

RECREATIONAL ANGLING IN
THE LAKES BRINGS IN OVER

**\$297
MILLION
ANNUALLY**
TO A FIVE COUNTY REGION*

*VALUES FROM 2006 STUDY WERE ADJUSTED
TO REFLECT EQUIVALENT BUYING POWER IN 2019

OVER
200,000
PEOPLE
RELY ON LAKE
WINNEBAGO FOR
THEIR DRINKING
WATER SUPPLY

THE LAKE
SYSTEM HOLDS
17%
OF WISCONSIN'S
SURFACE WATER

MORE THAN
2,000,000
PEOPLE
LIVE WITHIN 75 MILES
OF THE LAKES



WINNEBAGO WATERWAYS RECOVERY

An introduction to the Winnebago Waterways Lake Plan that aims to improve and protect the Winnebago Lakes

WINNEBAGO LAKES

- 1 Poygan
- 2 Winneconne
- 3 Butte des Morts
- 4 Winnebago

VISION

The lakes, rivers, streams and wetlands of the Winnebago Waterways Recovery Area are treasured resources that provide value to our community and are deserving of immediate and active large-scale restoration, coordinated management and ongoing protection for generations to come.

GOALS



WATER QUALITY

Increase the health of our lands and waterways to ensure our lakes, rivers and streams are fishable, swimmable and aesthetically enjoyable.



HABITAT, FISHERY, & WILDLIFE

Restore and protect habitat to support self-sustaining populations of fish and wildlife.



RECREATION

Increase use and enjoyment of the waterways



OUTREACH & ENGAGEMENT

Build an engaged community supportive of recovery efforts and ongoing protection of our waterways.



LAKE POYGAN



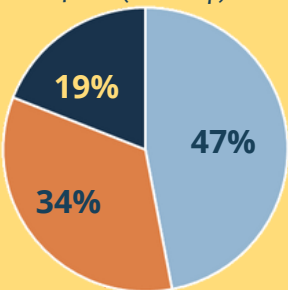
14,024
acres

11 ft.
maximum
depth

5.8 ft.
average depth

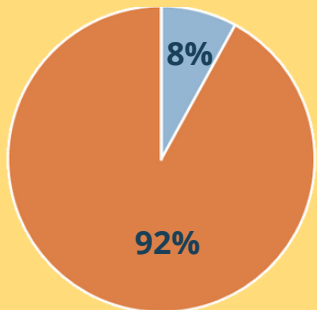
Submerged Aquatic Plant Density at 59 sites

locations where plants were found (X on map)



Low Moderate High

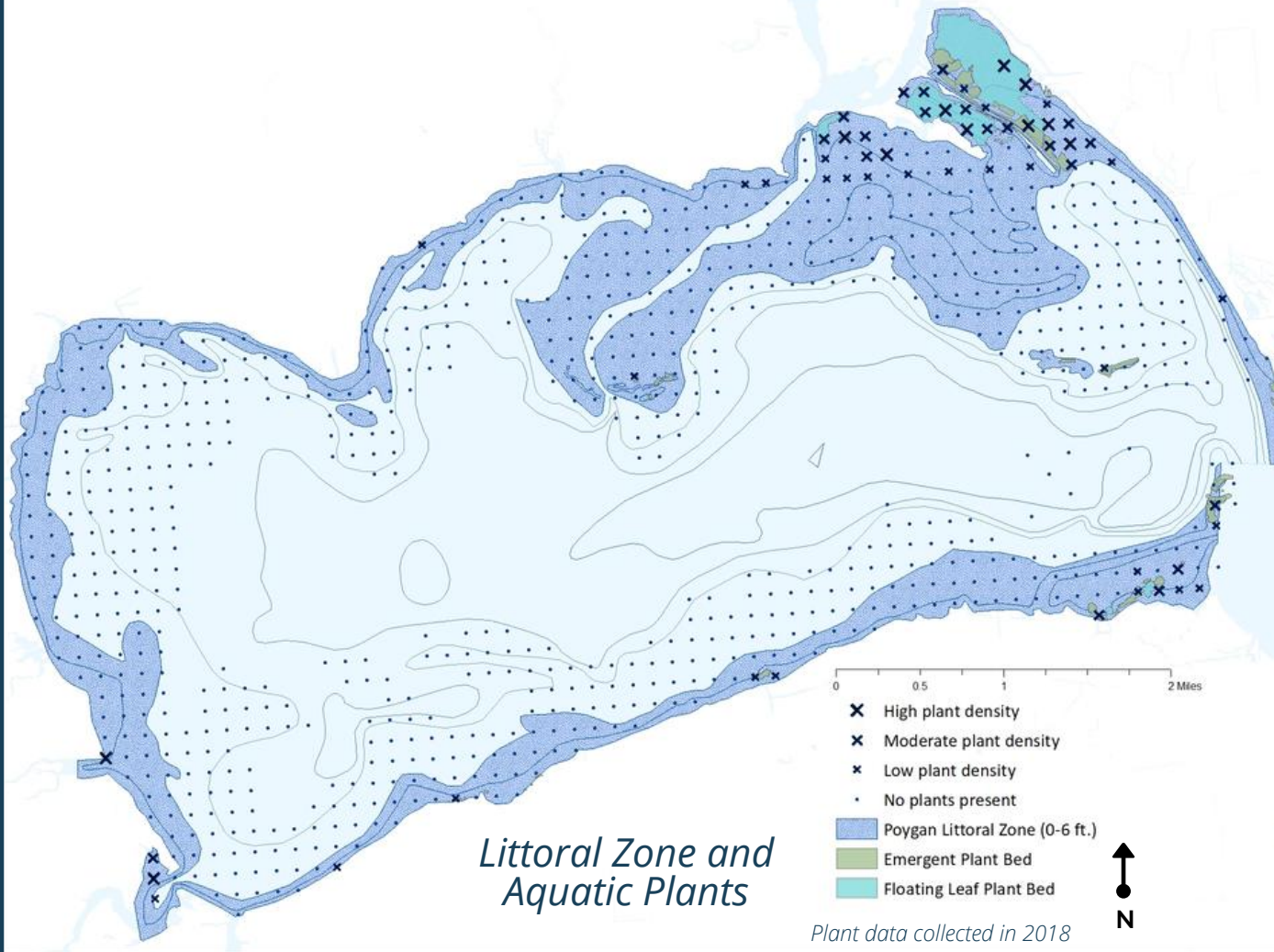
Dominant Sediment Type Littoral Zone



Sand Muck Rock

43 miles
total shoreline
distance

3 miles
of shoreline are
actively eroding



8
verified
invasive
species

33%
of the lake
area is
littoral
(where light
reaches bottom)

