

Status Overview

Oconto County Lakes Project

Multi - Year Program of Studying 60 “Public Access Lakes”

Overall Project: Currently, as part of a series of grants, Oconto county lakes are being studied within in groups of 6 to 9 until all 60 county lakes with public access facilities are completed. Each lake will have an individual **Lake Management Plan** developed (some smaller lakes may be grouped with others) and the county will have an **Operational Strategy & Plan** completed and adopted to help County staff members in achieving an overall goal of **“Having the Healthiest Waters in Wisconsin.”** Summary reports, surveys and plans are available for the first **40** lakes on the Oconto Land & Water Conservation Department’s Website located www.co.oconto.wi.us/321/County-wide-Lake-Study

*It is utmost important for you and your neighbors to fill out the **individual lake surveys** expressing your concerns and hopes for the lakes. It is anonymous and you may complete a survey on all lakes you care about. All surveys are on the Departmental Website detailed above.*

Goal 1. Develop a scientific understanding of nearshore and shoreline habitat of the 60 lakes.

Activity. Understand the ‘state of the shorelines’ through inventory of the study lakes. Inventories will be conducted during summer or early fall of the year. The newly developed WDNR shoreline inventory methodology will be used to assess shoreline vegetation, erosion, preferred flow, structures, and in-lake woody habitat and diversity of aquatic vegetation.

All research is completed for lakes: Bear, Leigh, Machickanee, Maiden, Munger, Oconto Falls, Paya, Rost, Waubee, Anderson, Bass, Boot, Grindle, John, Ranch, Green, Shay, Star, Ucil, Underwood, Wescott, Cooley, Bear Paw, Nelligan, Pecor, White, White Potato, Grignon, Little Pickeral, Pickeral, Pine Ridge, Smoke, Surprise, Wiscobee, Pickerel, Half Moon, Round, Long, Chain, Boulder, Christie, Finnegan, Mary, Moody, Porcupine, Shadow.

Waterbody:	Shoreland Survey:	Coarse Woody Habitat Survey:	Aquatic Plant Survey:
• Sunrise	July, 2023	July, 2023	July, 2023
• Crooked	July, 2023	July, 2023	July, 2023
• Gilkey	July, 2023	July, 2023	July, 2023
• Bass	July, 2023	July, 2023	July, 2023
• Yankee	July, 2023	July, 2023	July, 2023
• Boundary	Aug, 2023	Aug, 2023	Aug, 2023

Deliverable/Outcomes. Spatial data will be displayed on maps and data will be summarized in tables and graphs. This information will be interpreted in **mini-reports** (written for a citizen audience) developed for each lake. A **summary report** will be developed for comparison of results from **all study lakes**. These results will be used in the development of LMPs (Lake Management Plans).

Goal 2. Develop a scientific understanding of aquatic plants and AIS (Aquatic Invasive Species) in the lakes and develop new bathymetric maps.

Activity. Characterize the aquatic plant community in each lake using WDNR point-intercept methodology along with visual observations. Sample grids will be obtained from WDNR. During summer months, the WDNR lake biologist will inventory lakes and collect data for new bathymetric maps. Data will be collected electronically and provided to UWSP for processing and generation of summary statistics and maps of key attributes and species for inclusion in the reports.

All research completed for lakes: Bear, Leigh, Machickanee, Maiden, Munger, Oconto Falls, Paya, Rost, Waubee, Anderson, Bass, Boot, Grindle, John, Ranch, Cooley, Bear Paw, Nelligan, Pecor, White, White Potato, Grignon, Little Pickeral, Pickeral, Pine Ridge, Smoke, Surprise, Wiscobee, Pickerel, Half Moon, Round, Long, Chain, Boulder.

Deliverable/Outcomes. Spatial data will be displayed on maps and data will be summarized in tables or graphs. This information will be interpreted in a *mini-report developed for each lake*. Bathymetric maps will be developed for each lake. A summary report will be developed for comparison of results from all study lakes.

