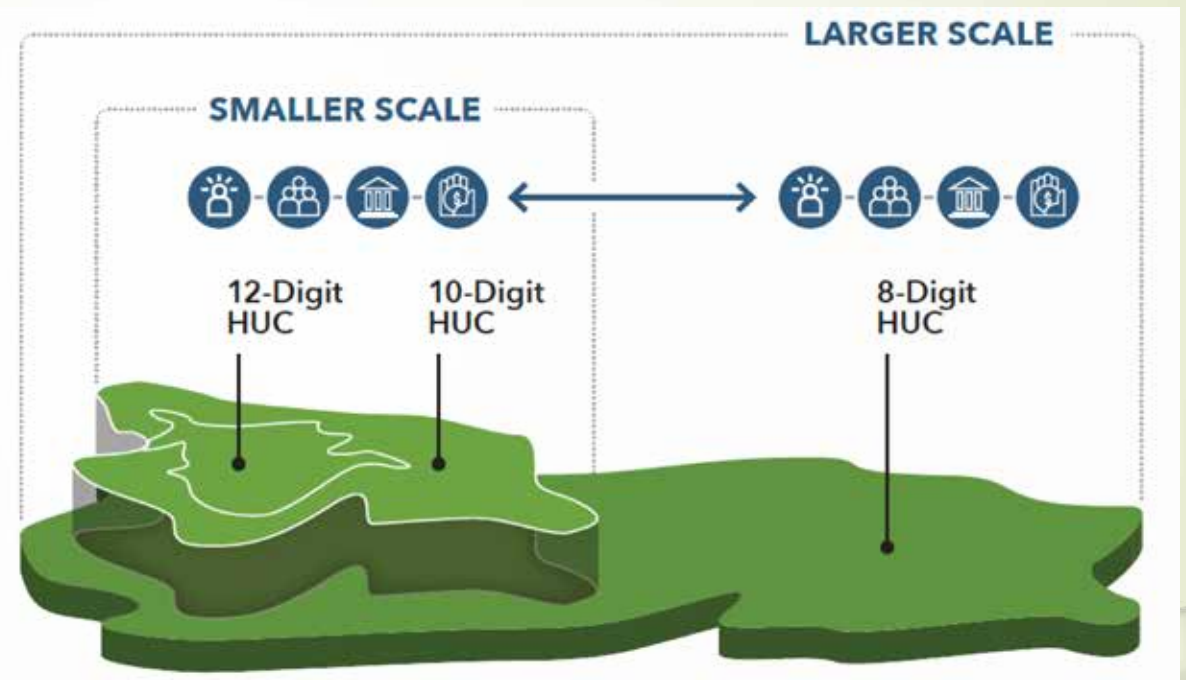
Social capital



Policy framework



Finance framework



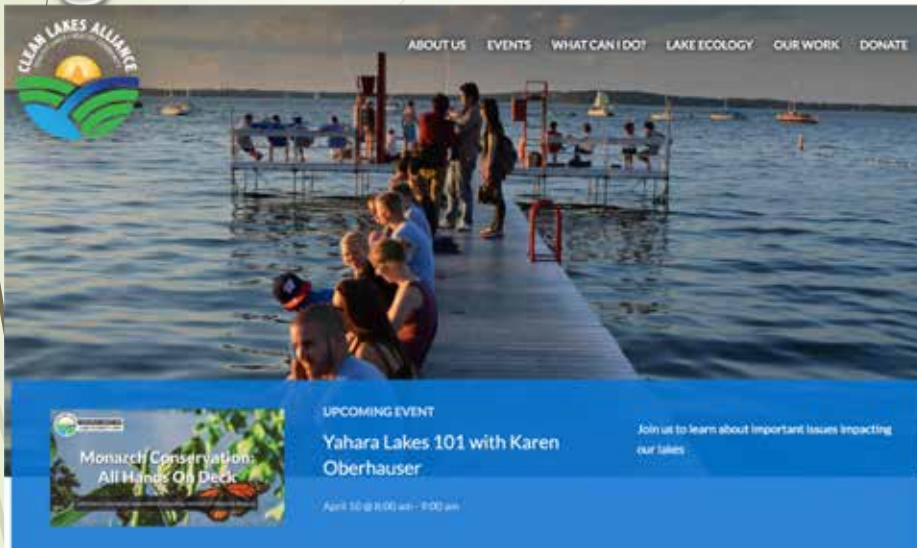
<https://northcentralwater.org/getting-to-scale/>



Some Wisconsin Resources

PLACES TO START . . .