2%
of lake area
contains
emergent or
floating leaf
plant beds

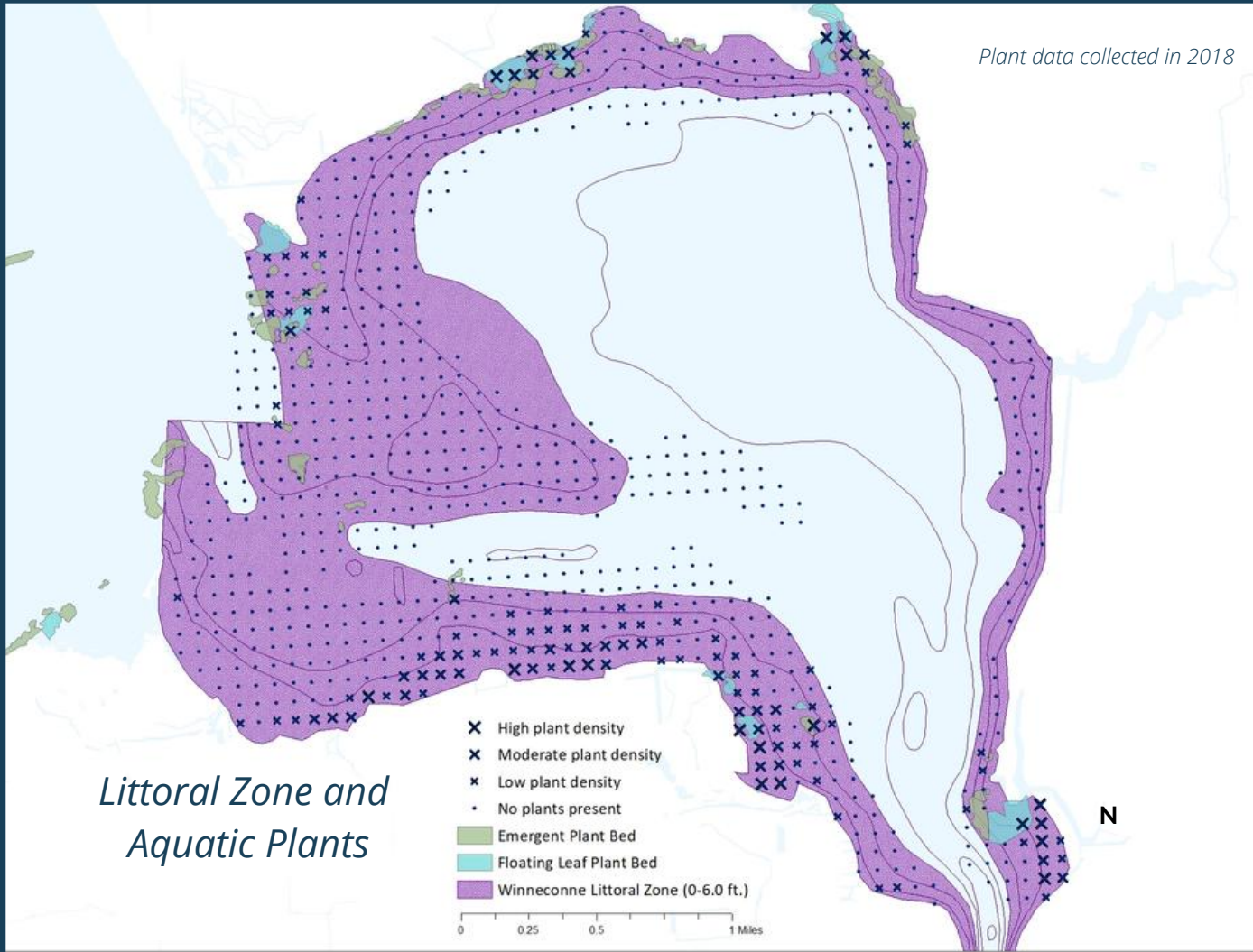
9%
of 986
locations
sampled in the
lake had
plants present

29
different
aquatic
plant
species

**1 every
4 miles**
Average
occurrence of
in-lake shallow
woody habitat



LAKE WINNECONNE



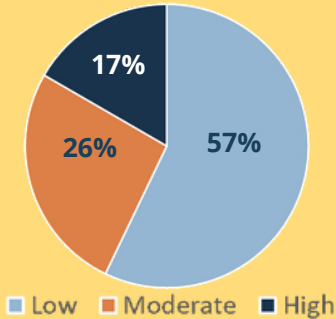
4,553
acres

9 ft.
maximum depth

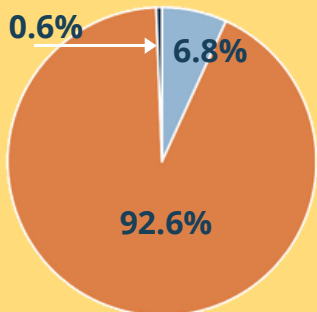
5.3 ft.
average depth

Submerged Aquatic Plant Density at 124 sites

locations where plants were found (X on map)



Dominant Sediment Type Littoral Zone



24 miles

total shoreline distance

~3 miles

of shoreline are actively eroding

9

verified invasive species

52%

of the lake area is littoral (where light reaches bottom)