<u>Waterbody:</u>	<u>Data collection/generation of Bathymetric map</u>	
• Christie	Summer 2022	Spring 2023
• Finnegan	Summer 2022	Spring 2023
• Mary	Summer 2022	Spring 2023
• Moody	Summer 2022	Spring 2023
• Porcupine	Summer 2022	Spring 2023
• Shadow	Summer 2022	Spring 2023
• Sunrise	Summer 2023	Spring 2024
• Crooked/Gilkey/Bass	Summer 2023	Spring 2024
• Yankee	Summer 2023	Spring 2024
• Boundary	Summer 2023	Spring 2024

Goal 3. Develop a scientific understanding of lake water quality and its relationship to land use.

Activity 1. Characterize the water quality and sources of pollutants in the lakes. This effort will include the collection of integrated samples from the deep holes of each lake **between June and mid-September** for evaluation of nutrients and algal response and comparison to P criteria. **DACT, a measure of the mobile herbicide atrazine, will be analyzed in June or early July samples.** Once during **spring and fall overturn**, integrated samples will be collected from each lake for evaluation of nutrients, groundwater inputs, minerals, color, and alkalinity. During each winter, the extent of oxygen depletion and hypolimnion in the lakes will be assessed by measuring temperature and dissolved oxygen profiles. LDO meters have been purchased for use by County staff and volunteers. WISCALM protocol will be used for sample acquisition and timing. Sample preparation and shipping will follow QC procedures required for analysis at state-certified labs. Overturn samples (10 total) will be analyzed for alkalinity, ammonium, calcium and total hardness, chloride, color, nitrate+nitrite (N), ammonium, potassium, reactive P, sodium, sulfate, total Kjeldahl nitrogen, and total P. **WDNR will collect 3 summer samples** from each lake (15 TP and Chl a) and **UWSP will collect 1 summer sample** from each lake (5 TP, Chl a, DACT). In Year 2, UWSP will collect all of the samples (25 TP & Chl a, 5 DACT). WDNR samples will be analyzed by the SLH (not grant funded), and UWSP samples will be analyzed by UWSP's WEAL. **Land & Water Conservation and UW-Extension staff will take winter temperature and Dissolved Oxygen measurements of the lakes.**

All research, under this Goal, has been completed for lakes: Bear, Leigh, Machickanee, Maiden, Munger, Oconto Falls, Paya, Rost, Waubee Lake, Anderson, Bass, Boot, Grindle, John, Ranch, Green, Shay, Star, Ucil, Underwood, Wescott, Cooley, Bear Paw, Nelligan, Pecor, White, White Potato, Grignon, Little Pickeral, Pickerel, Pine Ridge, Smoke, Surprise, Wiscobee.

Waterbody:	4 Samples Taken June-September	1 Winter Sample to be taken
• Pickerel	TB 2021 ; 2 nd readings 2022	March 2022
• Half Moon	TB 2021 ; 2 nd readings 2022	March 2022
• Round	TB 2021 ; 2 nd readings 2022	March 2022
• Long	TB 2021 ; 2 nd readings 2022	March 2022
• Chain	TB 2021 ; 2 nd readings 2022	March 2022
• Boulder	TB 2021 ; 2 nd readings 2022	March 2022
• Christie	TB 2022 ; 2 nd readings 2023	February 2023
• Finnegan	TB 2022 ; 2 nd readings 2023	February 2023
• Mary	TB 2022 ; 2 nd readings 2023	February 2023
• Moody	TB 2022 ; 2 nd readings 2023	February 2023
• Porcupine	TB 2022 ; 2 nd readings 2023	February 2023
• Shadow	TB 2022 ; 2 nd readings 2023	February 2023

Deliverable/Outcomes. Water quality data will be summarized for each lake by season and parameter. Profiles will be graphed. Results will be compared with important thresholds such as the Wisconsin P criteria. Data will be interpreted and included in the mini-reports for each lake as well as the summary report for the group of lakes.

Activity 2. Estimate the areas that are contributing groundwater to the lakes based on a **GFlow Model**. In areas with porous substrate, the groundwater contributing areas are not coincident to a lake's surface water watershed, so a different approach needs to be taken. Groundwater can contribute a large amount of the water to the lakes and can carry with it minerals and pollutants. Therefore, understanding the groundwater contributing areas can be an important part of lake management. To understand groundwater contributions to the lakes, this information will be used with land use data in the lake nutrient models. The USGS, WGNHS and U.S. Forest Service are currently developing a groundwater flow model using GFlow for the Nicolet National Forest. We will use the base model they have developed to develop models around the Oconto County lakes. GIS and topographic maps will be used to develop refined stream elevations that will be added to the USGS/WGNHS base GFlow Model. Particle tracking will be used to identify contributing areas.