Local Watershed Organizations



CLEAN LAKES ALLIANCE

ABOUT US | EVENTS | WHAT CAN I DO? | LAKE ECOLOGY | OUR WORK | DONATE

UPCOMING EVENT
Yahara Lakes 101 with Karen Oberhauser
Join us to learn about important issues impacting our lakes.
April 10 @ 8:00 am - 9:00 am

Monarch Conservation: All Hands On Deck



YAHARA PRIDE FARMS

Who We Are | What We Do | Get Involved | Learn more | Contact Us

Certification. Cost-share. Research & Outreach.

Yahara Pride Farms strives to improve water quality while balancing farm profitability.

INVEST NOW

Learn more about us!

County Land and Water Departments and Municipal Stormwater Managers



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Portage County

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- Zoning Section
- Planning Section

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- Terrestrial Invasive Plants
- Programs And Projects
- Youth And Community Events
- Watershed Organizations
- Cooperating Agencies And Partners
- LWCC FAQ

Department » Planning & Zoning » Land and Water Conservation

Land And Water Conservation

Font Size: + - | Share & Bookmark | Feedback

Established under Chapter 92, State Statutes, the Portage County Land and Water Conservation Division (LWCD) is located within the Planning and Zoning (P&Z) Department. The LWCD's focus is on protection and improvement of the County's land and water resources by implementing a variety of County, State, and Federal programs. The **Portage County Land and Water Resource Management (LWRM) Plan** was approved by the County Board on June 16, 2009, and serves as the document for guiding LWCD activities for the years 2009 through 2019.

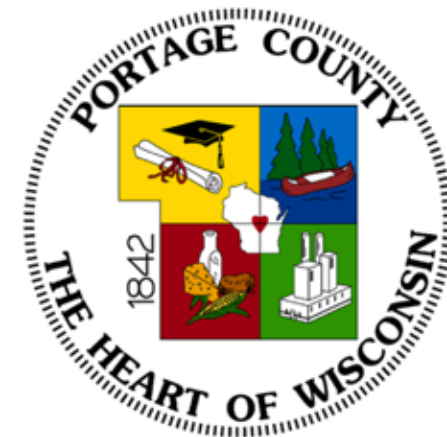
[Click here for a calendar containing agendas and minutes](#)

[Check here for an archived collection of agendas and minutes](#)

NEWS

Work Zone Safety Awareness Week News Release
Portage County Officials Remind Drivers to "Drive Like You Work Here" in Work Zone this Construction Season
4/5/2019 7:00:00 AM