3%

of lake area contains emergent or floating leaf plant beds

15%

of 798 locations sampled in the lake had plants present

33

different aquatic plant species

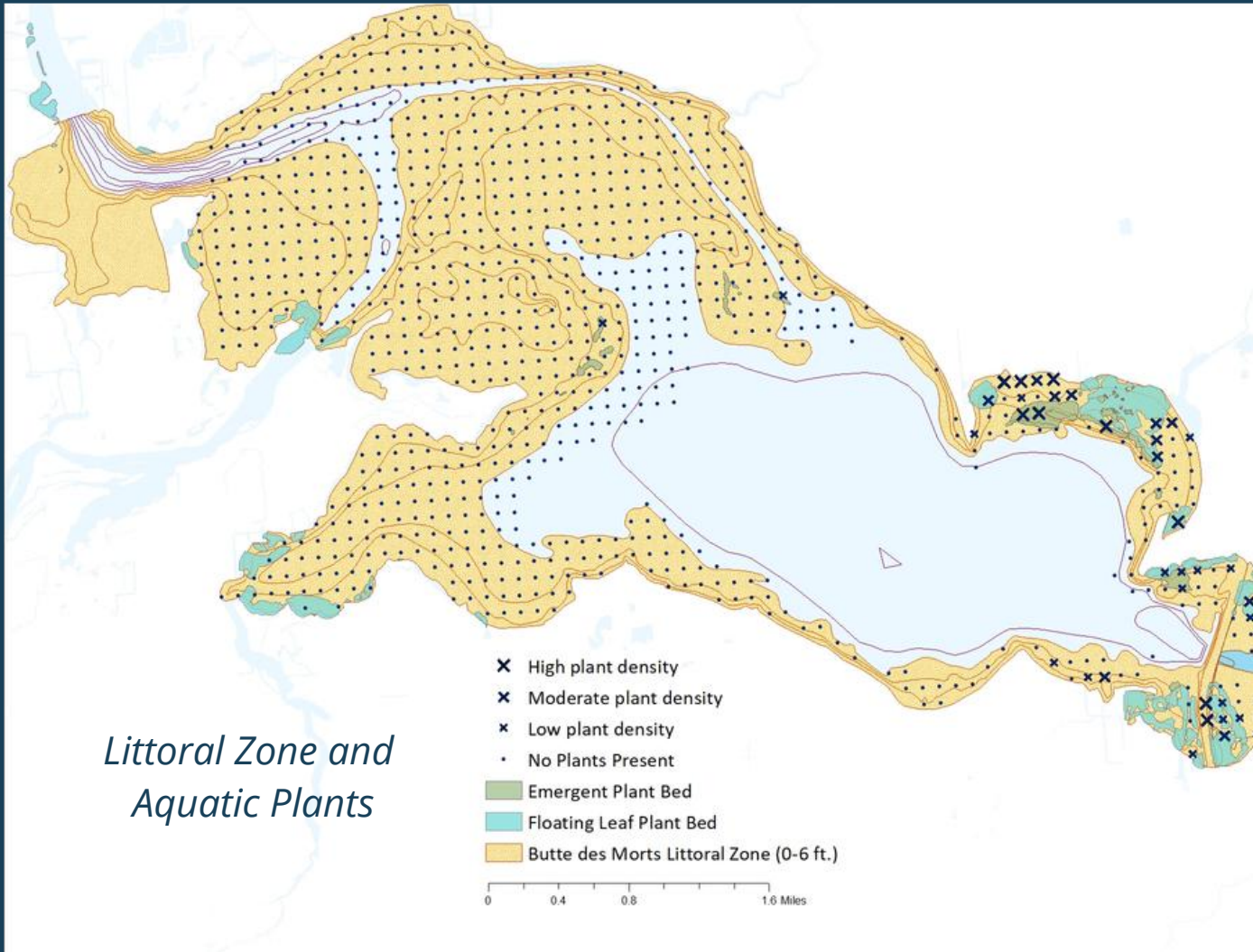
1 every 6 miles

Average occurrence of in-lake shallow woody habitat



■ Sand ■ Muck ■ Rock

LAKE BUTTE DES MORTS



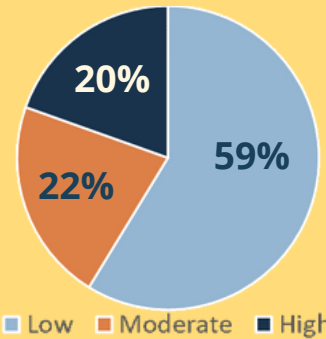
8,581
acres

9 ft.
maximum
depth

5.1 ft.
average depth

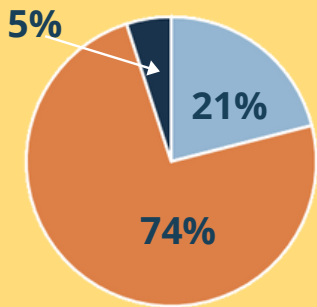
Submerged Aquatic Plant Density at 99 sites

locations where plants were found (X on map)



Low Moderate High

Dominant Sediment Type Littoral Zone



Sand Muck Rock

53 miles
total shoreline
distance

~6 miles
of shoreline are
actively eroding

10
verified
invasive
species

73%
of the lake
area is
littoral
(where light
reaches bottom)