All research completed for lakes: Bear, Leigh, Machickanee, Maiden, Munger, Oconto Falls, Paya, Rost, Waubee, Anderson, Bass, Boot, Grindle, John, Ranch, Green, Shay, Star, Ucil, Underwood, Wescott, Cooley, Bear Paw, Nelligan, Pecor, White, White Potato, Grignon, Little Pickeral, Pickerel, Pine Ridge, Smoke, Surprise, Wiscobee Lakes.

Waterbody:	GFlow Model	Nutrient Model
• Pickerel	Summer 2022	Winter 2022
• Half Moon	Summer 2022	Winter 2022
• Round	Summer 2022	Winter 2022
• Long	Summer 2022	Winter 2022
• Chain	Summer 2022	Winter 2022
• Boulder	Summer 2022	Winter 2022

- Christie Summer 2023 Winter 2023
- Finnegan Summer 2023 Winter 2023
- Mary Summer 2023 Winter 2023
- Moody Summer 2023 Winter 2023
- Porcupine Summer 2023 Winter 2023
- Shadow Summer 2023 Winter 2023
- Sunrise ***Dates to be determined 2024***
- Crooked, Gilkey, Bass
- Yankee
- Boundary

Deliverable/Outcomes. Groundwater contributing areas and surface watersheds for the lakes as GIS shapefiles and maps to be included in the mini-reports and the summary report.

Activity 3. Nutrient models will be developed to characterize the sources of nutrients to the lakes. Ultimately, this information will inform strategies to reduce nutrients to the lakes, which will be done by the County and during the development of the LMPs in Phase 2. Surface runoff/phosphorus loading based on export rates for different land uses. Surface watersheds will be delineated using Wisconsin Surface Water Viewer and GIS with 30 meter DEMs. We will explore the characterization of the surface hydrology of the watersheds using WDNR EVAAL modeling. Land management in the watersheds will be based on USGS land cover and aerial photographs. Inlake phosphorus concentrations will be simulated using mass balance/steady-state models combining annual average phosphorus loads, hydrologic budgets and in-lake sedimentation.

All research completed for lakes: Bear, Leigh, Machickanee, Maiden, Munger, Oconto Falls, Paya, Rost, Waubee, Anderson, Bass, Boot, Grindle, John, Ranch, Green, Shay, Star, Ucil, Underwood, Wescott, Cooley, Bear Paw, Nelligan, Pecor, White, White Potato, Grignon, Little Pickeral, Pickerel, Pine Ridge, Smoke, Surprise, Wiscobee Lakes.

Deliverable/Outcomes Graphs of the results and a brief interpretation will be included in the mini-reports and summary reports for this project.

Goal 4. Assess the capacity of groups and lakefront property owners to implement management strategies. When needed, work towards building capacity.

Activity 1. Meet your Scientist/Capacity Building Events. Provides an opportunity for scientists and lakefront property owners, elected officials, and others to learn about current issues/concerns on a lake, learn about the project, and assess the capacity for lake partners to plan and implement actions. Follow-up gatherings may be planned. Predominantly during the summer; however, some capacity building activities may be ongoing throughout the project. For efficiency, multiple gatherings for different lakes will occur on a given day. Ideally, this would occur during the first year of study of the lake groups. We will meet to discuss the project and learn about lake-specific issues. Scientists, UW-Extension, and county staff will facilitate these sessions. Capacity evaluation will be conducted and strategies will be developed to address lakes in need of capacity building. Measures will be taken to enhance capacity. **Multiple meetings have been held for lakes:** Bear, Leigh, Machickanee, Maiden, Munger, Oconto Falls, Paya, Rost, Waubee, Anderson, Bass, Boot, Grindle, John, Ranch, Green, Shay, Star, Ucil, Underwood, Wescott, Cooley, Bear Paw, Nelligan, Pecor, White, White Potato, Grignon, Little Pickeral, Pickerel, Pine Ridge, Smoke, Surprise, Wiscobee Lakes.

Deliverable/Outcomes. These meetings are intended as a first step in relationship building between the study team, local stakeholders, and local groups associated with each lake. Information shared during the meetings and important considerations or issues generated at these meetings will be collected and summarized. Additional needs for capacity development will be identified.

