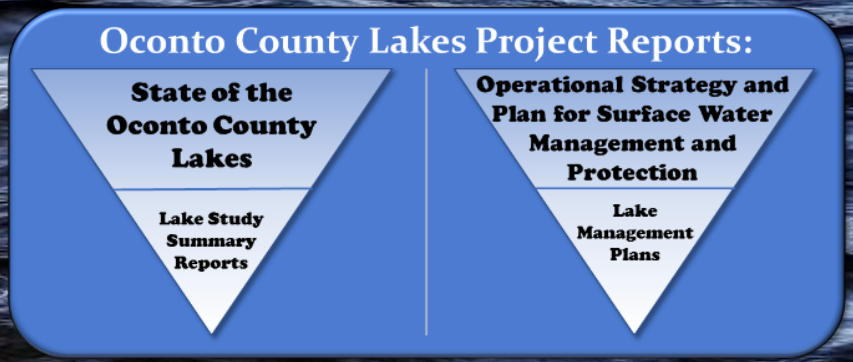
Oconto County Lakes Project

ANDERSON LAKE MANAGEMENT PLAN

2020



VISION

The Anderson Lake Association, Inc. endeavors to be a steward of the lake for people, wildlife, and future generations. It will support activities that maintain the natural ecological balance and preserve the environment contributing to the lake.

Anderson Lake Management Plan

The authors would like to acknowledge the commitment and enthusiasm of the Anderson Lake Association, Oconto County Lakes & Waterways Association, Oconto County Land and Water Conservation Department, UW Extension – Oconto County, Wisconsin Department of Natural Resources, UW-Stevens Point Water and Environmental Analysis Laboratory, landowners in the Anderson Lake watershed, and participants in the Oconto County Lakes Project.

This plan was prepared by the Center for Watershed Science and Education at University of Wisconsin – Stevens Point.

Along with the Oconto County Lakes Project participants, the following individuals and organizations contributed to the content of this plan.

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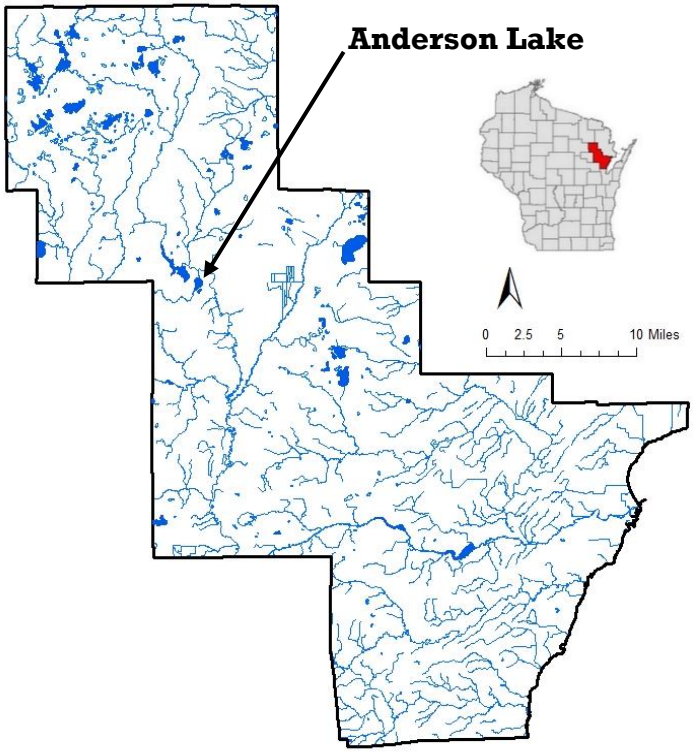
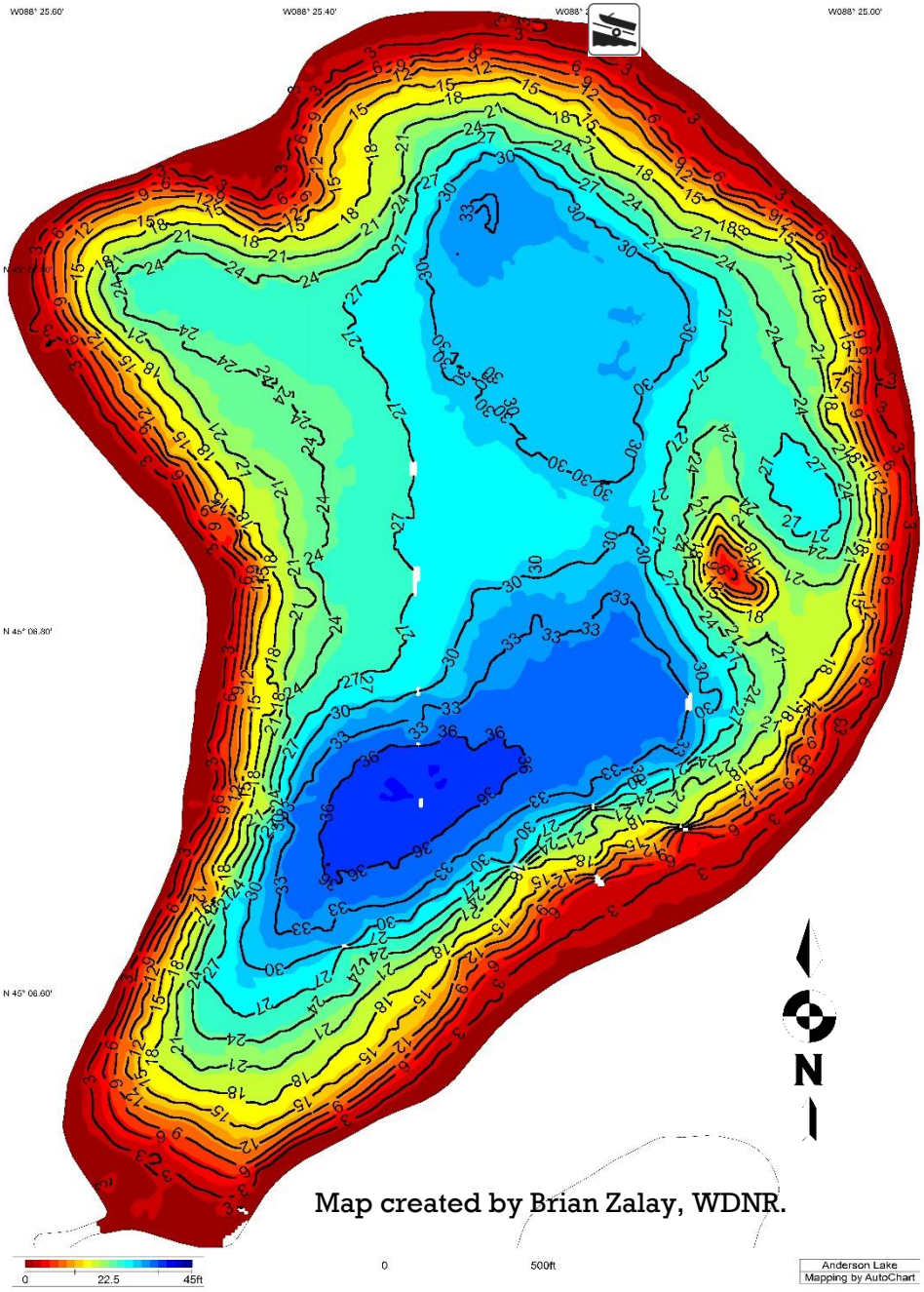
Resource	Acronym or Truncated Name
Anderson Lake Association	ALA
Citizen Lake Monitoring Network	CLMN
Clean Boats Clean Waters	CBCW
Lumberjack Resource Conservation & Development Council	LRCD
Oconto County Land Conservation Dept.	OC LCD
Oconto County Board of Supervisors	OC Board
Oconto County Lakes and Waterways Association	OCLAWA
Town of Breed	TOB
Town of Mountain	TOM
University of Wisconsin - Extension	UWEX
UWSP Water & Environmental Analysis Laboratory	WEAL
UWSP Center for Watershed Science and Education	CWSE
USDA Natural Resources Conservation Service	NRCS
Wisconsin Department of Natural Resources	WDNR
Wisconsin Department of Transportation	WDOT

Background

ABOUT ANDERSON LAKE

Anderson Lake is located in the Towns of Breed and Mountain, in northeast Wisconsin. This 177-acre drainage lake has a maximum depth of 40 feet with moderately clear water. Its bottom sediments are primarily muck and sand. Visitors have access to the lake from one public boat landing located on Anderson Lake which is owned by Oconto County. Water enters Anderson Lake from Weso Creek on the southwest side and leaves via a short reach of creek feeding the Oconto River to the north.





Map created by Brian Zalay, WDNR.

What Is A Lake Management Plan?

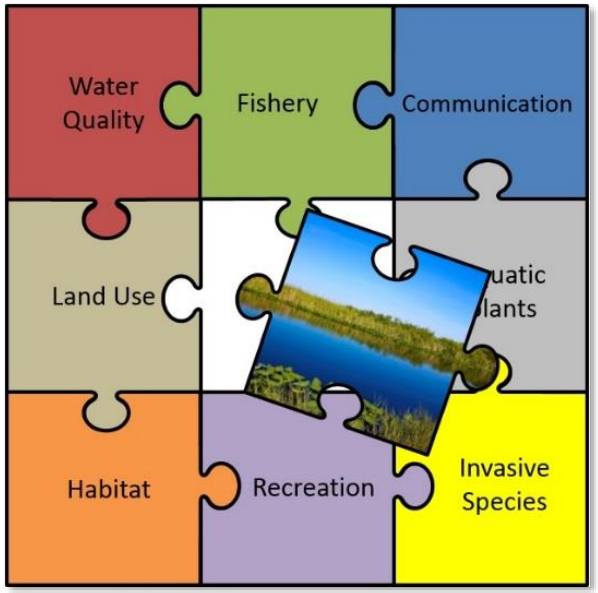
LAKE MANAGEMENT PLANS (LMP)

What is an LMP?

A management plan is a living document that changes over time to meet the current needs, challenges and desires of the lake and its community. Although each lake is different, the WDNR requires that each comprehensive lake management plan address a specific list of topics affecting the character of the lake, whether each topic has been identified as a priority, or as simply something to consider. In this way, every LMP considers the many aspects associated with lakes.

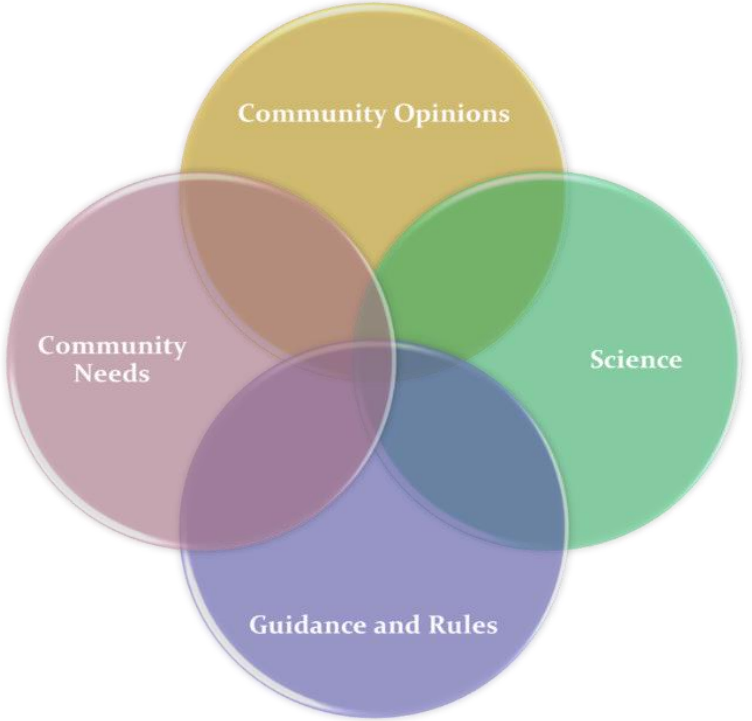
What is the purpose of this LMP?

This plan was created to ensure that Anderson Lake is healthy now and for future generations. It was designed to learn about Anderson Lake and identify features important to the Anderson Lake community, in order to provide a framework for the protection and improvement of the lake.



Implementing the content of this LMP will enable citizens and others to work together to achieve the vision for Anderson Lake now and in the years to come. It is a dynamic document that identifies goals and action items for the purpose of maintaining, protecting and/or creating desired conditions in the lake and identifies steps to correct past problems, improve on current conditions, and provide guidance for future boards, lake users, and technical experts.

Because many entities are involved in lake and land management, it can be challenging to navigate the roles, partnerships and resources that are available. The planning process and content of this plan have been designed to identify where some key assistance exists. The actions identified in this LMP can serve as a gateway for obtaining grant funding and other resources to help implement activities outlined in the plan.



How Was This Plan Created?

ABOUT THIS PLAN

One of the first steps in creating this plan was to gather and compile data about the lake and its ecosystem to understand past and current conditions. This was done in 2017-2018 alongside 5 other lakes as part of the Oconto County Lakes Project. The project was initiated by citizens in the Oconto County Lakes and Waterways Association who encouraged Oconto County to prioritize lake interests. This effort led to funding from the WDNR Lake Protection Grant Program. There was insufficient data available for many of the lakes to evaluate current water quality, aquatic plant communities, invasive species, and shorelands. The data that were available had been collected at differing frequencies or periods of time, making it difficult to compare lake conditions. Professionals and students from UW-Stevens Point, Oconto County Land Conservation Department, UW Extension, Oconto County citizens and WDNR staff collected the data for use in the development of lake management plans. Sources of information used in the planning process are listed at the end of this document.

Reports from the Anderson Lake Study and the materials associated with the planning process and reports can be found on the Oconto County website: **www.co.oconto.wi.us** and navigating to Departments>Land Conservation>County Waterways>County-wide Lake Study.

THE PLANNING PROCESS

Who created the strategic plan?

This plan is the result of a stakeholder-driven effort which involved many partners combining insight, knowledge, and expertise throughout the process. Members of the lake association, area residents, lake users, and representatives of local municipalities gathered at a public meeting held on August 23, 2019 at the Mountain Community Center to learn from one another and make decisions about the fishery, water quality, habitat, and land management in the Anderson Lake watershed. Technical assistance during the planning process was provided by staff from OCLCD, UWEX, WDNR, and the CWSE.

How were various opinions incorporated?