4%
of lake area
contains
emergent or
floating leaf
plant beds

10%
of 970
locations
sampled in the
lake had
plants present

22
different
aquatic
plant
species

**1 every
26 miles**
Average
occurrence of
in-lake shallow
woody habitat



LAKE WINNEBAGO

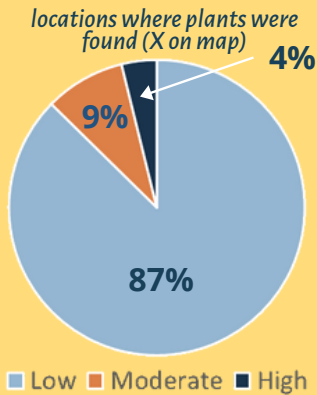


131,939
acres

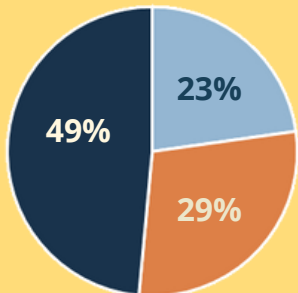
21 ft.
maximum
depth

14.9 ft.
average depth

Submerged Aquatic Plant Density at 182 sites



Dominant Sediment Type Littoral Zone



111 miles
total shoreline
distance

~5 miles
of shoreline are
actively eroding*

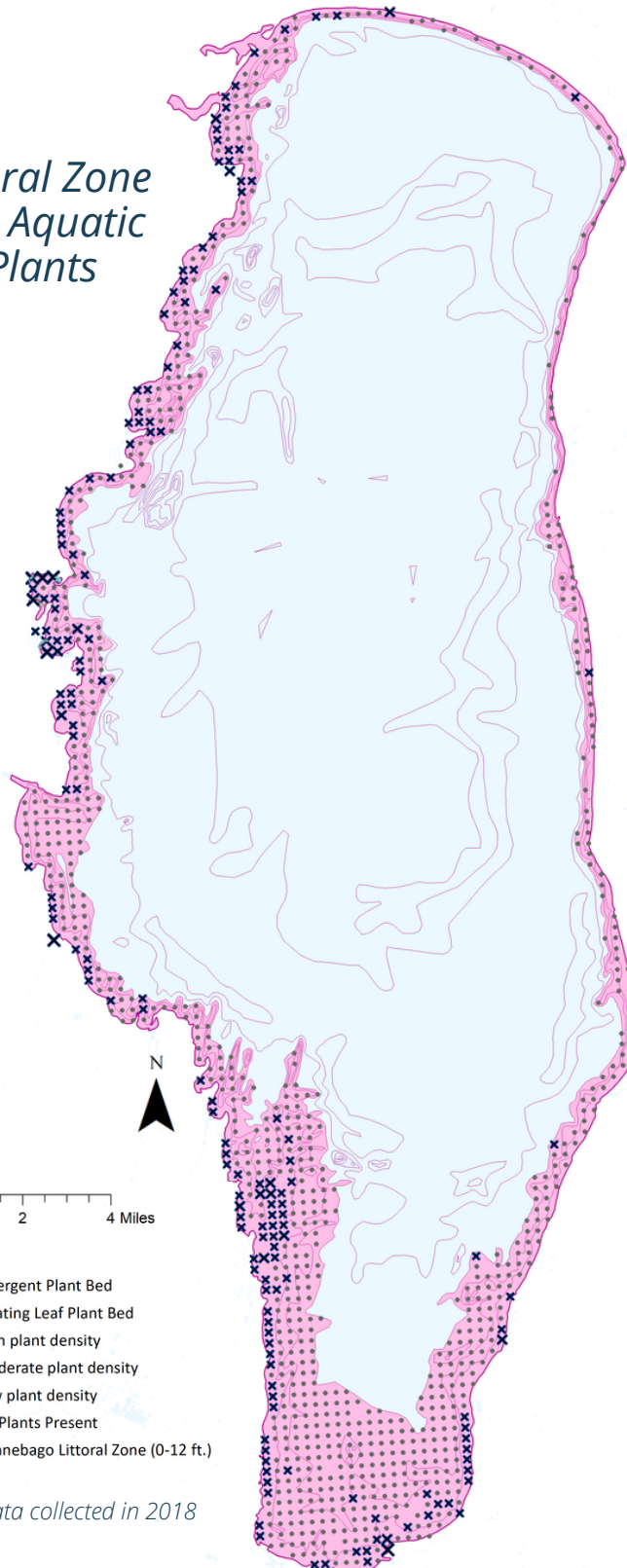
*does not include shorelines in Calumet County

Littoral Zone and Aquatic Plants

0 1 2 4 Miles

- Emergent Plant Bed
- Floating Leaf Plant Bed
- × High plant density
- × Moderate plant density
- Low plant density
- No Plants Present
- Winnebago Littoral Zone (0-12 ft.)

Plant data collected in 2018



10
verified
invasive
species

28%
of the lake area
is littoral
(where light reaches bottom)

17%
of 1,063 locations
sampled in the lake
had plants present

<1%
of lake area contains
emergent or floating
leaf plant beds

26
different
aquatic plant
species

**1 every
3 miles**
Average occurrence
of in-lake shallow
woody habitat
(not including Calumet County)



WATER QUALITY

Water quality (WQ) describes the desired conditions of a body of water. Lakes not meeting those conditions are listed as impaired.