Final Lake Plans will be completed after the Summary Reports have been published and the public develops strategies to address the report's findings after the Planning Meetings and any subsequent meetings.

Waterbody:	Meet Your Scientist/ Public Meetings	** Planning Meetings	Summary Lake Report
• Grignon	Sep 24, 2020	Feb 21, 2023	Fall 2022
• Pickerel Chain	Sep 23, 2020	Feb 21, 2023	Fall 2022
• Pine Ridge	Sep 24, 2020	Feb 28, 2023	Fall 2022
• Surprise	Sep 23, 2020	Feb 28, 2023	Fall 2022
• <u>Wiscobee</u>	<u>Sep 24, 2020</u>	<u>Feb 21, 2023</u>	<u>Fall 2022</u>
• Pickerel	May 6, 2021	Winter 2023	Fall 2023
• Half Moon	May 6, 2021	Winter 2023	Fall 2023
• Round	May 6, 2021	Winter 2023	Fall 2023
• Long	May 6, 2021	Winter 2023	Fall 2023
• Chain	May 11, 2021	Winter 2023	Fall 2023
• <u>Boulder</u>	<u>May 11, 2021</u>	<u>Winter 2023</u>	<u>Fall 2023</u>
• Christie	March 15, 2022	Winter 2024	Fall 2024
• Finnegan	March 22, 2022	Winter 2024	Fall 2024
• Mary	March 15, 2022	Winter 2024	Fall 2024
• Moody	March 22, 2022	Winter 2024	Fall 2024
• Porcupine	March 22, 2022	Winter 2024	Fall 2024
• <u>Shadow</u>	<u>March 15, 2022</u>	<u>Winter 2024</u>	<u>Fall 2024</u>
• Sunrise	March 7, 2023		
• Crooked, Gilkey, Bass	March 7, 2023		
• Yankee	March 14, 2023	New Lakes	
• Boundary	March 14, 2023		

**These planning meetings will begin once researched information on the waterbodies have been compiled.

Goal 5. Develop a scientific understanding of the social setting associated with the lakes in Oconto County.

Activity. Conduct a **Socioeconomic Community Survey**. Priority is being given to understanding the decision-making context for lake management in Oconto County that will influence the successful implementation of lake management efforts. To support this process during the first years of the project, a scientific sample of 400+ community members are to be asked to participate in a community wide survey used to gather data on attitudes toward lakes, relative importance of water management activities, and economic impact of water-related recreation and associated tourism activities. A stratified random sample representing key community stakeholder groups (rural, suburban, and urban) will be followed.

Deliverable/Outcomes. The result of the **socioeconomic community survey** has been compiled into a report highlighting the key findings that have aided the development of the first lake management plans. The report was presented as part of a small group workshop to disseminate results to key project partners (create a unified strategic response to major objectives) and develop key social objectives for the individual lake management plans, make recommendations for the lake property owner surveys, and develop a narrative version of the survey results to be shared with the public including county board supervisors.

Major Projects Completed:

1. [County-wide survey complete](#): 400 Respondents, Published & Results presented to Oconto County Board of Supervisors on **January 18, 2018**.
2. [Presentations on progress](#): given to (1) **Oconto County Land & Water Conservation Committee** and **Waterways – Citizen Advisory Committee (W-CAC)** on *December 2017 and January 2018*. **WDNR Administration on June 2019, County Board of Supervisors in February of 2018 and an update in 2020**.
3. [Operational Strategy & Plan Document created](#): developed, published & presented to County Board of Supervisors with Oconto County **adoption, January 2018**.
4. [Individual property lake surveys](#) are available for the on-going lake studies. Please go online to the Oconto County website to fill out survey. **Everyone's perspective matters!**

For more information on the Oconto County Lakes Project, contact:

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Go to County website: www.co.oconto.wi.us/321/County-wide-Lake-Study

For these documents:

1. *Operational Strategy and Plan for Surface Water Management and Protection-*
 2. *County-wide Lake Survey Results-*
 3. *Individual Lake Summary Reports & Plans-*
 4. *Individual Lake Surveys-*
 5. *Oconto County Lakes Project Update* (This Document)
 6. *Archived Lake Planning ZOOM sessions*
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