Participation in the planning process was open to everyone and was encouraged by letters mailed to Anderson Lake waterfront property owners and by press releases in local newspapers. In addition, those individuals and organizations who provided their information were provided with emails about upcoming meetings, which could be forwarded to additional contact lists. To involve and collect input from as many people as possible, including those who might not be able to attend the public meetings, an online survey was conducted. Property owners and interested lake users were notified about the survey and how to access it via direct mailings to waterfront property owners and associated lake organizations and press releases in local newspapers. The surveys could be filled out anonymously online, or paper copies were available upon request. Survey questions and responses were shared at the planning sessions and can be found in the Appendix.

How Is This Management Plan Used?

Who will use this plan?

- **Individuals:** Individuals can use this plan to learn about the lake they love and their connection to it. People living near Anderson Lake can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **Anderson Lake Association:** This plan provides the Association with guidance for the whole lake and lists options that can easily be prioritized. Resources and funding opportunities for lake management activities are made more available by placement of goals into the lake management plan, and the Association can identify partners to help achieve their goals for the lake.
- **Neighboring lake groups, sporting and conservation clubs:** Groups with similar goals for lake stewardship can combine their efforts and provide each other with support, improve competitiveness for funding opportunities, and make efforts more fun.
- **The Towns of Breed and Mountain:** Municipalities can utilize the visions, objectives, and goals documented in this lake management plan when considering town-level planning or decisions within the watershed that may affect the lake.
- **Oconto County:** County professionals will better know how to identify needs, provide support, base decisions, and allocate resources to assist in lake-related efforts documented in this plan. This plan can also inform county board supervisors in decisions related to Oconto County lakes, streams, wetlands, and groundwater.
- **Wisconsin Department of Natural Resources (WDNR):** Professionals working with lakes in Oconto County can use this plan as guidance for management activities and decisions related to the management of the resource, including the fishery, and invasive species. LMPs help them to identify and prioritize needs, and where to apply resources. A well thought out lake management plan increases an application's competitiveness for funding from the State.

Who can help implement this plan?

Lead persons and resources are identified under each action in this plan. These individuals and organizations are able to provide information, suggestions, or services to achieve goals. The table on page 2 lists organization names and their common acronyms used in this plan. This list should not be considered all-inclusive – assistance may also be provided by other entities, consultants, and organizations.

Management Plan Structure

GOALS FOR ANDERSON LAKE

The foundation of any effective strategic plan is clear identification of goals and the steps needed to achieve the goals. The selected goals should achieve the overall vision for Anderson Lake. This plan also identifies available resources within each objective.

The topics comprise the chapters in this plan and have been grouped as follows:

In-Lake Habitat and a Healthy Lake

Fish Community—fish species, abundance, size, important habitat and other needs

Aquatic Plant Community—habitat, food, health, native species, and invasive species

Critical Habitat—areas of special importance to the wildlife, fish, water quality, and aesthetics of the lake

Landscapes and the Lake

Water Quality—water chemistry, clarity, contaminants, lake levels

Shorelands—habitat, erosion, contaminant filtering, water quality, vegetation, access

Watershed—land use, management practices, conservation programs

People and the Lake

Recreation—access, sharing the lake, informing lake users, rules

Communication and Organization—maintaining connections for partnerships, implementation, community involvement

Updates & Revisions—plan for maintaining a living document

Anderson Lake Management Plan Goals

Goals for Anderson Lake

The following goals and actions were derived from the values and concerns of citizens interested in Anderson Lake and members of the planning committee, as well as the known science about Anderson Lake, its ecosystem and the landscape within its watershed.

Implementing and regularly updating the goals and actions in this plan will ensure that the vision is supported and that changes are incorporated into the plan.

LIST OF GOALS

Goal 1	**Maintain a healthy, well-balanced fishery in Anderson Lake.**
Goal 2	**Anderson Lake will maintain a healthy and diverse aquatic plant community.**
Goal 3	**Sensitive areas and those that provide essential habitat and/or water quality benefits, will be protected.**
Goal 4	**Property owners within Anderson Lake's watershed will understand their connection to the lake and will know about and utilize resources for healthy land management practices.**
Goal 5	**Anderson Lake will have healthy shorelands that protect water quality and provide essential habitat.**
Goal 6	**Maintain or improve water quality in Anderson Lake.**
Goal 7	**Lake users will be informed about and respectful of Anderson Lake.**
Goal 8	**Increase participation in lake stewardship.**
Goal 9	**Review plan annually and update as needed.**

Fish Community

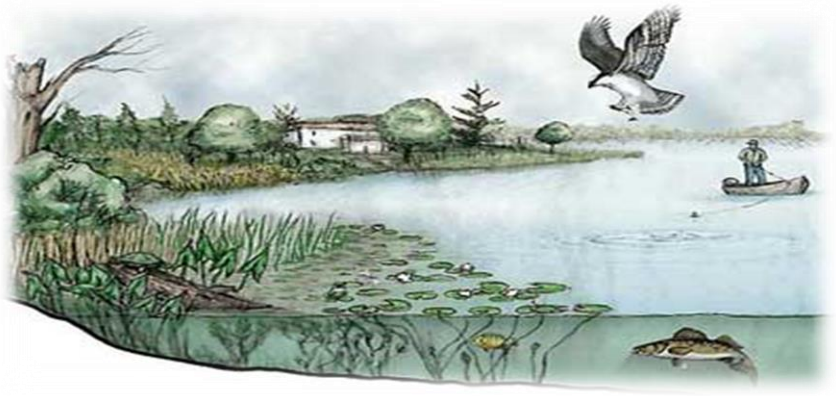
IN-LAKE HABITAT AND A HEALTHY LAKE

The health of one part of the lake system affects the health of the rest of the plant and animal community, the experiences of the people seeking pleasure at the lake, and the quality and quantity of water in the lake. Habitat is the structure for a healthy fishery and wildlife community. It can provide shelter for some animals and food for others. Many animals that live in and near the lake are only successful if their habitat needs are met.

What is lake-habitat?

Healthy lake-habitat in Anderson Lake includes native aquatic plants and shoreland vegetation, as well as tree branches/limbs above and below the water.

Habitat exists within the lake, along the shoreland, and even extends into its watershed for some wildlife species. Native vegetation (including wetlands) along the shoreline and connected to the lake provides shelter and food for waterfowl, small mammals, turtles, frogs, and fish. Native plants in and near the lake can also improve water quality and balance water quantity. Aquatic plants infuse oxygen into the water, which is



essential for the fish community. Some lake visitors such as birds, frogs, and turtles use limbs from trees that are sticking out of the water for perches or to warm themselves in the sun. The types and abundance of plants and animals that comprise the lake community also vary based on the water quality, and the health and characteristics of the shoreland and watershed.

The Fish Community

A balanced fish community has a mix of predator and prey species, each with different food, habitat, nesting substrate, and water quality needs to flourish.

What can affect the fishery?

Activities in and around a lake that can affect a fishery include:

- disturbances to the native aquatic plant community or substrate,
- excessive additions of nutrients or harmful chemicals,
- removal of woody habitat,
- shoreline alterations,
- shoreland erosion can cause sediment to settle onto the substrate, causing the degradation of spawning habitat.

What People Value about Anderson Lake

Swimming and various watercraft activities in a safe environment
Small peaceful lake with friendly people and low boat traffic
Fishing, view
Peaceful family getaway
Not busy, good neighbors
Close to home
Bird watching
Good water quality

Habitat provides shelter and food for fish and wildlife.

Fish Community

Can the fishery be improved?

Managing a lake for a balanced fishery can result in fewer expenses to lake stewards and the public. While some efforts may be required to provide a more suitable environment to meet the needs of the fish, they usually do not have to be repeated on a frequent basis. Ideally, a lake contains the habitat, water quality, and food necessary to support the fish communities present within the lake and provide fishing opportunities for people without a lot of supplemental effort and associated expenses to maintain these conditions:

- Protecting existing habitat such as emergent, aquatic, and shoreland vegetation, and allowing trees that naturally fall into the lake to remain in the lake, are free of cost.
- Restoring habitat in and around a lake can have an up-front cost, but the effects will often continue for decades.
- Costs in time, travel, and other expenses are associated with routine efforts such as fish stocking and aeration.

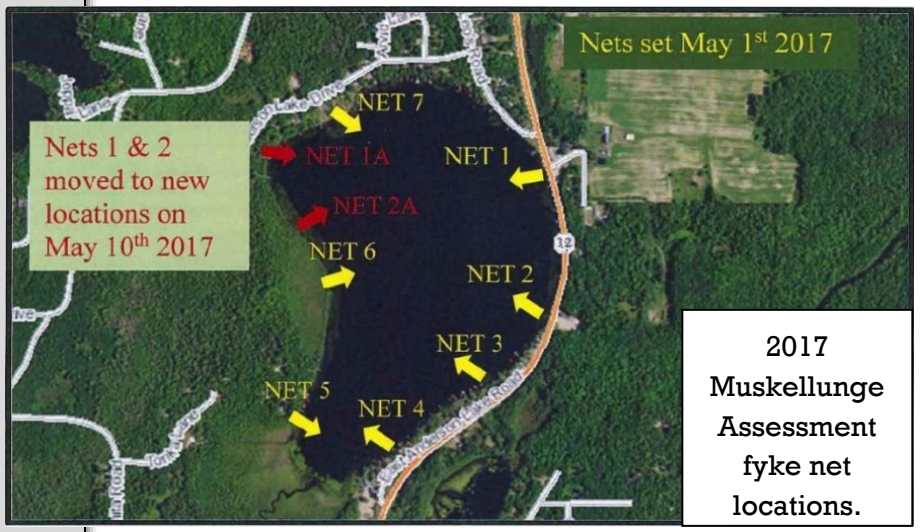
Stocking Date	Species	# Stocked	Avg. Length (in)
1962	Walleye	35000	
1964	Walleye	35000	
1966	Walleye	35000	
1988	Walleye	1000	4
1988	Walleye	600	7
1989	Walleye	300	13
1989	Walleye	800	7
1990	Walleye	1000	7
1992	Walleye	4669	3
1992	Walleye	2125	7
1994	Walleye	9044	3.6
1994	Walleye	1600	9
1996	Walleye	8411	1.6
1997	Walleye	9000	2.7
1998	Walleye	9000	1.2
2000	Walleye	9000	1.7
2004	Walleye	8980	2
2006	Walleye	6355	1.4
2008	Walleye	6364	1.4
2009	Muskellunge	257	9
2010	Muskellunge	56	10.8
2010	Walleye	6300	1.4
2012	Walleye	6297	1.6
2013	Muskellunge	135	13.3
2014	Walleye	3544	7.3
2015	Muskellunge	532	13.6
2016	Walleye	3566	7.9
2016	Muskellunge	200	13.9
2017	Muskellunge	300	17
2018	Walleye	3537	7.7

Anderson Lake supports a good overall fishery with many species showing increases in abundance, size structure, or both compared to the 2001 survey. As a Great Lakes spotted muskellunge brood source lake, there is a 50" minimum on musky fishing since 2012. In 2009, 9 fish stick clusters were installed along the west shore, though they weren't observed during the 2017 shoreland survey (they may have been pulled to deeper water by ice). In 1987, a walleye spawning reef was constructed along the east shore. In 2001, a rock reef was installed on Weso Creek near Weso Creek Road.

Fish Community

Anderson Lake 2012 Fish Survey Summary

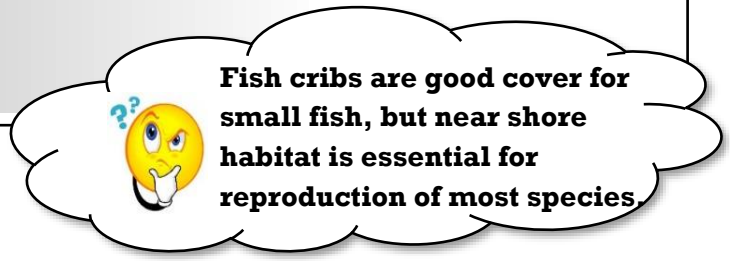
- ✓ A previous survey was conducted in 2001.
- ✓ Fishing regulations follow general inland lake regulations with the exception of muskellunge, which has a special regulation of 50" minimum.
- ✓ Anderson is a brood stock lake for Great Lakes spotted musky as part of the Green Bay Restoration Project starting in 2009. No musky were captured during the 2012 survey or a during the 2017 Muskellunge Assessment.
- ✓ Walleye are stocked by DNR every other year since 1988 at a rate of 35 to 50/acre.
- ✓ 13 species collected during 2012 survey. Most abundant were bluegill (36%), northern pike (18%), black crappie (15%), walleye (11%), and largemouth bass (9%).
- ✓ Black crappie have increased. Average length 8.9".
- ✓ Many more bluegill than 2001. Average length 6.6".
- ✓ Similar largemouth bass abundance but size structure has improved with 56% at 14" or greater.
- ✓ High density of small northern pike with slow growth rates. Average length was 17.7" with a population of 3.2/acre (compared to 1.6/acre in 2001). Poor size structure with only 13% greater than 21".
- ✓ Walleye have excellent size structure and fast growth rates. Average length is 19.4" with an estimated 1/acre (compared to 1.1/acre in 2001). Anderson Lake is part of the Wisconsin Walleye Initiative program and is considered a sentinel (study) lake, with 20/acre large fingerling walleye stocked in "even" years beginning in 2014. Nighttime electrofishing surveys are conducted each fall. There is no evidence of natural reproduction, so stocking is necessary to maintain.
- ✓ The next comprehensive fish survey is scheduled for 2022.



2017 Muskellunge Assessment fyke net locations.

Good fishing doesn't just happen. It's the result of clean water and abundant spawning habitat found in lakes and rivers that still have plenty of natural shoreline.

Fish Community



Goal 1. Maintain a healthy, well-balanced fishery in Anderson Lake.

Objective 1.1 Continue to enhance fish habitat in Anderson Lake.

Actions	Lead person/group	Resources	Timeline
Continue to identify willing property owners for fish stick installations. Track and map these installations as they occur. 10% of properties with fish stick clusters (or at least 250 logs/mile) is recommended. Also identify properties seeking tree removal (>35 feet from water's edge) as a source of material.	ALA	WDNR-Tammie Paoli	2020-2025
Explore installation of fish cribs to add woody structure to lake.	ALA	WDNR-Tammie Paoli	Ongoing
Educate property owners about healthy shoreland habitat and its importance to having a healthy fishery. See **Shorelands** section.	ALA		Ongoing

Objective 1.1 Continue to augment fish populations as appropriate.