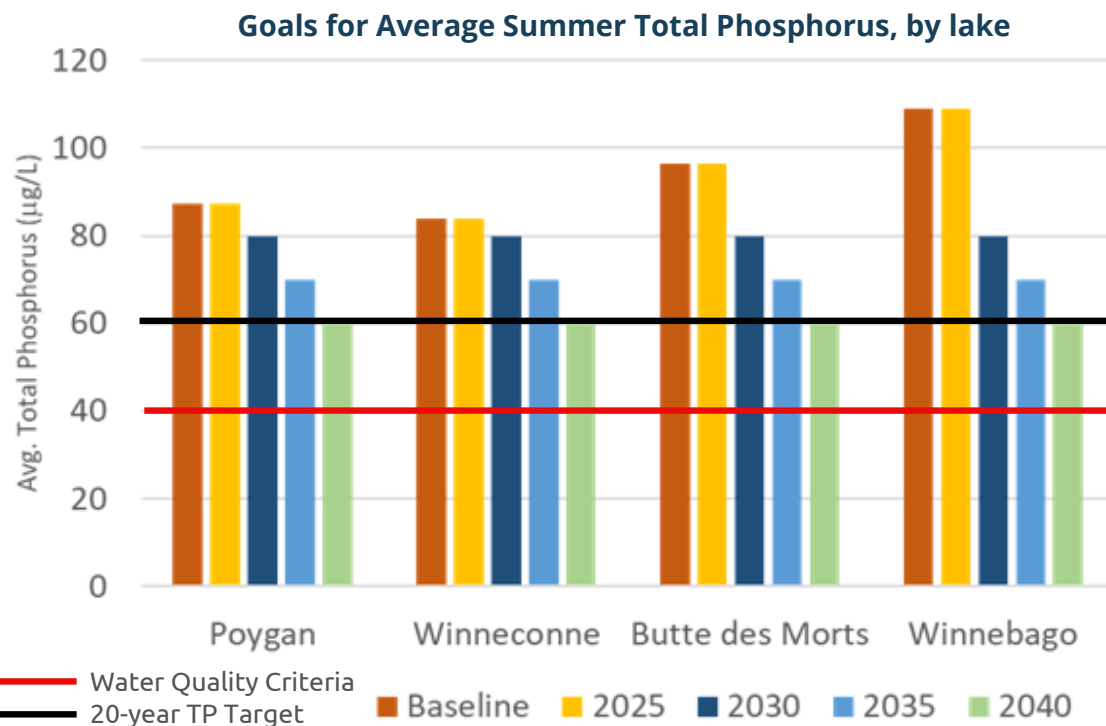
OVERALL WQ STATUS: **POOR**

While the Winnebago Lakes truly are an incredible resource, they are showing signs of stress. All four lakes are listed as impaired for total phosphorus, suspended solids, and excessive algae growth. Major drivers of these impairments include the artificial water level regime of the impounded system and nutrient and sediment pollution from agricultural and urban land uses, point-source pollution, internal nutrient loading, and shoreline practices. Impacts from these drivers are compounded by the impacts of climate change. As a result, the Lakes are borderline hypereutrophic – an unnatural state marked by excessive algae blooms and low water clarity.

The graph to the right provides an example of the severity of the impairments. All four lakes greatly exceed the impairment listing threshold for Total Phosphorus (red line). Baseline represents the most current available data.



The four lakes currently do not meet Wisconsin's water quality criteria for aquatic life or recreational uses.



To assess progress over time, in-lake water quality benchmarks are:

2020: Begin implementation

2025: Maintain or improve water quality from baseline values

2030: In-lake summer TP at or below 80 µg/L

2035: In-lake summer TP at or below 70 µg/L

2040: In-lake summer TP at or below 60 µg/L

*Because the recovery area only represents a portion of the entire Fox-Wolf drainage basin that is contributing pollution to the Winnebago Lakes, the 20-year target for TP in the lake plan is 60 µg/L and not the delisting criterion of 40 µg/L. Substantial efforts will also be needed outside of the recovery area in order for the total phosphorus concentration in the Lakes to ultimately be decreased to 40 µg/L.

Reaching the milestones outlined in this plan by 2040 should shift conditions in the Winnebago Lakes, resulting in:

- Less algae (no algae scums)
- More aquatic plants
- Better water clarity (although still murky)

EXTERNAL LOADING *of phosphorus and sediment*

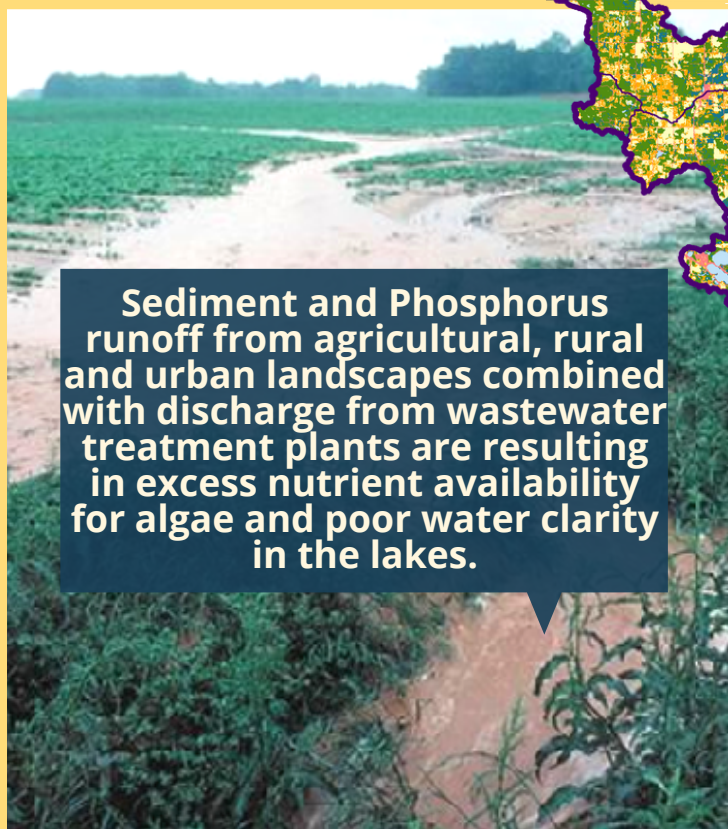
What happens on Land is reflected in our Water.

We all have a part to play in improving our waterways:

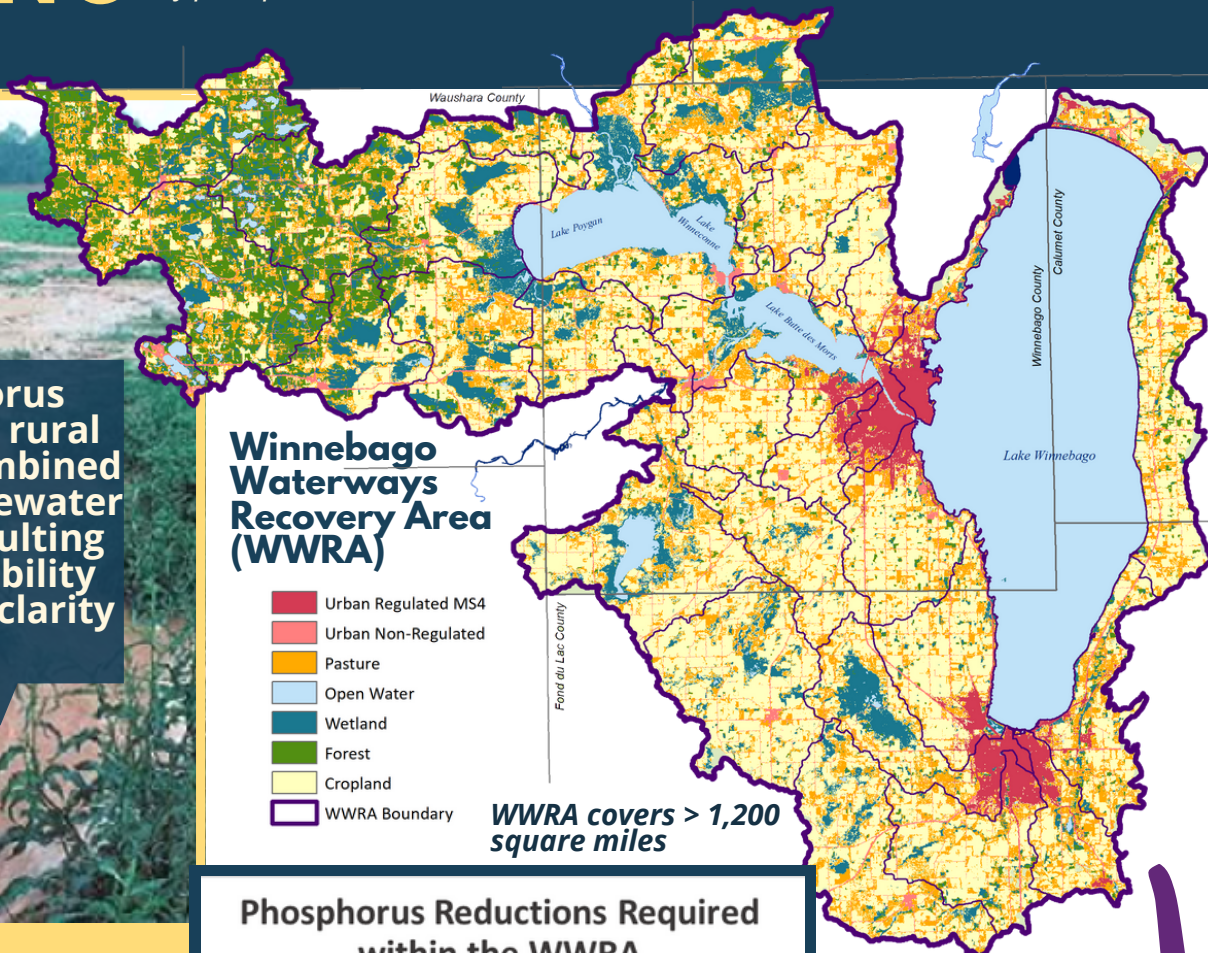
Interseed cover crop into corn to increase soil health and reduce runoff

Restore your shore with native plants to reduce erosion and slow runoff

Sweep grass clipping to keep them out of stormdrain



Sediment and Phosphorus runoff from agricultural, rural and urban landscapes combined with discharge from wastewater treatment plants are resulting in excess nutrient availability for algae and poor water clarity in the lakes.

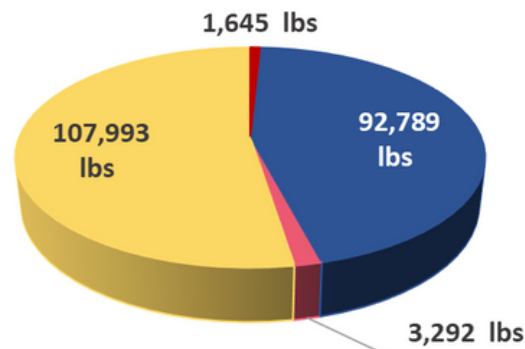


Goal: Reduce Phosphorus loading from WWRA by 79%

Priority Recommendations:

- Increase storage capacity on the landscape to reduce runoff volume by:
 - Installing Agricultural Runoff Treatment Systems (ARTS)
 - Increasing quantity and quality of wetlands
- Improve soil health to increase infiltration and improve runoff quality by:
 - Utilizing cover crop and no-till systems
- Increase available technical and agronomy support staff at County Land Conservation Departments to design and install practices, support farmers through transition and verify practices are performing as intended.
- Reduce shoreline and streambank erosion through restoration
- Support permitted wastewater treatment plants and communities with urban stormwater permits as they work to meet increased permit requirements.

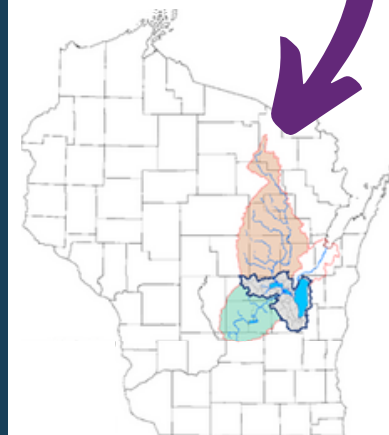
Phosphorus Reductions Required within the WWRA



- Regulated MS4 (urban stormwater)
- Wastewater Individual Permit (industrial/municipal)
- Urban, non-regulated (not including septic)
- Agriculture

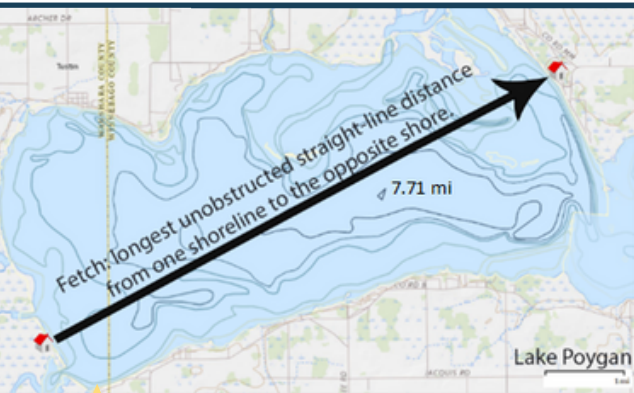
Reductions required derived from WDNR's Upper Fox/Wolf Total Maximum Daily Load Report