Report Wild Parsnip
If you see wild parsnip, tell about it.
4/3/2019

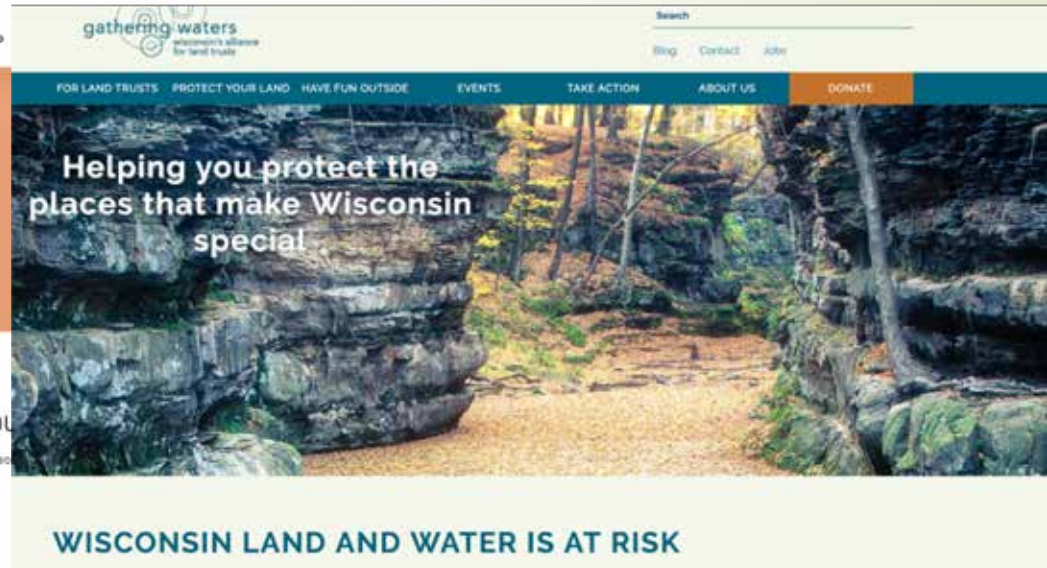


Land and Water Resource Management Plan

Plan Prepared By: Portage County Planning and Zoning Department
Land Conservation Division
June 2009
Revised December 2014



State Non-Governmental Organizations



<https://wisconsinlandwater.org/>

<https://www.wisconsinrivers.org/>

<https://www.gatheringwaters.org/>



University Extension

Division of Extension
University of Wisconsin-Madison

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Home » Natural Resources

Natural Resources

The Extension Institute of Natural Resources helps individuals, communities and the state... Extension's Lake Superior National research reserve and Upham Woods Outdoor Learning... living in a resource-rich state.

Natural Resources H




NORTH CENTRAL REGION WATER NETWORK

NETWORK INITIATIVES RESOURCES WEBINARS FUNDING EVENTS BLOG

We are an Extension-led partnership of 12 land-grant universities, ensuring safe and sufficient water supplies and sustainable, resilient communities

At the North Central Region Water Network, we are dedicated to enhancing connectivity and learning, sharing the latest Extension research and knowledge across the region, strengthening the resource base for Extension education, and coordinating initiatives with measurable short and long term impacts.

In the last two years Network Initiatives reported receiving over 1,707,739 in additional funds for their projects – that's a success rate of 49%.

Join us on our journey to turn science into success!

[JOIN THE NETWORK](#)
[EXPLORE EXTENSION KNOWLEDGE](#)
[SEE OUR IMPACT](#)

Upcoming Events:

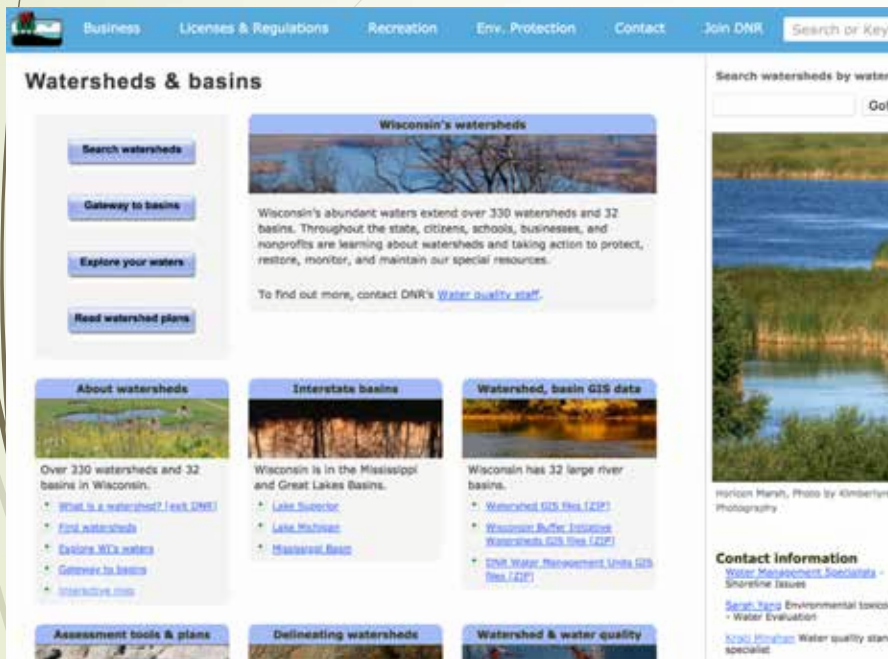
APRIL 2019						
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