Actions	Lead person/group	Resources	Timeline
Continue stocking walleye fingerlings and spotted musky yearlings.	WDNR	WDNR-Tammie Paoli	Ongoing, as appropriate
Evaluate the effectiveness and survival of stocked walleye and Great Lakes Spotted Muskellunge and adjust stocking strategies and rates as needed.	WDNR	WDNR-Tammie Paoli	Ongoing, as appropriate

Aquatic Plant Community

Native plants provide essential food and habitat for fish and wildlife.

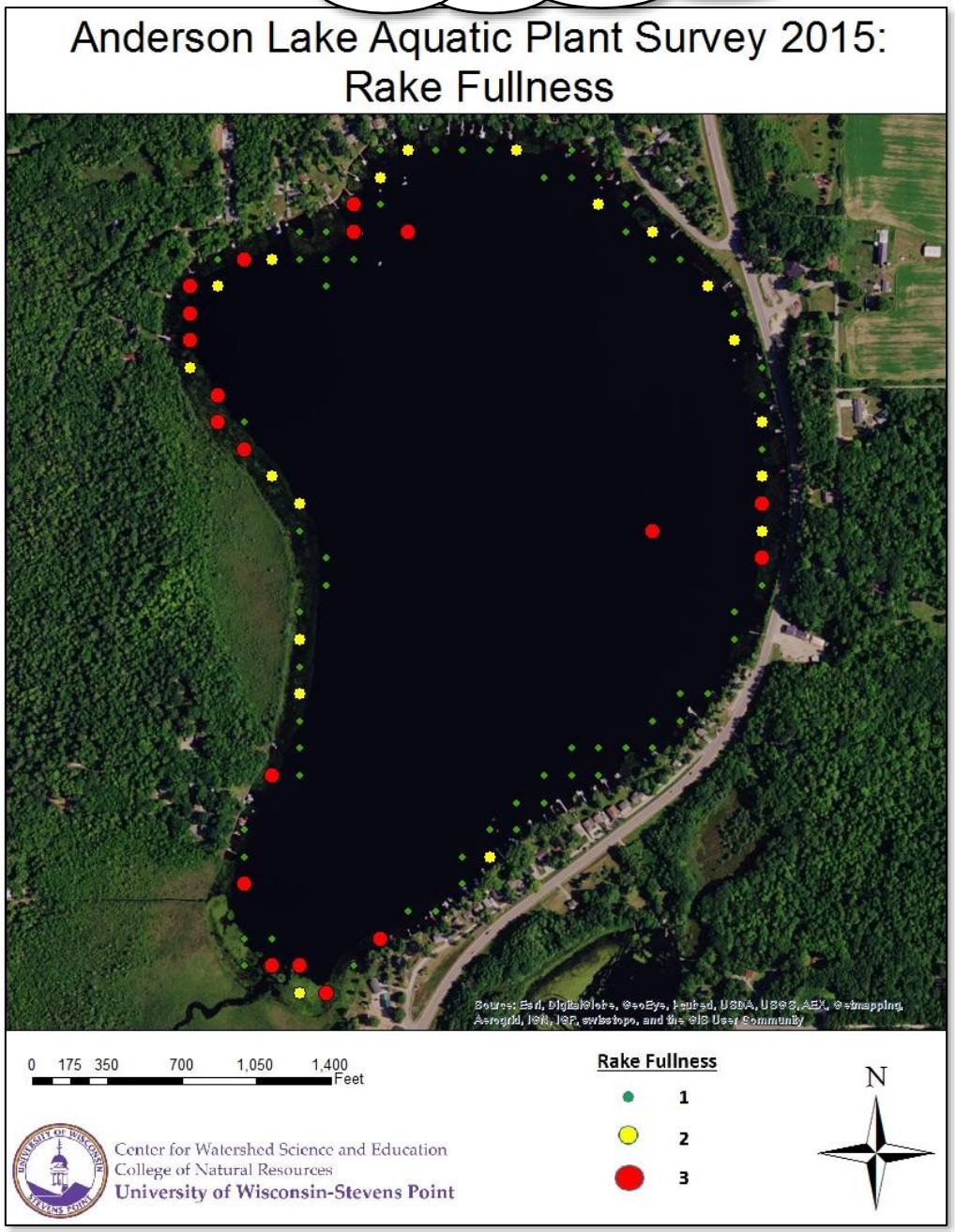
Aquatic Plants

Aquatic plants provide the forested landscape within Anderson Lake. They provide food and habitat for spawning, breeding, and survival for a wide range of inhabitants and lake visitors including fish, waterfowl, turtles, amphibians, as well as invertebrates and other animals. They improve water quality by releasing oxygen into the water and utilizing nutrients that would otherwise be used by algae. A healthy lake typically has a variety of aquatic plant species, which makes the aquatic plant community more resilient and can help to prevent the establishment of non-native aquatic species. Additionally, they stabilize the bottom sediment and help filter out the suspended sediment from the water column.

Aquatic plants near shore and in shallows provide food, shelter, and nesting material for shoreland mammals, shorebirds and waterfowl. It is not unusual for otters, beavers, muskrats, weasels, and deer to be seen along a shoreline in their search for food, water or nesting material. Aquatic plants also serve as indicator species for environmental stressors that could be occurring in a lake or river, such as a runoff event.

Anderson Lake 2016 Aquatic Plant Survey Highlights

- ✓ 22% (99 of 459) of the sites visited had vegetative growth.
- ✓ The greatest depth aquatic plants were found was 11 feet.
- ✓ 31 species of aquatic plants were identified. This is well above the North Central Hardwood average of 16.2.
- ✓ The three most dominate species were northern water-milfoil (41%), water star-grass (39%), and water marigold (30%).
- ✓ The Floristic Quality Index (FQI) was 32.6. The northcentral hardwood average is 23.3.
- ✓ Eurasian water-milfoil was observed at one location, but has since been mapped more extensively.



Aquatic Plant Community

Northern water-milfoil is a native plant whose leaves and fruits are consumed by a variety of waterfowl. Beds can become thick, offering shade and shelter for fish, but can inhibit recreational uses. It can be distinguished from invasive milfoil by counting leaflets (5-12 pairs).

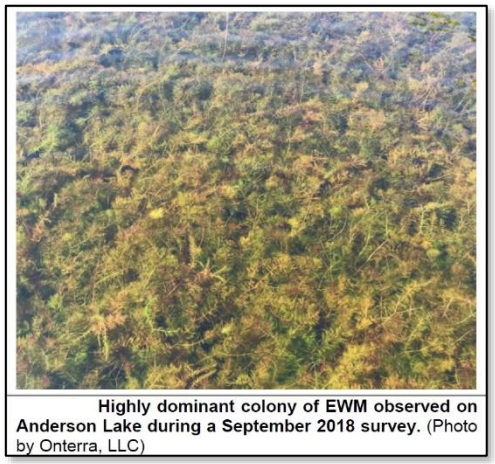
Water star-grass can grow up to 6 feet long and form floating colonies with bright, yellow star-shaped flowers above the water surface. It is important food for geese and ducks and offers cover and forage for fish.

Water marigold, like water star-grass, is a submergent species with emergent flowers. Typically growing in shallow water, its seeds are eaten by wood ducks.

Aquatic Invasive Species (AIS)

Aquatic invasive species are non-native aquatic plants and animals that are most often unintentionally introduced into lakes by lake users. This commonly occurs on trailers, boats, equipment, and from the release of bait. In some lakes, aquatic invasive plant species can exist as a part of the plant community, while in other lakes populations explode, creating dense beds that can damage boat motors, make areas non-navigable, inhibit activities like swimming and fishing, and disrupt the lakes' ecosystems.

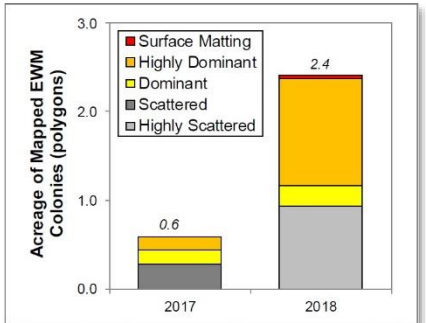
Eurasian water-milfoil



Highly dominant colony of EWM observed on Anderson Lake during a September 2018 survey. (Photo by Onterra, LLC)

Eurasian water-milfoil (EWM) is one of the most common invasive aquatic plants in Wisconsin. It can from dense mats that choke out native plants and inhibit navigation. New plants can grow from stem fragments that root on contact with the substrate. EWM was first documented on Anderson Lake in 2015 and observed at one location (near the boat launch) during the 2016 survey. Onterra was contracted to conduct a meander-based EWM survey in late-summer of 2017. A WDNR Early Detection and Response Grant was acquired to fund additional mapping which took place on September 10, 2018 by Onterra.

EWM populations rose quickly throughout the development of this plan. Onterra has been contracted by the lake group for management and control. Their latest report, *2019 EWM Monitoring and Control Report*, is included as Appendix D.



Acreage of Eurasian watermilfoil found in Anderson Lake from 2017 to 2018. Created using data from Onterra late-season EWM surveys.

Aquatic Plant Community

Chinese and Banded Mystery Snail

Chinese mystery snails and banded mystery snails were documented in Anderson Lake in August 2016. These snails compete with native snails for food and habitat, can serve as hosts for parasites and invade largemouth bass nests. Like other invasives, they are primarily spread by recreational boaters and can survive up to a month out of water, making their transport between waterbodies easy.

Rusty Crayfish

Rusty crayfish, verified in Anderson Lake, tend to displace native crayfish and reduce aquatic plant abundance and diversity (which can lead to increased turbidity and algae blooms).

A point-intercept survey per the DNR protocol is recommended every 5 years to detect changes in the plant community and detect any additional AIS. If new areas of Eurasian watermilfoil are found and the lake chooses to address it with chemicals, it is important to separate the surveyor from the herbicide applicator or the firm who is doing the control work. This eliminates the "fox guarding the henhouse" factor. AIS control projects that implement this strategy tend to be more successful.

Aquatic Plant Management in Anderson Lake

Management strategies in Anderson Lake were designed to achieve a balance between healthy aquatic habitat, good water quality, and eradication of invasive species.

Management Options for Invasive Species or Nuisance Native Aquatic Plants

Management options that offer the most practical and effective approaches for managing EWM (or other invasive species), while minimizing impacts to Anderson Lake as a whole, have been identified. Depending upon conditions, the following options may be used alone or in combination with others. Complete eradication is rare and may not be achievable.

No Action. No permit required.

In some lakes, EWM populations do not, or only periodically, reach nuisance levels. Anderson Lake has a narrow littoral area where plant growth is limited to a band around the edge of the lake as shown in the Rake Fullness figure above. Lake groups may decide to monitor the population and establish a threshold for action, but otherwise, let it be. Landowners may hand-pull invasive plants on their own without a permit in addition to their 30-foot lake access area.

Hand-pulling. No permit required.

Hand-pulling (either by volunteers or contractors) is the preferred method for removing EWM. Additionally, lakefront property owners are allowed to manually remove native aquatic plants from an area up to 30 feet wide without a permit for swimming and boat access (this does not include the excavation or removal of any bottom sediments). Any denuded lakebed is prime real estate for invasive species, however, and close monitoring is necessary to ensure no populations are established.

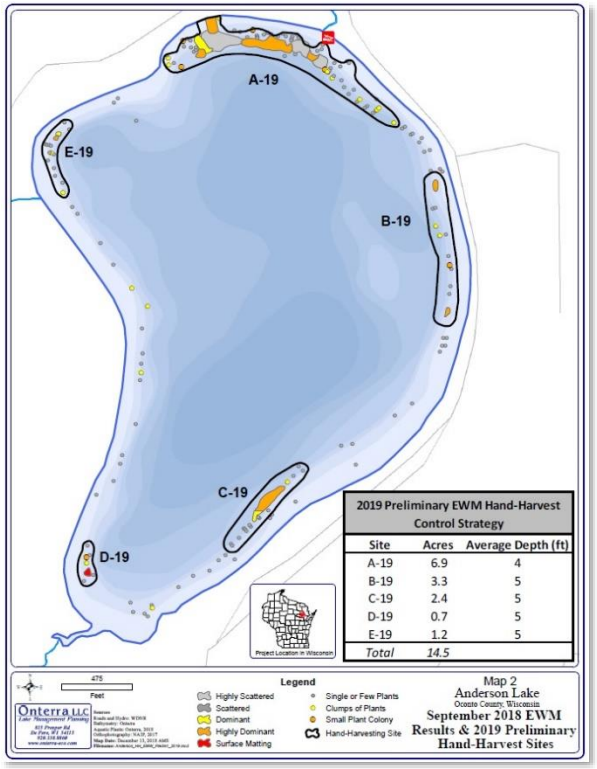
Aquatic Plant Community

EWM has most often been observed in Anderson Lake typically as a few isolated plants. Vigilance is required to address these populations while they are still small. Hand -pulling in these situations is the best approach (chemicals are reserved for large beds or lake-wide infestations). The plant spreads through fragmentation, so care to remove the entire plant, roots and all, is necessary. Dispose of away from the water's edge.

In 2019, the ALA chose to implement a two-tiered hand-harvesting strategy including a significant volunteer effort to manually remove EWM and assist DASH contractors.

Diver Assisted Suction Harvesting (DASH). Permit required.

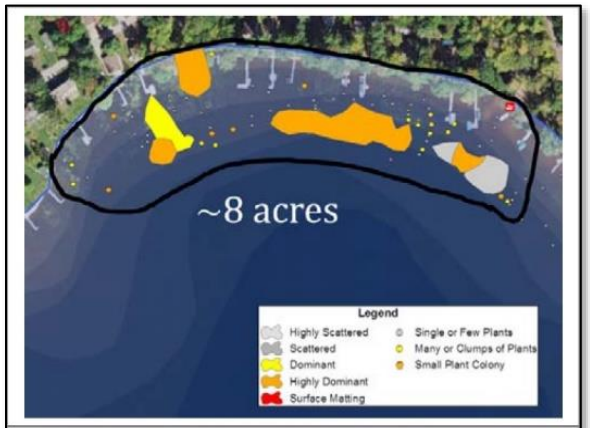
Some populations may be in areas of a lake (deep) that are problematic for hand pulling. DASH, a method where divers guide target plants into a suction device that is filtered on the other end, is an efficient way to access these areas while still thoroughly removing all plant fragments.