The WWRA is part of the larger Fox-Wolf Basin



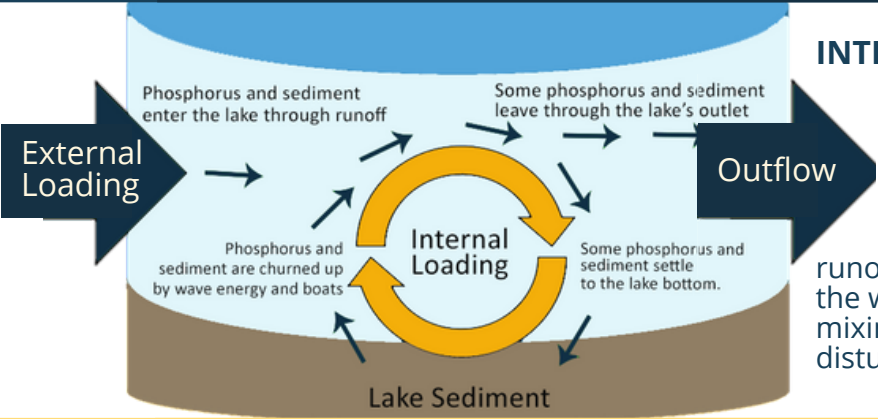
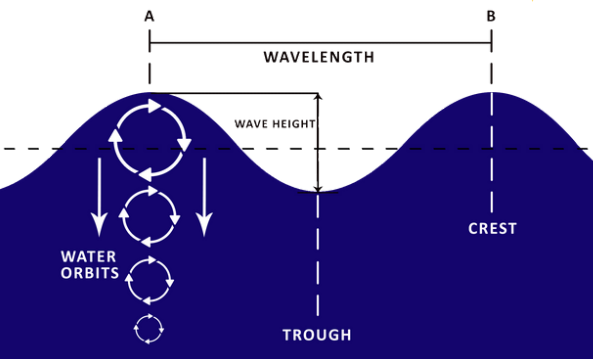
INTERNAL LOADING of phosphorus and sediment

The bottom of the shallow lakes is another source of phosphorus that can fuel blue-green algae blooms.

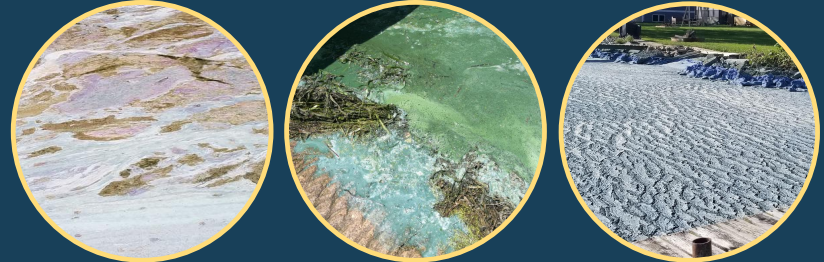


Large surface areas + unobstructed distance + strong, sustained wind = **High Energy Waves**

As waves get larger, they are able to exert energy at greater depths. Boat propellers and boat wakes can also disturb the lake bottom.



INTERNAL LOADING: Phosphorus and sediments that have built up in the lake bottom after years of excess nutrient rich runoff are resuspended in the water due to extensive mixing from waves or disturbance from boats.



Internal loading also fuels algal blooms and reduces water clarity. To see faster improvements in water quality, internal loading must be also reduced.



Aquatic plants are essential to water quality because they anchor sediment, reduce wave energy, protect the shorelines from erosion, and compete with blue-green algae for phosphorus.



- Goal: Reduce internal loading by 25% in 10 years.**
- Priority Recommendations:**
- Increase aquatic plants to stabilize sediments by:
 - Implementing a water level strategy that allows for plant establishment and growth.
 - Building breakwalls to create calm areas conducive to plant growth.
 - Increase public support of aquatic plants through education and localized management plans to address isolated areas of nuisance plants.
 - Decrease wave energy in the lakes by installing breakwalls.

While increased vegetation is a primary goal of the lake plan, it's recognized that dense vegetation growth in some areas can impede navigation. These areas may need active management. When managing plants in a lake, the priority should be to minimize damage to beneficial vegetation. The best way to do this is to develop a site-specific aquatic plant management plan.



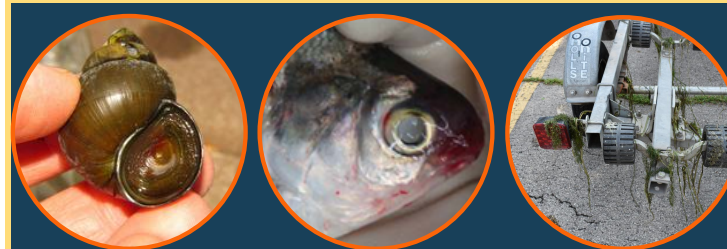
Aquatic Invasive Species (AIS)

AIS are non-native plants, animals, and pathogens that are likely to cause economic, environmental, or human harm and live in water or wetlands.

While there are over a dozen AIS currently found in the Winnebago Lakes, there are many more that have not been introduced. Prevention is the best way to fight AIS because once AIS are established in a lake it is often impossible to eradicate and costly to manage.

Priority Recommendations:

- 1.) Prevent the spread of AIS through coordinated outreach and education including Clean Boats, Clean Waters, Adopt-a-Launch, and other initiatives.
- 2.) Identify and respond rapidly to introductions through monitoring programs.
- 3.) Manage nuisance AIS.



Boaters and lake users can do their part by not moving plants, live animals, or water away from a lake or river.



Habitat

Habitat loss in the lakes and in the surrounding watershed has been extensive. Aquatic plants grow in limited areas and there are currently miles of actively eroding shoreline. The habitat communities important to the system continue to be threatened by development, poor water quality, invasive species, and climate change.