Have an event to add to the calendar?
[Email us!](#)

<https://extension.wisc.edu/natural-resources/>

<https://northcentralwater.org/>

State Agencies



Watersheds & basins

Search watersheds by water

Go!

Wisconsin's watersheds

Wisconsin's abundant waters extend over 330 watersheds and 32 basins. Throughout the state, citizens, schools, businesses, and nonprofits are learning about watersheds and taking action to protect, restore, monitor, and maintain our special resources.

To find out more, contact DNR's [Water quality staff](#).

About watersheds

Over 330 watersheds and 32 basins in Wisconsin.

- [What is a watershed? | eak DNR](#)
- [Find watersheds](#)
- [Explore WTA waters](#)
- [Get more on basins](#)
- [Interactive map](#)

Interstate basins

Wisconsin is in the Mississippi and Great Lakes Basins.

- [Lake Superior](#)
- [Lake Michigan](#)
- [Mississippi Basin](#)

Watershed, basin GIS data

Wisconsin has 32 large river basins.

- [Watershed GIS files \(.ZIP\)](#)
- [Wisconsin Buffer Interstate Watersheds GIS files \(.ZIP\)](#)
- [DNR Water Management Units GIS files \(.ZIP\)](#)

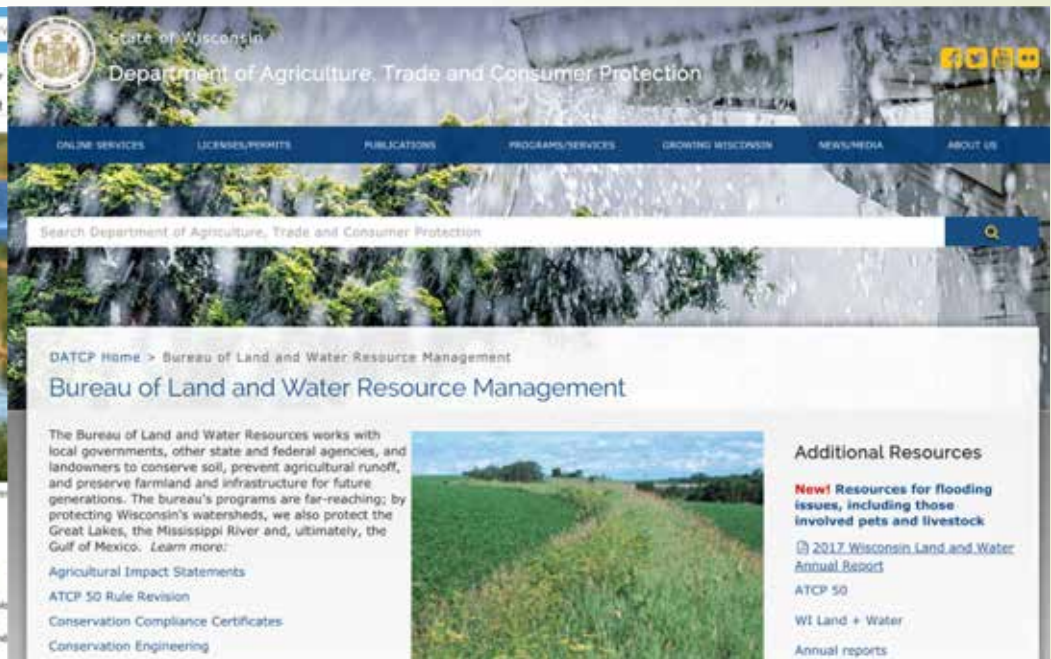
Contact information

[Water Management Specialists](#) - Shoreline Issues

[Sarah Yang](#) Environmental toxicologist - Water Evaluation

[Kandi Hinzman](#) Water quality standards specialist

<https://dnr.wi.gov/topic/watersheds/>



State of Wisconsin
Department of Agriculture, Trade and Consumer Protection

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Search Department of Agriculture, Trade and Consumer Protection