In 2019, the ALA contracted for 8 days of DASH for EWM removal within the target areas, with A-19 set as a priority area. Area A-19 grew larger than expected and DASH was not a viable option. Rather, approximately 4,000 pounds of EWM were removed from Areas E-19, B-19, D-19 and part of C-19.

Chemical Treatment: Spot Permit required.

If EWM beds exceed a certain size (typically >1 acre), hand removal may not be practical. In this case, targeting specific beds with herbicide is an option. Though less destructive the lake ecosystem than whole-lake treatment, the herbicide will dilute into a larger area given enough time, so potential collateral damage to native and sensitive species should be considered. An area of about 8 acres was identified on the north side of the lake for a potential spot treatment (estimated $6,000 in 2018). Some lake wide impacts are predicted.



Potential EWM Spot Treatment.

Chemical Treatment: Whole-lake Permit required.

Lake-wide treatment distributes herbicide throughout the entire lake. Water volume is calculated (while considering the thermocline) to achieve a target chemical concentration in lake water. Whole-lake treatment tends to reduce populations for a time (typically 4-6 years) resulting in less frequent applications. Because every lake responds a little differently, regular (perhaps annually) point intercept surveys are required to monitor the native plant community and measure efficacy of chemical applications.

Aquatic Plant Community

Aquatic Plant Management Plan Review

A good aquatic plant management plan strategy should reduce the amount of management activity needed as time goes on. In Anderson Lake, a series of successful strategies (integrated plant management) should lead to a balance between healthy aquatic habitat, water quality, and recreation with minimal annual management.

Goal 2. Anderson Lake will maintain a healthy and diverse aquatic plant community.

Objective 2.1 Control Eurasian water-milfoil populations in Anderson Lake to maintain good recreational access. Ensure no new populations are introduced.

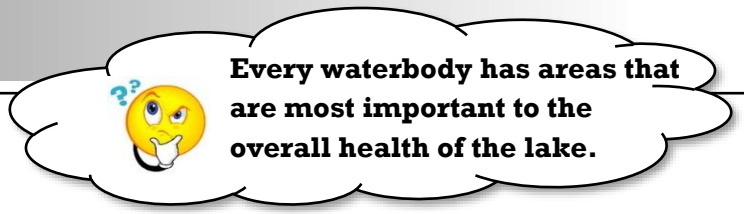
Actions	Lead person/group	Resources	Timeline
Encourage/host training, develop coasters or placemats for area businesses, provide brochures for rental properties, etc. on how to identify and properly remove invasive species, particularly EWM. The more people who know how to recognize EWM, the more eyes there are on the lake.	ALA	WDNR LRCD	Ongoing
Educate lake users on importance of native aquatic plants for preventing AIS. Bring in speaker for annual meeting, mail literature to property owners, include information in a newsletter, etc.	ALA	WDNR UWEX-Lakes LRCD	Ongoing
Participate in Clean Boats Clean Waters program. Identify volunteers or consider paying someone to staff the boat launch on busy days.	ALA	CBCW	Ongoing, in summer
Support/organize volunteer crews in monitoring for and removing new populations of EWM. Map and track these observations.	ALA	WDNR	Ongoing
Hire professionals for EWM survey/removal annually (or as needed) to assess EWM population and identify new populations. Prioritize non-chemical control as much as possible.	ALA	Consultants WDNR	Annually, as needed
Hire DASH contractors (and/or volunteers) to identify deeper populations of EWM and remove these plants, as necessary. Seek cost-share and grant funding for these activities where available.	ALA	WDNR grants OCLCD cost share	Ongoing
Proceed with whole-lake herbicide treatment.	ALA	WDNR Consultants	2021-2023
Form a lake district to fund management of invasive species (EWM).	ALA	UWEX-Lakes OCLCD	2020

Explore use of 'curtain' to contain spot treatment in target area, especially near the lake's outlet.	ALA	WDNR	As needed
Explore water-level drawdown to combat invasive species, excessive plant growth, and compact sediments. Approximately 2 vertical feet is impounded by the dam at the north end.	ALA	WDNR Consultants	2020
If a new AIS is suspected or observed, follow the guidance in **Appendix B**.	ALA Lake users	WDNR	Ongoing
Consider applying for AEPP grant to obtain an Aquatic Plant Management plan (a blueprint that is more detailed and specific to aquatic plant management than the comprehensive management plan).	ALA	WDNR-Brenda Nordin	2021-2022

Objective 2.2 Minimize disturbance to native aquatic plants.

Actions	**Lead person/group**	**Resources**	**Timeline**
Inform property owners of the importance of native aquatic vegetation to impede the establishment of additional AIS, provide food and habitat for wildlife, and protect the shoreline via educational materials provided at the annual meeting, direct mailings and in a newsletter.	ALA	WDNR-Brenda Nordin	Ongoing
Encourage landowners to limit plant removal to invasive species or skimming off those that have become unrooted and free-floating. If plants severely impede recreation, consider hand-pulling small areas around private docks (within WDNR guidelines). Cleared lakebed is ideal habitat for AIS to become established, so be vigilant about watching for AIS in these areas.	ALA	WDNR-Brenda Nordin	Ongoing
Regularly monitor aquatic plant community to detect any changes in lake conditions and ensure stable populations. A point-intercept survey is recommended.	ALA	WDNR-Brenda Nordin Consultants	Every 5-10 years.
Reduce nutrient and sediment loading to lake by improving shoreland buffers (see **Shorelands** section) and implementing BMPs in the watershed (see **Watershed** section).	ALA	WDNR-Brenda Nordin OCLCD	Ongoing

Critical Habitat



Critical Habitat

Special areas harbor habitat that is essential to the health of a lake and its inhabitants. In Wisconsin, critical habitat areas are identified by biologists and other lake professionals from the WDNR in order to protect features that are important to the overall health and integrity of the lake, including aquatic plants and animals. While every lake contains important natural features, not all lakes have official critical habitat designations. Designating areas of the lake as critical habitat enables these areas to be located on maps and information about their importance to be shared. Having a critical habitat designation on a lake can help lake groups and landowners plan waterfront projects that will minimize impact to important habitat, ultimately helping to ensure the long-term health of the lake.

Although Anderson Lake does not have an official critical habitat area designation, there are areas within Anderson Lake that are important for fish and wildlife. Natural, minimally-impacted areas with woody habitat such as logs, branches, and stumps; areas with emergent and other forms of aquatic vegetation; areas with overhanging vegetation; and wetlands are elements of good quality habitat. This is typical of the county-owned property on the west shore. Identifying other important areas around the lake that are important habitat and informing lake users of their value can help raise awareness for the protection of these areas.

Goal 3. Sensitive areas and those that provide essential habitat and/or water quality benefits, will be protected.

Objective 3.1 Identify and inform others of quality habitat in and around Anderson Lake.

Actions	Lead person/group	Resources	Timeline
Request a Critical Habitat Designation from WDNR.	ALA	WDNR-Brenda Nordin	2020
If critical habitat is designated on Anderson Lake, communicate to property owners, visitors, and Town Board as to why these areas are important.	ALA		TBD
Support landowners (particularly those with large stretches of natural shoreline such as the southeast side) interested in preserving natural and sensitive areas around the lake.	ALA	WDNR UWEX Northeast Wisconsin Land Trust	As available.

Watershed

LANDSCAPES AND THE LAKE

Anderson Lake Watershed

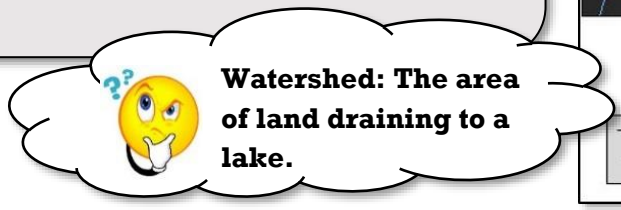
A Lake is a Reflection of its Watershed…

Understanding where Anderson Lake's water originates is important to understanding lake health. During snowmelt or rainstorms, water moves across the surface of the landscape (runoff) towards lower elevations such as lakes, streams, and wetlands. This area is called the watershed. Groundwater also feeds Anderson Lake; its land area may be slightly different than the surface watershed.

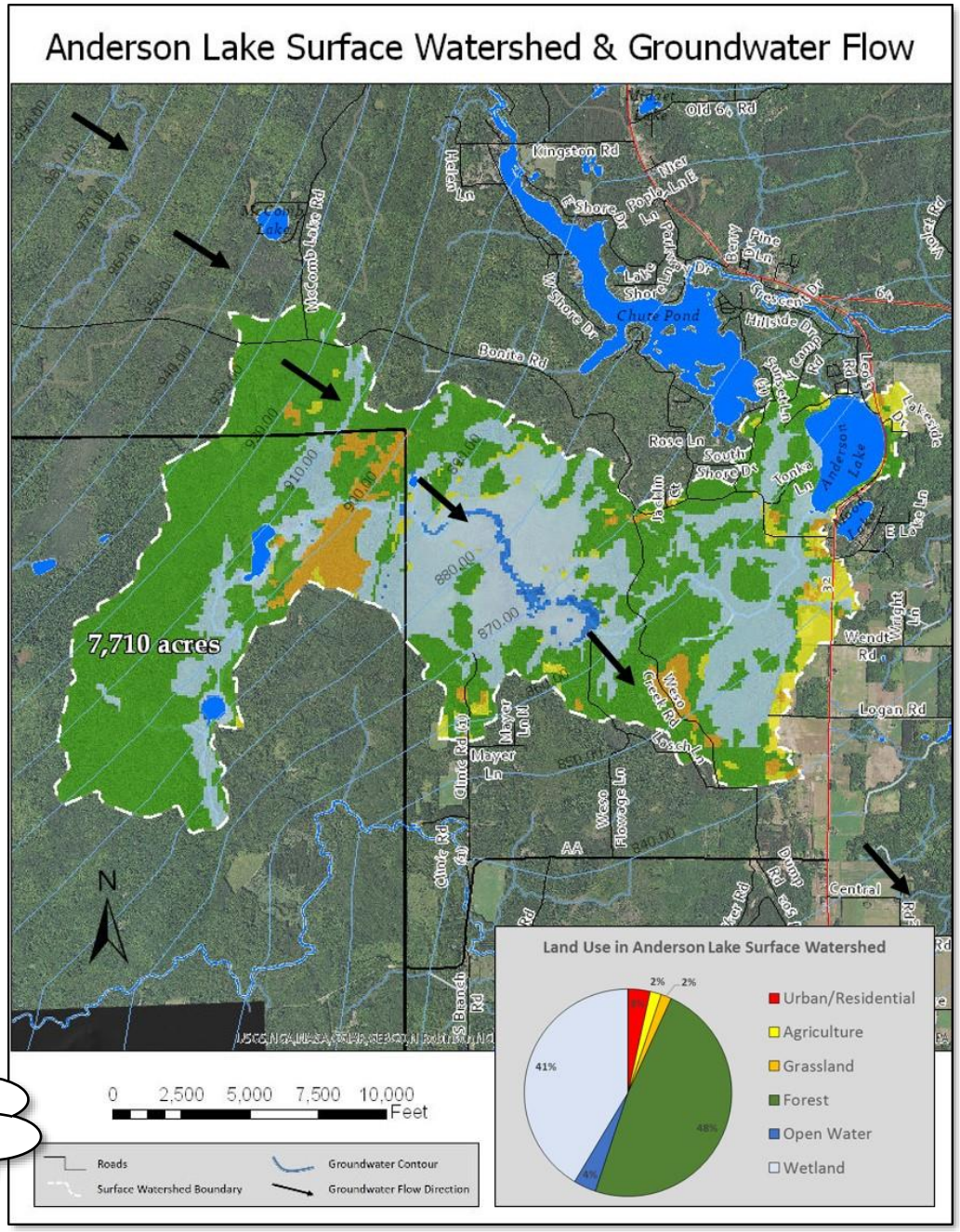
Less runoff is desirable because it allows more water to recharge the groundwater, which feeds the lake year-round - even during dry periods or when the lake is covered with ice. The capacity of the landscape to shed or hold water and contribute or filter particles determines the amount of erosion that may occur, the amount of groundwater feeding a lake, and the lake's water quality and quantity. Landscapes with greater capacities to hold water during rain events and snowmelt slow the delivery of the water to the lake.

Anderson Lake's Watershed

The Anderson Lake watershed is 7,710 acres. Primary land use is forest. The lake's shoreland is surrounded primarily by developed residential lots. In general, the land closest to the lake has the greatest immediate impact on water quality.



Watershed: The area of land draining to a lake.



Watershed

Why does land matter?

Land use and land management practices within the watershed can affect both its water quantity and quality. While forests, grasslands, and wetlands allow a fair amount of precipitation to soak into the ground, resulting in more groundwater and good water quality, other types of land uses may result in increased runoff and less groundwater recharge, and may also be sources of pollutants that can impact the lake and its inhabitants.

Soil and Erosion

Areas of land with exposed soil can produce soil erosion. Soil entering the lake can make the water cloudy and cover fish spawning beds. Soil also contains nutrients that increase the growth of algae and aquatic plants.

Development

Development on the land may result in changes to natural drainage patterns, alterations to vegetation on the landscape, and may be a source of pollutants. Impervious (hard) surfaces such as roads, rooftops, and compacted soil prevent rainfall from soaking into the ground, which may result in more runoff that carries pollutants to the lake. Wastewater, animal waste, and fertilizers and soaps containing phosphorus used on lawns, gardens and crops and in the lake can contribute nutrients that enhance the growth of algae and aquatic plants in our lakes.

What can be done?

Land management practices can be put into place that mimic some of the natural processes, and reduction or elimination of nutrients added to the landscape will help prevent the nutrients from reaching the water. In general, the land nearest the lake has the greatest impact on the lake water quality and habitat and is often the easiest to manage (own property, no politics, etc.).

Be Part of the Solution!

Practices designed to reduce runoff include:

- protecting/restoring wetlands,
- installing rain gardens, swales, rain barrels, and other practices that increase infiltration
- routing drainage from pavement and roofs away from the lake
- meandering lake access paths to minimize direct flow to the lake.