Active, strategic management and coordination of the system is needed to efficiently utilize limited resources.

Priority Recommendations:

- 1.) Increase the amount of aquatic plant habitat through water level management, areas protected by breakwalls, and water quality improvements.
- 2.) Increase the diversity of in-lake habitat types through the installation of woody debris, breakwalls, and submerged reefs.
- 3.) Increase quality and quantity of wetland and grassland acres.



Recreation

Improving the Winnebago Lakes for recreation is essential for supporting the region's tourism and sustaining long-held family traditions. Poor water quality, invasive species, nuisance plant growth in isolated areas, and concerns about boating safety threaten these recreational opportunities.

Priority Recommendations:

- 1.) Improve water quality to reduce the number of days that severe blue-green algae blooms impact lake recreation.
- 2.) Improve recreational navigation and safety by expanding navigation buoy coverage and improving buoy maintenance.
- 3.) Increase the number of lake access points for boating, paddle sports, and shoreline fishing.
- 4.) Increase facilities at access points such as restrooms, overnight mooring, etc.
- 5.) Increase availability of information about recreational access and use for the lakes.



WATER QUALITY RECOVERY TARGETS SUMMARY

Numeric targets were established to assess progress towards recovery:

- By 2025:**
 - Increase the frequency of occurrence of submerged, rooted vegetation on all four Winnebago Lakes by **40%** and increase emergent and floating-leaf plant bed acres by **5%**.
 - Reduce external total phosphorus (TP) load by **28%**; no net increase in internal loading

The water quality impacts of these efforts are not anticipated to result in a noticeable water quality improvement, but will set the stage for reaching future water quality goals.

- By 2030:**
 - Reduce in-lake internal TP loading by **25%**
 - Reduce external load of TP by an **additional 33%** (for a total of 61% reduction from baseline)

These reductions are anticipated to result in In-lake average summer TP concentrations measuring at or below 80 ug/L.

- By 2035:**
 - No measurable increase in internal TP loading from 2030 targets.
 - Reduce external loading of TP by an **additional 13%** from WWRA baseline load estimates (for a total of 74% reduction from baseline).

These reductions are anticipated to result in In-lake average summer TP concentrations measuring at or below 70 ug/L.

- By 2040:**
 - Reduce external TP loading from the WWRA by an additional **5%** from WWRA baseline load estimates.
 - Reductions in the WWRA should total **79%** from estimated baseline loading from the 20 year management period.

These reductions are anticipated to result in In-lake average summer TP concentrations measuring at or below 60 ug/L.



REGIONAL COORDINATION

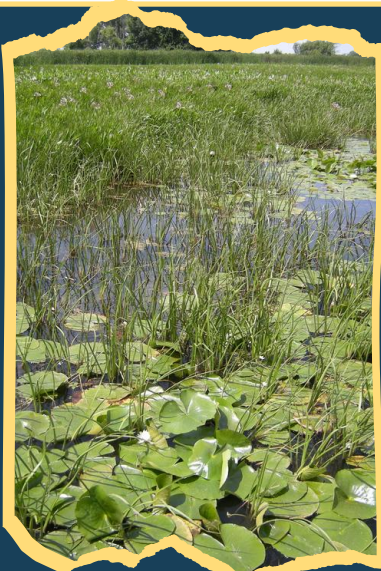
The Winnebago Waterways Program facilitates active and collaborative implementation of the recovery plan. This includes facilitating regional capacity building and partnerships, serving as a technical resource, developing projects, educating people on lake topics, and tracking implementation of the plan.

This initiative, led by the Fox-Wolf Watershed Alliance and partially funded by three counties, is supported by numerous partners including area organizations, residents, property owners, local governments, lake users, and area businesses.

An important recommendation in the lake plan is to maintain and grow the Winnebago Waterways Program to ensure ongoing adaptive management of coordinated recovery efforts in the Winnebago Waterways region.

Recovery has already begun!

It is important to recognize all of the hard work and efforts already being made by residents, farmers, non-profit organizations, businesses, municipalities, counties, agencies, and other stakeholders to improve soil health and water quality in the watershed and in the lakes. Such activities vary widely, ranging from shoreline, agricultural, forestry and urban stormwater best management practices to in-lake habitat restorations. Existing efforts should be built upon and utilized as examples of what can be accomplished as implementation of the plan moves forward.



MONITORING, TRACKING & REPORTING

Installed best management practices will be tracked for each management topic. Water quality and aquatic plant monitoring will be utilized to measure progress towards water quality targets.

A summary of plan implementation progress will be made available annually to agencies and partners who have an active or potential role in future implementation including elected officials and the public.

FUNDING PARTNERS

This report was funded through the Winnebago Waterways Intergovernmental Cooperative Agreement of Calumet, Winnebago, and Fond du Lac Counties as well as Wisconsin Department of Natural Resources Surface Water Grants for Lake Management Planning and funding from the Great Lakes Restoration Initiative through the United States Environmental Protection Agency. Professional and volunteer time from several organizations and individuals provided additional support for the project.



Questions? Comments?

Email us: wwinfo@fwwa.org
Visit us: www.winnebagowaterways.org
You can also follow us on Facebook!!



PLAN ADOPTION

The development of the Winnebago Waterways Lake Management Plan brought together partners from local governments, conservation organizations, the scientific and regulatory communities with watershed residents, shoreline property owners and lake users to create a unified vision for the Lakes. The plan itself provides a framework for moving forward and serves as a pathway to secure additional funding to increase the amount of conservation efforts currently happening in the system.

Now is the time to capitalize on the momentum built during the planning effort to restore and protect the resources that we rely upon and to ensure they are able to provide the same resources for future generations.

The Community surrounding the Winnebago Waterways must come together to prioritize the restoration and protection of the Lakes. Organizations, municipalities, businesses, and individuals will be asked to adopt the plan and implement the recommendations.

**FIND THE FULL PLAN HERE:
WWW.WINNEBAGOWATERWAYS.ORG**