DATCP Home > Bureau of Land and Water Resource Management

Bureau of Land and Water Resource Management

The Bureau of Land and Water Resources works with local governments, other state and federal agencies, and landowners to conserve soil, prevent agricultural runoff, and preserve farmland and infrastructure for future generations. The bureau's programs are far-reaching; by protecting Wisconsin's watersheds, we also protect the Great Lakes, the Mississippi River and, ultimately, the Gulf of Mexico. [Learn more:](#)

- [Agricultural Impact Statements](#)
- [ATCP 50 Rule Revision](#)
- [Conservation Compliance Certificates](#)
- [Conservation Engineering](#)

Additional Resources

New! Resources for flooding issues, including those involving pets and livestock

- [2017 Wisconsin Land and Water Annual Report](#)
- [ATCP 50](#)
- [WI Land + Water](#)
- [Annual reports](#)

https://datcp.wi.gov/Pages/Programs_Services/LWC_Overview.aspx



Federal Agencies – USEPA, NRCS, USGS

EPA United States Environmental Protection Agency

Environmental Topics | Laws & Regulations | About EPA

Related Topics: Environmental Topics

Water Topics

When the water in our rivers, lakes, and oceans becomes polluted, it can endanger wildlife, make drinking water unsafe, and threaten the waters where we swim and fish. EPA research supports efforts under the Clean Water Act and Safe Drinking Water Act.

Drinking Water

- Local Water Quality Reports
- Drinking Water Basics
 - Lead in Drinking Water
- Private Wells
- Source Water Protection

Water Bodies

- Lakes and Rivers
- National Estuary Program (NEP)
- Oceans, Coasts, Wetlands
- Watersheds
 - Invasive Species
 - Surf Your Watershed

Wastewater and Water Treatment

- Wastewater Treatment
- Septic Systems
- Green Stormwater Management

Monitoring and Preventing Water Pollution

- Hydraulic Fracturing (Fracking)
- Polluted Runoff (NPS)

USDA Natural Resources Conservation Service
Wisconsin
United States Department of Agriculture

Topics | Programs | Newsroom | Contact Us

NRCS Wisconsin Announces 2019 EQIP Signup

Apply by May 17, 2019

Providing Conservation Practices to Protect Natural Resources

4 / 5

In the News

- NRCS Thinks Earth Team Volunteer Services During National Volunteer Week
- USDA Announces Sign-Up Period for Updated Conservation Stewardship Program
- NRCS and 8 Northeast Wisconsin Counties Launch New Upper Fox-Wolf Demonstration Farm Network

Events & Deadlines

Highlights

- Environmental Quality Incentives Program
- Conservation Stewardship Program
- Regional Conservation Partnership Program
- Agricultural Conservation Easement Program
- Our Commitment to Civil Rights: Working Together for Equality

USGS science for a changing world

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Regions

USGS Wisconsin Water Science Center

High-quality data and unbiased research on Wisconsin's water

RESOURCES

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Wisconsin

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Through advanced research and long-term monitoring, three Wisconsin-based USGS centers—the National Wildlife Health Center, the Upper Midwest Environmental Sciences Center, and the Upper Midwest Water Science Center—provide the scientific information needed by managers, decision makers, and the public to protect, enhance, and

<https://www.epa.gov/environmental-topics/water-topics>

<https://www.nrcs.usda.gov/wps/portal/nrcs/site/wi/home/>

<https://www.usgs.gov/science/regions/midwest/wisconsin>

“To keep every cog and wheel is the first precaution of intelligent tinkering”

Aldo Leopold





THANK YOU!

Rebecca Power
rebecca.power@wisc.edu