Practices used to help reduce nutrients from moving across the landscape towards the lake include:

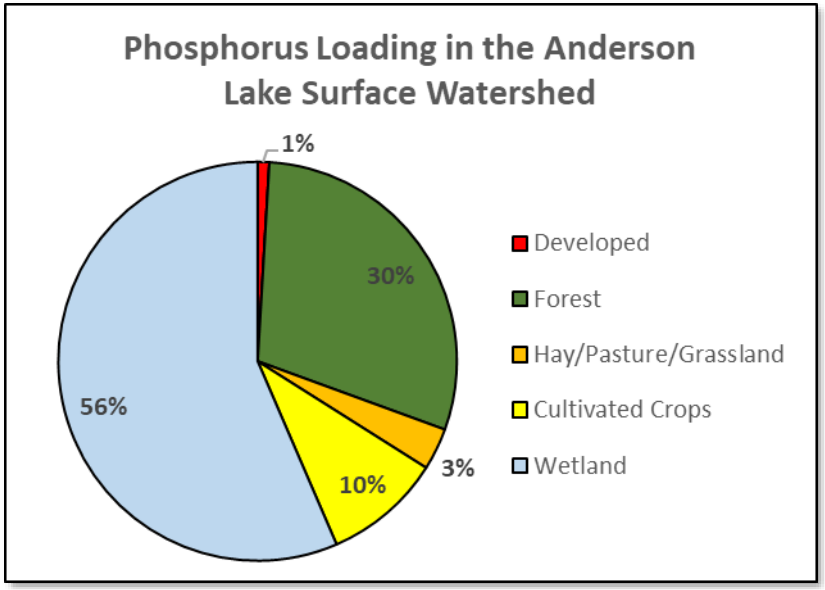
- eliminating/reducing the use of fertilizers,
- increasing the distance between the lake and a septic drainfield,
- protecting/restoring wetlands and native vegetation in the shoreland,
- controlling [illegible]
- manur[illegible]

Most of these activities are eligible for cost share and grant assistance!

Watershed

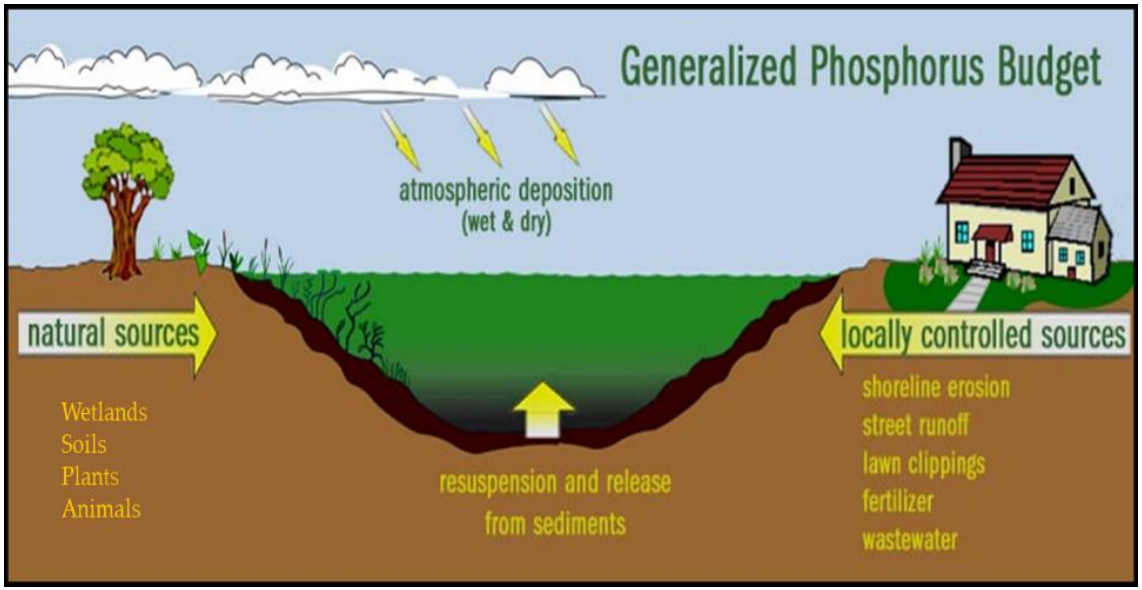
Phosphorus Modeling

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Anderson Lake. Land use in the surface watershed was evaluated and used to populate the Wisconsin Lakes Modeling Suite (WILMS) model. In general, each type of land use contributes different amounts of phosphorus in runoff and groundwater. The types of land management practices that are used and their distances from the lake also affect the contributions to the lake from a parcel of land. The phosphorus contributions by land use category, called phosphorus export coefficients, have been obtained from studies throughout Wisconsin (Panuska and Lillie, 1995). In the Anderson Lake watershed, the vast majority of these sources are natural and cannot be changed.



Phosphorus Loading in Anderson Lake Watershed

Based on modeling results, wetlands and forest had the greatest percentage of phosphorus contributions from the watershed. Though a smaller piece of the pie, efforts to reduce nutrient inputs to the lake must be focused on land uses that we have some control over such as agriculture and developed areas.



Goal 4. Property owners within Anderson Lake's watershed will understand their connection to the lake and will know about and utilize resources for healthy land management practices.

Objective 4.1 Support healthy land management practices in the Anderson Lake watershed to reduce sediment and nutrient loading.

Actions	Lead person/group	Resources	Timeline
Encourage the County to support and follow-up with water quality-based best management practices (BMPs) within the watershed.	ALA	OCLCD County Board Supervisors	Ongoing
Support landowners (consider financial support) interested in the protection of their land via a land conservation program (i.e. Conservation Easement, Purchase of Development Rights, or sale of land for protection).	ALA	WDNR Lake Protection Grants Knowles-Nelson Stewardship Fund Northeast WI Land Trust	As needed
Encourage any new developments to manage runoff on site and consider ways to minimize impacts from septic systems.	ALA	Towns of Breed and Mountain Developers/Builders	As needed
Protect wetlands to maintain the water budget of Anderson Lake. Any altered wetlands should be mitigated within the lake's watershed.	ALA Oconto County	WDNR	As needed
Encourage design of road and construction projects that will minimize impacts to the lakes.	ALA	Towns of Breed and Mountain OC Highway Department/WDOT	As needed
Work with highway department to limit use of salt on STH 32.	Oconto County	OC Highway Department/WDOT	As needed

Shorelands

90% of lake life spends all or part of their life in the near shore zone.

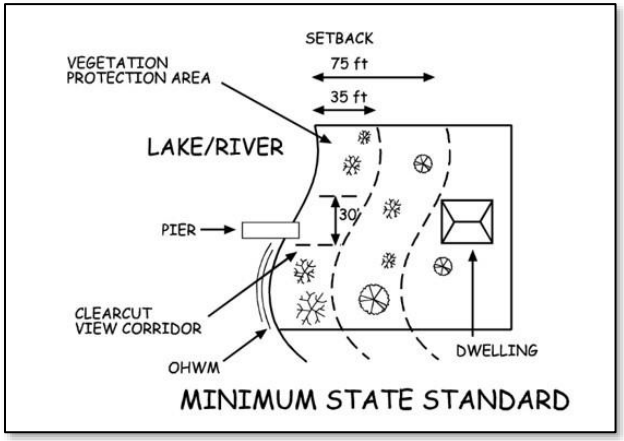
Shorelands

Shoreland vegetation is critical to a healthy lake ecosystem. It provides habitat for many aquatic and terrestrial animals including birds, frogs, turtles, and small and large mammals. It also helps to improve the quality of the runoff that is flowing across the landscape towards the lake.

Healthy shoreland vegetation includes a mix of unmowed grasses/flowers, shrubs, trees, and wetlands which extends at least 35 feet landward from the water's edge.

Shoreland ordinances have been in place since 1964 to improve water quality and habitat, and to protect our lakes. To protect our lakes, county and state (NR 115) shoreland ordinances state that vegetation should extend at least 35 feet inland from the water's edge, with the exception of an optional 30-foot wide view corridor for each shoreland lot. Although some properties were grandfathered in when the ordinance was initiated in 1966, following this guidance will benefit the health of the lake and its inhabitants.

Disturbed shoreland is measured as any shoreline without a shrub or herbaceous layer at the water's edge, regardless of buffer thickness. This may be a result of mowed lawn, artificial beach, etc.



Be Part of the Solution!

Follow Healthy Shoreland Practices

- Mow Less: The simplest, most affordable way to improve your shoreland is to reduce mowing near shore. Native vegetation will re-establish itself over time.
- Leave natural shoreland vegetation in place.
- Restore native shoreland vegetation where it is lacking.
- Plant attractive native species of grasses/flowers, shrubs and trees that will add interest and beauty to your property.
- Don't use fertilizers or herbicides, they may run into the lake. Test your soil to determine if fertilizer is warranted.
- Add or leave woody habitat near the shore. Turtles, birds, and fish love it!
- Never transplant water garden plants or aquarium plants into lakes, streams, or wetlands.
- Visit **www.healthylakeswi.com** for additional resources.

State Shoreland Zoning Ordinance

NR 115 Wisc. Adm. Code for Unincorporated Municipalities

No vegetation within 35 feet of the lake's edge shall be removed except for:

- Up to 30% of shoreline may be removed of shrubs and trees for a view corridor
- A mowed or constructed pedestrian path up to 5 feet wide to access lake

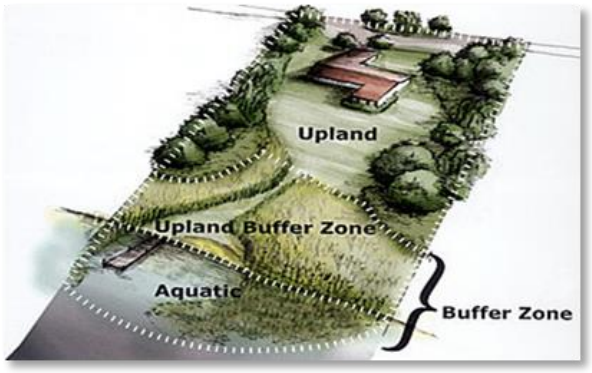
Coarse Woody Habitat (CWH)

Woody debris (i.e., branches, limbs, trees) that falls into the lake forms critical habitat for tiny aquatic organisms that feed bluegills, turtles, crayfish and other critters. Water insects such as mayflies graze on the algae that grow on decomposing wood. Dragonfly nymphs hunt for prey among the stems and branches. Largemouth and smallmouth bass often find food, shelter, or nesting habitat among these fallen trees.

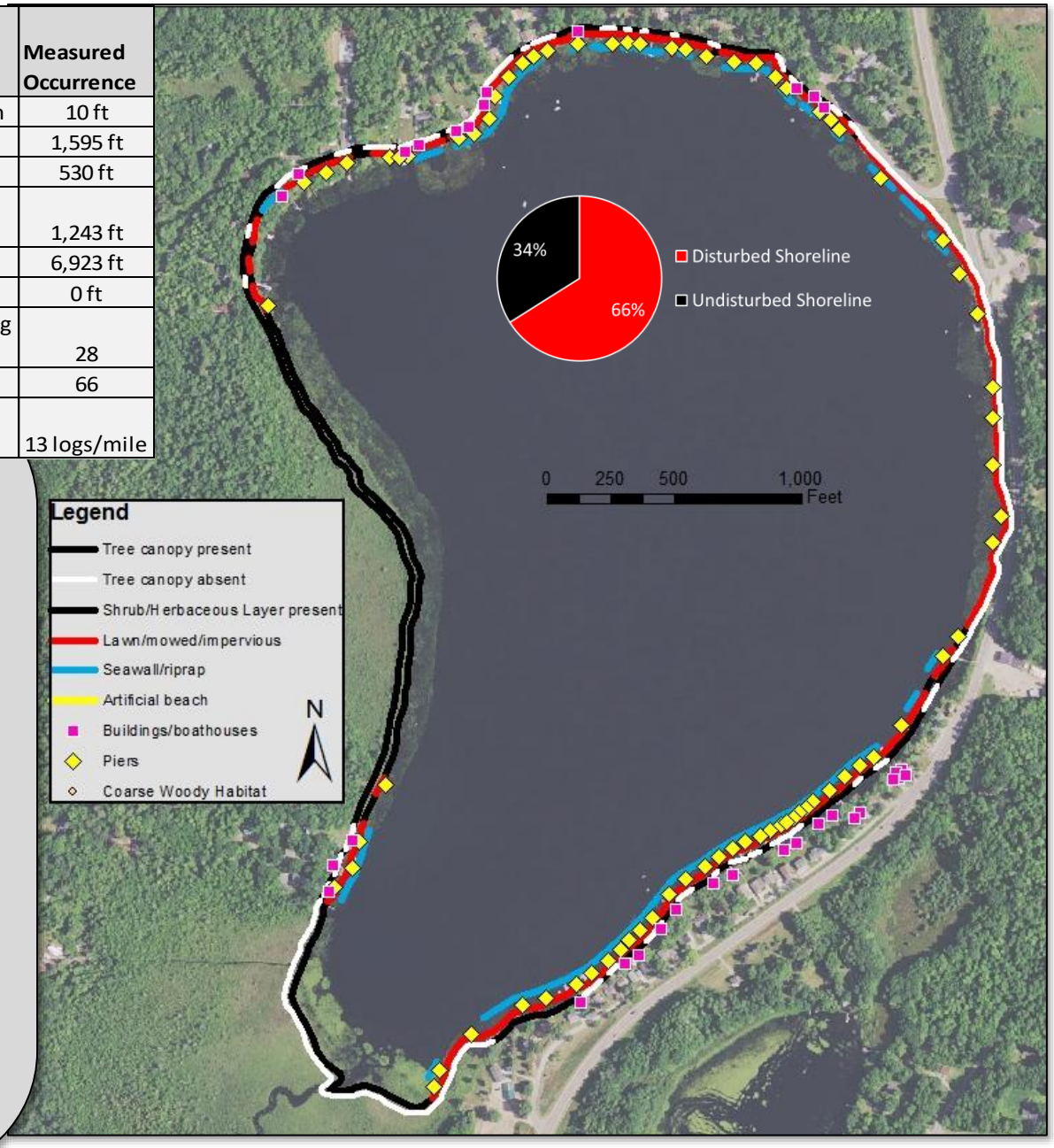
Above water, a fallen tree is like a dock for wildlife. Ducks and turtles sun themselves on the trunk, muskrats use the tree as a feeding platform, predators such as mink and otter hunt for prey in the vicinity of fallen wood, and dead trees that remain along the shoreline are used as perches by belted kingfishers, ospreys and songbirds.

Undeveloped lakes typically contain hundreds of 'logs per mile' while they may completely disappear on developed lakes. Unless it is a hazard to navigation or swimming, consider leaving woody debris in the water.

Shorelands



Modifications, Structures, Erosion	Measured Occurrence
Artificial Beach	10 ft
Rip Rap	1,595 ft
Sea Wall	530 ft
Impervious Surface	1,243 ft
Mowed Lawn	6,923 ft
Erosion	0 ft
Nonconforming Buildings	28
Piers	66
Coarse Woody Habitat	13 logs/mile



Anderson Lake's Shorelands

To better understand the health of Anderson Lake, shorelands were evaluated. The survey inventoried shoreland vegetation, erosion, riprap, barren ground, seawalls, structures, and docks. The majority of the 2.4 miles of shoreline is developed as homes and seasonal cottages. A total of 66 piers were counted during the survey (1/192 ft).

- With 90 lakefront lots, 2700 feet (21%) of disturbed shoreland is permitted. Based on the 2018 shoreland inventory, 66% (8378 feet) of Anderson Lake's shoreland was disturbed. Coarse woody habitat was measured at 13 logs/mile (250 logs/mile recommended.)
- As a whole, Anderson Lake had below average shoreland health compared to other lakes in the study. Some stretches of Anderson Lake's shorelands are in good shape, but many portions have challenges that should be addressed.

Shorelands

Anderson Lake 2017 Shoreland Survey Results			
Total lakefront footage	**# Riparian lots**	**Total allowable (NR115) disturbed shoreland**	**Measured disturbed shoreland**
12,681	90	2,700 feet (21%)	8,378 feet (66%)

Goal 5. Anderson Lake will have healthy shorelands that protect water quality and provide essential habitat.

Objective 5.1 Shoreland property owners will be knowledgeable about and make good decisions regarding their shoreland practices that result in good water quality and habitat. Over the next 5 years, 1,500 feet (or 300 feet/year for the next 5 years) of disturbed shoreland will be restored.

Actions	Lead person/group	Resources	Timeline
Provide informational materials to all shoreland property owners about basic lake stewardship including healthy shorelands and their composition (wildflowers, shrubs, trees, etc.). Include information on cost share programs.	ALA	OCLWA UWEX Lakes WDNR Healthy Lakes grants	Ongoing
Identify willing properties and install fish sticks to improve fish habitat (see **Fish Community** section, Objective 1.1)	ALA	OCLCD WDNR	Ongoing
Encourage and support shoreland owners interested in shoreland restoration (including rain gardens, diversion practices, infiltration practices, native plantings, no mow, or fish sticks). Include information on how and why to create healthy shorelands in a welcome packet to new property owners.	ALA	UWEX Lakes OCLCD WDNR Healthy Lakes Grants	Ongoing
Encourage those interested in shoreland restorations to contact the OCLCD for available resources.	ALA	OCLCD WDNR Healthy Lakes Grants	Ongoing
Host a speaker/demonstration: "How to restore your shoreline."	ALA	UWEX Lakes-Pat Goggin	2021-2022
Consider restoring and showcasing a "demonstration site" with a sign at the water's edge about shoreland restoration (perhaps at the boat launch or on one of the commercial properties).	ALA	OCLCD UWEX Lakes-Pat Goggin WDNR Healthy Lakes Grants	2021-2022
Explore purchase of undeveloped shoreland property.	ALA	UWEX Lakes Knowles-Nelson Stewardship Fund	As available

Water Quality

Water Quality

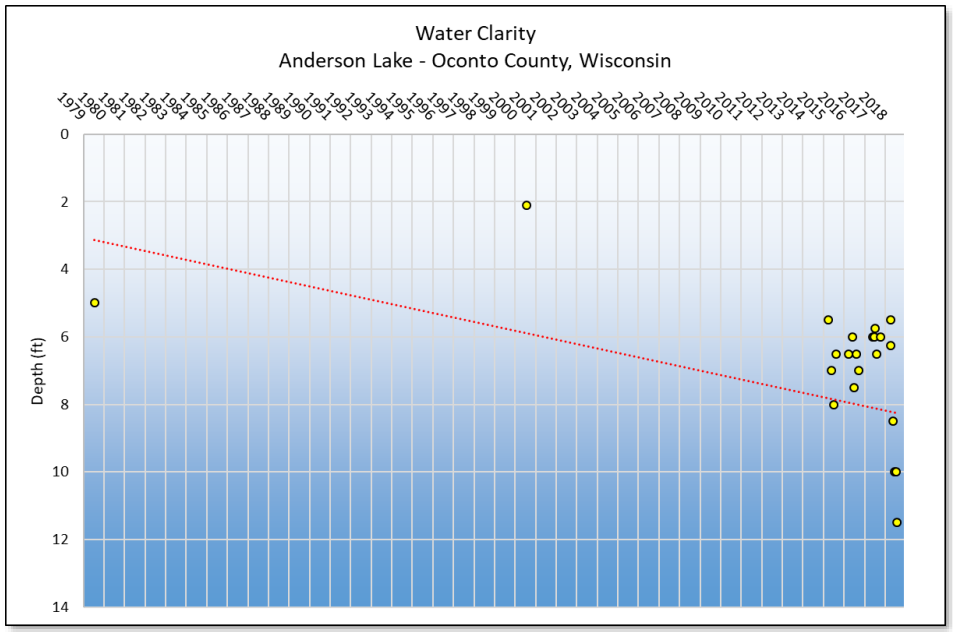
A variety of water chemistry measurements were used to characterize the water quality in Anderson Lake. Water quality was assessed during the 2017-2018 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). Nutrients are important measures of water quality in lakes because they contribute to algae and aquatic plant growth. Each of these interrelated measures plays a part in the lake's overall water quality. In addition, water quality data collected in past years was also reviewed to determine trends in Anderson Lake's water quality.

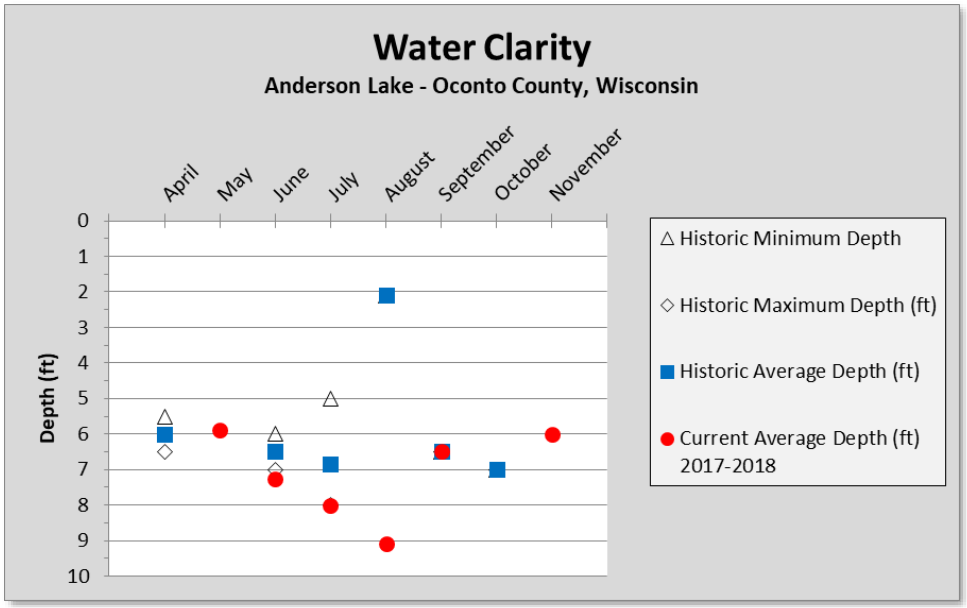
Water Clarity

Water clarity is a measure of how deep light can penetrate (Secchi depth). Clarity is affected by water color, turbidity, and algae and helps determine where rooted aquatic plants grow.

Anderson Lake's Water Quality Summary

- ✓ **Water clarity** ranged from 5.5-11.5 feet (considered good), which is generally better than historic measurements.
- ✓ Sufficient **dissolved oxygen** was present in at least the upper 10-12 feet of water at all times during the study.
- ✓ Concentrations of **contaminants** were all low during the study. Atrazine was not detected.
- ✓ **Phosphorus** concentrations remained below the standard of 30 ug/L throughout the study. Inorganic nitrogen remained well below concentrations that spur algal blooms.
- ✓ Water in the lake is calcium-rich (moderately hard), which helps reduce the impacts of phosphorus.

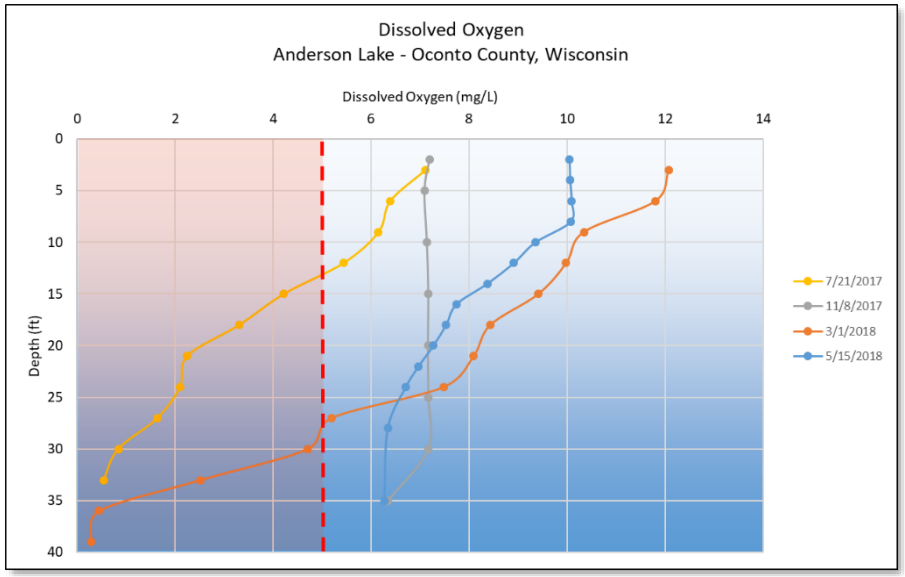




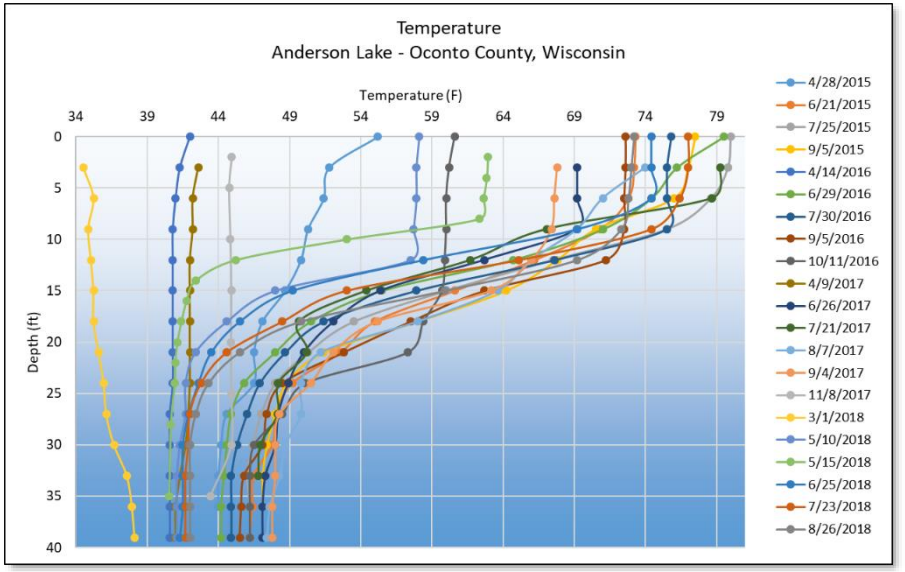
Water Quality

Dissolved oxygen

Dissolved oxygen is an important measure in Anderson Lake because a majority of organisms in the water depend on oxygen to survive. Oxygen is dissolved into the water from contact with air, which is increased by wind and wave action. Algae and aquatic plants also produce oxygen when sunlight enters the water, but the decomposition of dead plants and algae reduces oxygen in the lake.



Dissolved oxygen concentrations decline with depth as access to sources such as the atmosphere and growing plants is decreased. Oxygen levels in Anderson Lake are typically sufficient to support fish throughout the year but can shrink to as little as the top 10-12 feet of water column during summer (July 2017 profile). This is because Anderson Lake strongly stratifies during the summer at about 10 feet, which can more clearly be seen in the temperature profile.



Contaminants

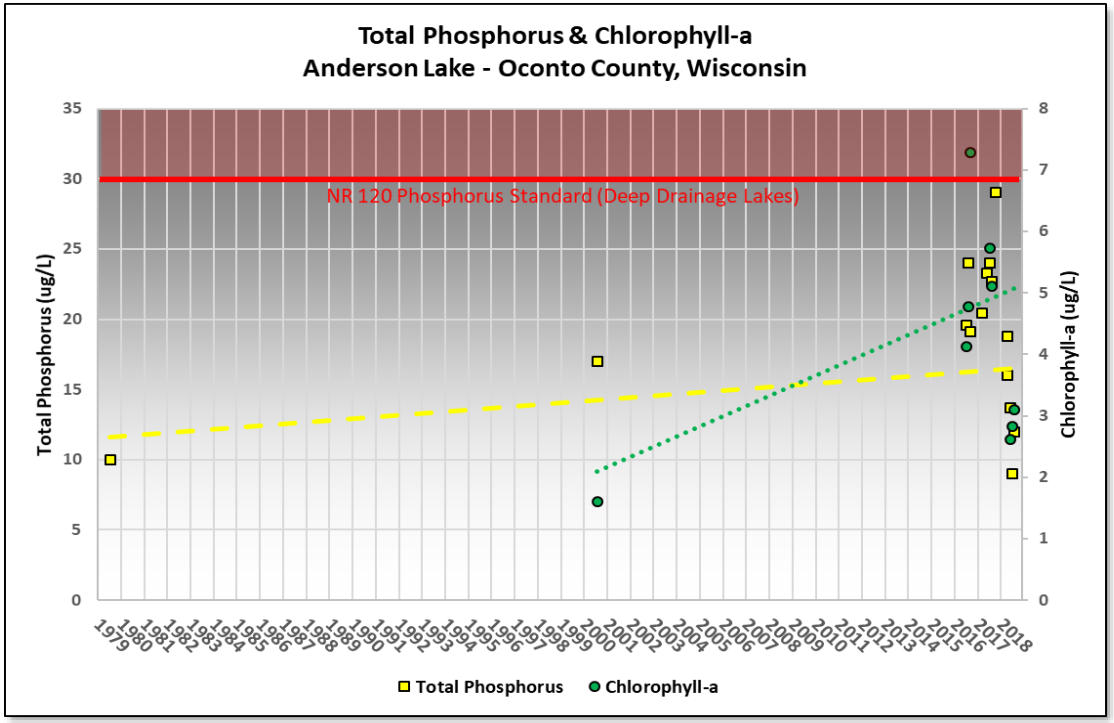
Chloride, sodium and potassium concentrations are commonly used as indicators of how a lake is being impacted by human activity. The presence of these compounds where they do not naturally occur indicates sources of water contaminants. Although these elements are not detrimental to the aquatic ecosystem, they indicate that sources of contaminants such as road salt, fertilizer, animal waste and/or septic system effluent may be entering the lake from either surface runoff or via groundwater. Measurements of contaminants were low.

Nutrients

Phosphorus is an element that is essential in trace amounts to most living organisms, including aquatic plants and algae. Naturally-occurring sources of phosphorus include soils and wetlands, and groundwater. Common sources from human activities include soil erosion, animal waste, fertilizers, and septic systems. Although a variety of compounds are important to biological growth, phosphorus receives so much attention because it is commonly

the "limiting nutrient" in many Wisconsin lakes. Due to its relatively short supply compared to other substances necessary for growth, relatively small increases in phosphorus result in significant increases in aquatic plants and algae. NR 120, Wisconsin Administrative Code lists phosphorus limits for different lake types. Deep drainage lakes such as Anderson have a standard of 30 ug/L they must remain stay to remain healthy. The very limited data available show concentrations in Anderson to be well below this standard. Continued monitoring is necessary to verify this and establish and trends. Concentrations of 0.3 mg/L inorganic nitrogen in spring are sufficient to fuel algal blooms throughout the summer. Sources of inorganic nitrogen include animal waste, septic systems/waste treatment effluent, and fertilizers.

In Anderson Lake, phosphorus concentrations remained below, but approached, the threshold of 30 ug/L throughout the study. When compared with limited historical data, this suggests an increasing trend in phosphorus concentrations. Continued monitoring is recommended.



Be part of the solution!

Managing nitrogen, phosphorus and soil erosion throughout the Anderson Lake watershed is one of the keys to protecting the lake itself. Near shore activities that may increase the input of phosphorus to the lake include applying fertilizer, removing native vegetation (trees, bushes and grasses), mowing vegetation, and increasing the amount of exposed soil. Nitrogen inputs to a lake can be controlled by using lake-friendly land management decisions, such as the restoration of shoreland vegetation, elimination/reduction of fertilizers, proper management of animal waste and septic systems, and the use of water quality-based management practices.

Goal 6. Maintain or improve water quality in Anderson Lake.

Objective 6.1 Maintain median summer total phosphorus concentrations below 30 ug/L and fall inorganic nitrogen concentrations below 0.3 mg/L.

Actions	Lead person/group	Resources	Timeline
Inform others around the lake about the impact of nutrients and land management on water quality through the distribution of an Association newsletter and/or hosting a guest speaker at the annual meeting.	ALA	OCLWA WDNR UWEX Lakes	Ongoing
Refrain from the use of fertilizers. Encourage soil testing to determine if fertilizer is necessary.	ALA	OC UWEX	Ongoing
Encourage the restoration of unmowed vegetation to slow and absorb runoff and pollutants.	ALA	UWEX Lakes	Ongoing

Objective 6.2 Continue to develop a good water quality dataset for Anderson Lake to monitor trends, declines and improvements over time.

Actions	Lead person/group	Resources	Timeline
Continue participation in CLMN and support volunteers collecting total phosphorus and chlorophyll-a data.	ALA Trained volunteer	CLMN	3+ times annually-summer
Submit all collected data to WDNR for archival and use by scientists and resource managers.	ALA Trained volunteer	WDNR	Ongoing

PEOPLE AND THE LAKE

The people who interact with the lake are a key component of the lake and its management. In essence a lake management plan is a venue by which people decide how they would like people to positively impact the lake. The plan summarizes the decisions of the people to take proactive steps to improve their lake and their community. Individual decisions by lake residents and visitors can have positive impacts on the lake and on those who enjoy this common resource. Collaborative efforts may have bigger positive impacts; therefore, communication and cooperation between the lake association, community, and suite of lake users are essential to maximize the effects of plan implementation.

Boating hours, regulations, and fishing limits are examples of principles that are put into place to minimize conflicts between lake users and balance human activities with environmental considerations for the lake.

Recreation

According to survey responses, the lake is enjoyed for its scenery, wildlife, boating and fishing. There is one public boat launch located on the north end of Anderson Lake which is owned and maintained by Oconto County. No Wake is allowed between 6pm and 10am.

Dam

The level of Anderson Lake is raised approximately 1-2' by a small dam, owned by Oconto County, located at the outlet on the north end. The water level is annually drawn down about 8 inches in the fall to prevent ice damage to shoreland properties as required by the courts.

Goal 7. Lake users will be informed about and respectful of Anderson Lake.

Objective 7.1 Cultivate an environment of compliance amongst lake users.

Actions	Lead person/group	Resources	Timeline
Work with other lake groups and towns to support a recreational officer and municipal court for enforcement of regulations, including 'No Wake' and safe boat operation.	ALA	TOB, TOM OCLWA OC UWEX	Ongoing
Inform residents and consider posting signage of "DNR Hotline" to report unlawful behavior. (1-800-TIP-WDNR)	ALA	WDNR	Ongoing

Communication and Organization

Working together on common values will help to achieve the goals outlined in this plan. This will involve communication between individuals, the Association, the Towns of Breed and Mountain, Oconto County, resource managers, and elected officials. In addition, staying informed about lake- and groundwater-related topics will be essential to achieving the goals laid out in this plan. See the Oconto County Lake Information Directory in the Appendices for contact information.

Many of the goals outlined in this plan focus on distributing information to lake and watershed residents and lake users in order to help them make informed decisions that will result in a healthy Anderson Lake ecosystem that is enjoyed by many people. Working together on common values will help to achieve the goals that are outlined in this plan.

Goal 8. Increase participation in lake stewardship.

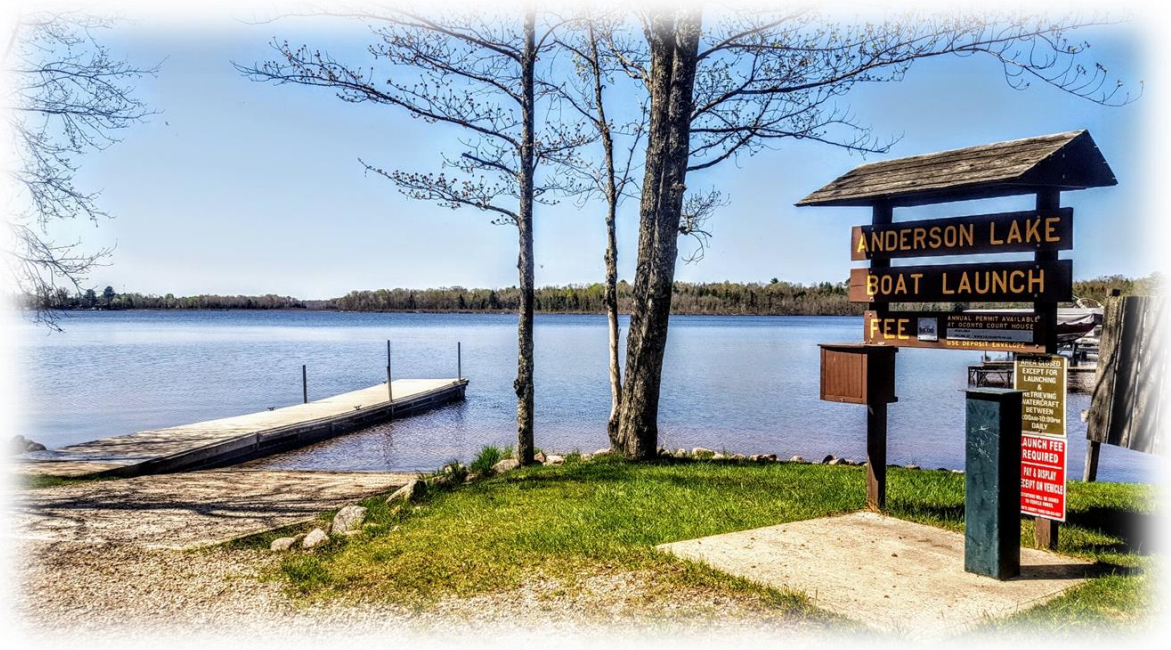
Objective 8.1 Develop opportunities and incentives for active participation in the management of Anderson Lake.

Actions	Lead person/group	Resources	Timeline
Maintain Association website (**https://andersonlakeassociation.wordpress.com**)	ALA		Ongoing
Maintain an email list of shoreland property owners and others interested in Anderson Lake.	ALA	OC UWEX	Ongoing
Share minutes (or meeting notes) from annual meeting on website and/or newsletter.	ALA		As needed
Distribute a welcome packet/mailing to all new shoreland property owners with basic lake stewardship information/brochures. WDNR small-scale planning grants can pay for this.	ALA	OC UWEX OC Zoning Dept. OCLCD	Ongoing
Communicate updates to lake management plan and management activities to residents and users of the lake and WDNR via meetings, email list and/or newsletter.	ALA		Ongoing
Host an annual meeting to discuss lake management and opportunities for shoreland property owners.	ALA		Annually
Host gatherings to learn about topics identified in this plan. Invite speakers or conduct demonstrations.	ALA	UWEX Lakes WDNR OCLCD	As needed

Identify ways to recruit 'next generation' of water quality monitors and AIS removers. Support interested persons in Lake Leaders Institute and/or Wisconsin Lakes Convention.	ALA	UWEX Lakes Lake Leaders	Ongoing

Objective 8.2 Maintain good, clear communication between ALA, its residents, clubs, municipalities, agency staff, elected officials and organizations interested in Anderson Lake.

Actions	Lead person/group	Resources	Timeline
Network with other lake groups in Oconto County by having Anderson Lake represented at OCLWA.	ALA	OC UWEX	Ongoing
Network with other lakes in the state to learn lake management strategies, etc. by having a representative attend the Wisconsin Lakes Convention.	ALA	UWEX Lakes	Annually in April
Consider nominating an individual from Anderson Lake for the Lake Leaders Institute. Encourage members of OCLWA to attend Lake Leaders Institute.	ALA	UWEX Lakes	Ongoing



Updates and Revisions

Updates and Revisions

A management plan is a living document that changes over time to meet the current needs, challenges and desires of the lake and its community. The goals, objectives and actions listed in this plan should be reviewed annually and updated with any necessary changes. Partners listed in the plan should be contacted annually, and updated information complied. A list of changes/updates to the plan should be documented. To ensure that everyone is informed about changes, appropriate approval for changes should be acquired by all partners signing on to this plan.

Goal 9. Review plan annually and update as needed.

Objective 9.1 Maintain an up-to-date and relevant lake management plan and communicate updates to the lake community, Oconto County and WDNR.

Actions	Lead person/group	Resources	Timeline
Review plan at annual meeting and discuss accomplishments and identification of goals/objectives/actions for coming year.	ALA		Annually
Formally update this plan every 5 years.	ALA	OC UWEX UWEX Lakes WDNR	2025

REFERENCES

Boat Ed, 2013. The Handbook of Wisconsin Boating Laws and Responsibilities. Approved by Wisconsin Department of Natural Resources. www.boat-ed.com

Borman, Susan, Robert Korth, and Jo Temte, 2001. Through the looking glass, a field guide to aquatic plants. Reindl Printing, Inc. Merrill, Wisconsin.

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Haney, Ryan, 2019. State of the Oconto County Lakes. Center for Watershed Science and Education-University of Wisconsin-Stevens Point.

Paoli, Tammie, 2013. Anderson Lake, Oconto County Wisconsin, Fisheries Survey Report, 2012. Wisconsin Department of Natural Resources.

Paoli, Tammie, 2019. Anderson Lake Fishery. Presentation given at Lakewood Community Center on August 25, 2019. Wisconsin Department of Natural Resources.

Panuska and Lillie, 1995. Phosphorus Loadings from Wisconsin Watershed: Recommended Phosphorus Export Coefficients for Agricultural and Forested Watersheds. Bulletin Number 38, Bureau of Research, Wisconsin Department of Natural Resources.

Public Service Commission of Wisconsin, 1948. Opinions and Decisions of the Public Service Commission of Wisconsin, Volume XXXII. 410 pp.

Shaw, B., C. Mechenich, and L. Klessig, 2000. Understanding Lake Data. University of Wisconsin-Extension, Stevens Point. 20 pp.

APPENDICES

Appendix A

Appendix A. Oconto County Lake Information Directory

Algae - Blue-Green

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/bluegreenalgae

Contact: Wisconsin Department of Health Services
1 West Wilson Street, Madison, WI 53703
Phone: 608-267-3242
Website:
www.dhs.wisconsin.gov/eh/bluegreenalgae/contactus.htm

Aquatic Invasive Species/Clean Boats Clean Water

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/topic/Invasives/

Aquatic Plant Management

(Native and Invasive)

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Aquatic Plant Identification

Contact: Dr. Emmet Judziewicz
UWSP Freckmann Herbarium
TNR 301, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4248
E-mail: ejudziew@uwsp.edu

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Aquatic Plant Surveys/Management

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/plants/

Best Management Practices (rain gardens, shoreland buffers, agricultural practices, runoff controls)

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Boat Landings, Signage, Permissions (County)

Contact: Monty Brink
Oconto County Forestry/Park/Recreation
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6995
E-mail: monty.brink@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Boat Landings (State)

Contact: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: tammie.paoli@wisconsin.gov
Website: http://dnr.wi.gov/org/land/facilities/boataccess/

Appendix A

Boat Landings (Town)

Contact the clerk for the specific town/village in which the boat landing is located.

Conservation Easements

Contact: Gathering Waters Conservancy
211 S. Paterson St., Suite 270, Madison, WI 53703
Phone: 608-251-9131
E-mail: info@gatheringwaters.org
Website: http://gatheringwaters.org/

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Contact: Patrick Sorge
Wisconsin Department of Natural Resources
PO Box 4001, Eau Claire, WI 54702
Phone: 715-839-3794
E-mail: Patrick.Sorge@wisconsin.gov

Contact: Northeast Wisconsin Land Trust
14 Tri-Park Way, Suite 1, Appleton, WI 54914
Phone: 920-738-7265
E-mail: newlt@newlt.org
Website: www.newlt.org

Contact: NRCS Lena Service Center
410 ½ East Main Street, Lena, WI 54139
Phone: 920-829-5406

Critical Habitat and Sensitive Areas

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/lakes/criticalhabitat/

Dams

Contact: Meg Galloway
Wisconsin Department of Natural Resources
PO Box 7921, Madison, WI 53707
Phone: 608-266-7014
E-mail: meg.galloway@wisconsin.gov
Website: http://dnr.wi.gov/org/water/wm/dsfm/dams/

Fertilizers/Soil Testing

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Fisheries Biologist (management, habitat)

Contact: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: tammie.paoli@wisconsin.gov
Website: http://dnr.wi.gov/fish/

Frog Monitoring—Citizen Based

Contact: Andrew Badje
Wisconsin Department of Natural Resources
Phone: 608-785-9472
E-mail: Andrew.badje@wisconsin.gov
Website: WFTS@wisconsin.gov

Grants

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/Aid/Grants.html

Appendix A

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Groundwater Quality

Contact: Kevin Masarik
UWSP Center for Watershed Science & Education
TNR 224, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4276
E-mail: kmasarik@uwsp.edu
Website: http://www.uwsp.edu/cnr/watersheds/

Groundwater Levels/Quantity

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Contact: George Kraft
UWSP Center for Watershed Science & Education
TNR 224, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-2984
E-mail: george.kraft@uwsp.edu

Informational Packets

Contact: UW Extension - Lakes
TNR 224, 800 Reserve St. Stevens Point, WI 54481
Phone: 715-346-2116
E-mail: uwexlakes@uwsp.edu

Lake Groups – Friends, Associations, Districts

Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Contact: Patrick Goggin
UWEX Lakes
TNR 203, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-365-8943
E-mail: pgoggin@uwsp.edu
Website: http://www.uwsp.edu/cnr/uwexlakes/organizations/

Contact: Eric Olson
UWEX Lakes
TNR 206, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-2192
E-mail: eolson@uwsp.edu
Website: http://www.uwsp.edu/cnr/uwexlakes/organizations/

Contact: Susan Tesarik
Wisconsin Lakes
4513 Vernon Blvd., Suite 101, Madison, WI 53705
Phone: 1-800-542-5253
E-mail: lakeinfo@wisconsinlakes.org
Website: http://wisconsinlakes.org/

Lake Levels

See: Groundwater

Lake-Related Law Enforcement (no-wake, transporting invasives, etc.)

Contact: Ben Mott
State Conservation Warden
Wisconsin Department of Natural Resources
427 E. Tower Drive, Suite 100, Wautoma, WI 54982
Phone: 920-896-3383
Website: http://www.wigamewarden.com/

Appendix A

Land Use Plans and Zoning Ordinances

Contact: Patrick Virtues
Oconto County Planning/Zoning/Solid Waste
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6827
E-mail: Patrick.virtues@co.oconto.wi.us
Website: http://www.co.waushara.wi.us/zoning.htm

Contact: UWSP Center for Land Use Education
TNR 208, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-3783
E-mail: Center.for.Land.Use.Education@uwsp.edu
Website: http://www.uwsp.edu/cnr/landcenter/

Nutrient Management Plans

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Contact: NRCS Lena Service Center
410 ½ East Main Street, Lena, WI 54139
Phone: 920-829-5406

Parks (County)

Contact: Monty Brink
Oconto County Forestry/Park/Recreation
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6995
E-mail: monty.brink@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Purchase of Development Rights

Contact: Northeast Wisconsin Land Trust
14 Tri-Park Way, Suite 1, Appleton, WI 54914
Phone: 920-738-7265
E-mail: newlt@newlt.org
Website: www.newlt.org

Purchase of Land

Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov
Website: http://dnr.wi.gov/topic/stewardship/

Rain Gardens and Stormwater Runoff

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Septic Systems/Onsite Waste

Contact: Patrick Virtues
Oconto County Planning/Zoning/Solid Waste
301 Washington Street, Oconto, WI 54153
Phone: 920-834-6827
E-mail: Patrick.virtues@co.oconto.wi.us
Website: http://www.co.waushara.wi.us/zoning.htm

Shoreland Management

Contact: Ken Dolata
Oconto County Land Conservation Department
410 ½ East Main Street, Lena, WI 54139
Phone: 920-834-7152
E-mail: ken.dolata@co.oconto.wi.us
Website: http://www.co.oconto.wi.us/departments/

Shoreland Vegetation

http://dnr.wi.gov/topic/ShorelandZoning/

Shoreland Zoning Ordinances

See: Land Use Plans and Zoning Ordinances

Appendix A

Soil Fertility Testing
Contact: Dale Mohr
Oconto County UW- Extension
301 Washington Street, Oconto, WI 54153
Phone: 920-835-6845
E-mail: dale.mohr@co.oconto.wi.us
Website: http://oconto.uwex.edu

Water Quality Monitoring
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Water Quality Problems
Contact: Brenda Nordin
Wisconsin Department of Natural Resources
Phone: 920-360-3167
E-mail: brenda.nordin@wisconsin.gov

Wetlands
Contact: Jason Fleener
Wisconsin Department of Natural Resources
GEF2 DNR Central Office, Madison, WI 53707
Phone: 608-266-7408
E-mail: Jason.fleener@wisconsin.gov
Website: http://dnr.wi.gov/wetlands/

Contact: Wisconsin Wetlands Association
214 N. Hamilton Street, #201, Madison, WI 53703
Phone: 608-250-9971
Email: info@wisconsinwetlands.org

Wetland Inventory
Contact: Dr. Emmet Judziewicz
UWSP Freckmann Herbarium
TNR 301, 800 Reserve St., Stevens Point, WI 54481
Phone: 715-346-4248
E-mail: ejudziew@uwsp.edu

Woody Habitat
Contact: Tammie Paoli
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5052
E-mail: tammie.paoli@wisconsin.gov
Website: http://dnr.wi.gov/fish/

Appendix B. Rapid Response Plan

REPORTING A SUSPECTED INVASIVE SPECIES

1. Collect specimens or take photos.

Regardless of the method used, provide as much information as possible. Try to include flowers, seeds or fruit, buds, full leaves, stems, roots and other distinctive features. In photos, place a coin, pencil or ruler for scale. Deliver or send specimen ASAP.

Collect, press and dry a complete sample. This method is best because a plant expert can then examine the specimen.

-OR-

Collect a fresh sample. Enclose in a plastic bag with a moist paper towel and refrigerate.

-OR-

Take detailed photos (digital or film).

2. Note the location where the specimen was found.

If possible, give the exact geographic location using a GPS (global positioning system) unit, topographic map, or the Wisconsin Gazetteer map book. If using a map, include a photocopy with a dot showing the plant's location.

Provide one or more of the following:

- Latitude & Longitude
- UTM (Universal Transverse Mercator) coordinates
- County, Township, Range, Section, Part-section
- Precise written site description, noting nearest city & road names, landmarks, local topography

3. Gather information to aid in positive species identification.

- Collection date and county
- Your name, address, phone, email
- Exact location (lat/long or UTM, Township/Range)
- Plant name
- Land ownership (if known/applicable)
- Population description (estimated # plants, area covered)
- Habitat type where found (forest, field, prairie, wetland, open water)

4. **Mail or bring specimens and information to any of the following locations (digital photos may be emailed):**

Wisconsin Dept. Natural Resources
2984 Shawano Avenue,
Green Bay, WI 54313
Phone: (920) 662-5100

UW-Stevens Point Herbarium
301 Trainer Natural Resources Building
800 Reserve Street
Stevens Point, WI 54481
Phone: 715-346-4248
E-Mail: ejudziew@uwsp.edu

Wisconsin Invasive Plants Reporting & Prevention Project
Herbarium-UW-Madison
430 Lincoln Drive
Madison, WI 53706
Phone: (608) 267-7612
E-Mail: invasiveplants@mailplus.wisc.edu

Appendix C

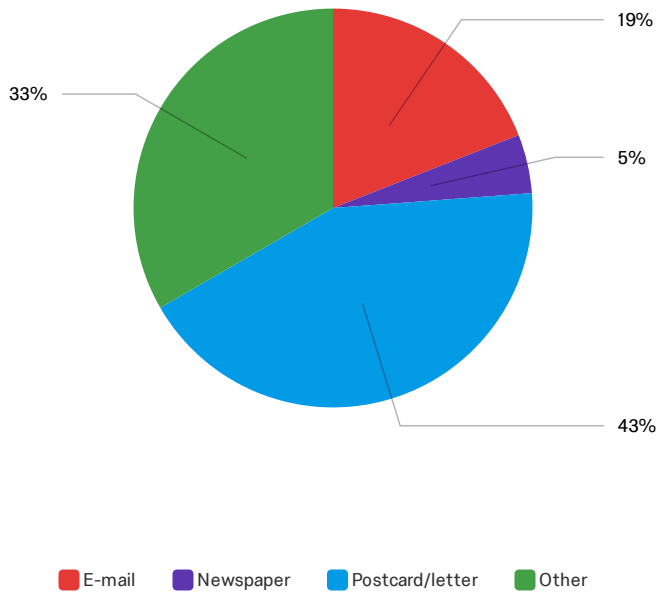
Appendix C. Lake User Survey Results

Default Report

Anderson Lake Survey - Oconto County Lakes Project

September 12, 2019 11:12 AM MDT

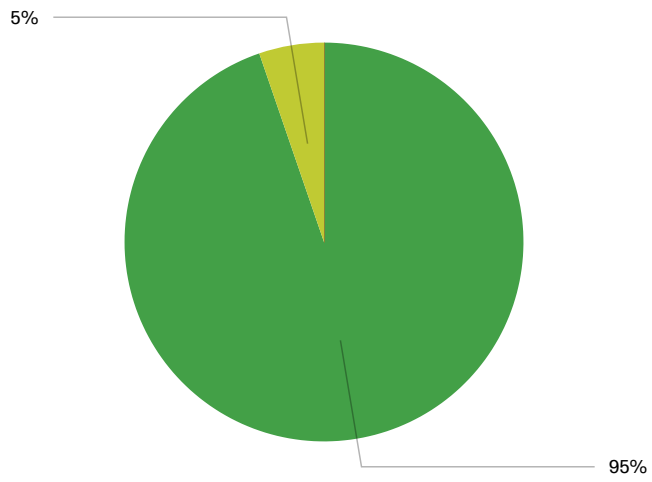
Q2 - How did you hear about this survey?



#	Field		Choice Count
1	E-mail	19%	4
2	Newspaper	5%	1
3	Postcard/letter	43%	9
4	Other	33%	7
			21

Showing rows 1 - 5 of 5

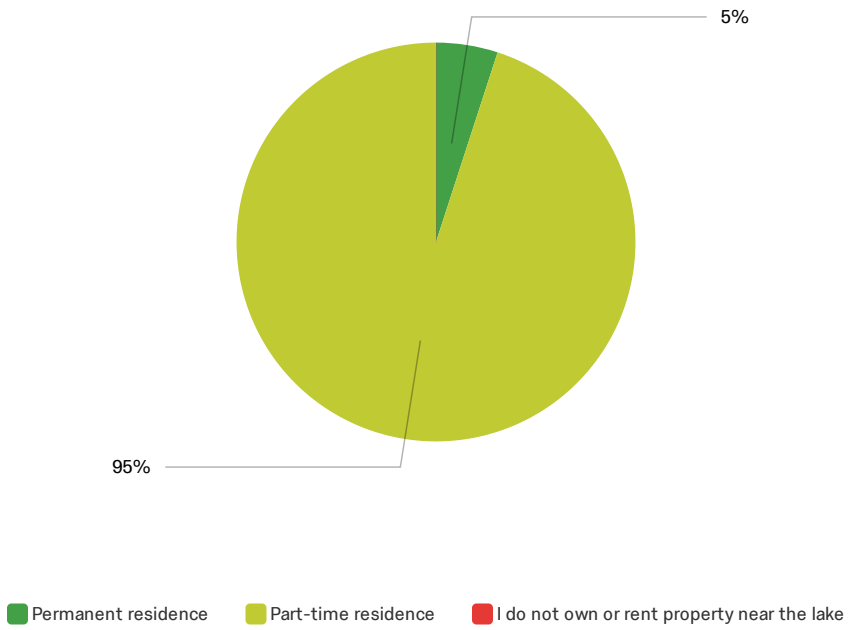
Q3 - Do you own or rent property...



#	Field		Choice Count
1	Around the lake	95%	18
2	Less than 1/2 mile from the lake	5%	1
3	Near the lake, but more than 1/2 mile away	0%	0
4	I do not own or rent property near the lake	0%	0
			19

Showing rows 1 - 5 of 5

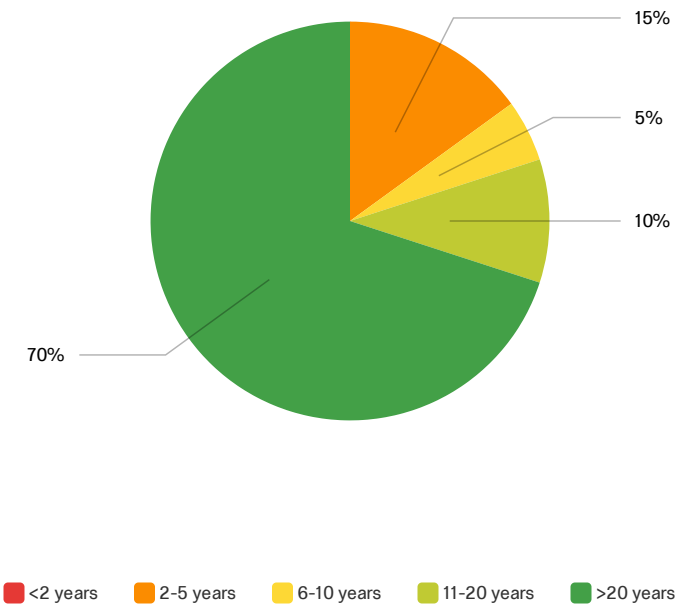
Q4 - If you own or rent property near the lake, is this property your...



#	Field		Choice Count
1	Permanent residence	5%	1
2	Part-time residence	95%	19
3	I do not own or rent property near the lake	0%	0
			20

Showing rows 1 - 4 of 4

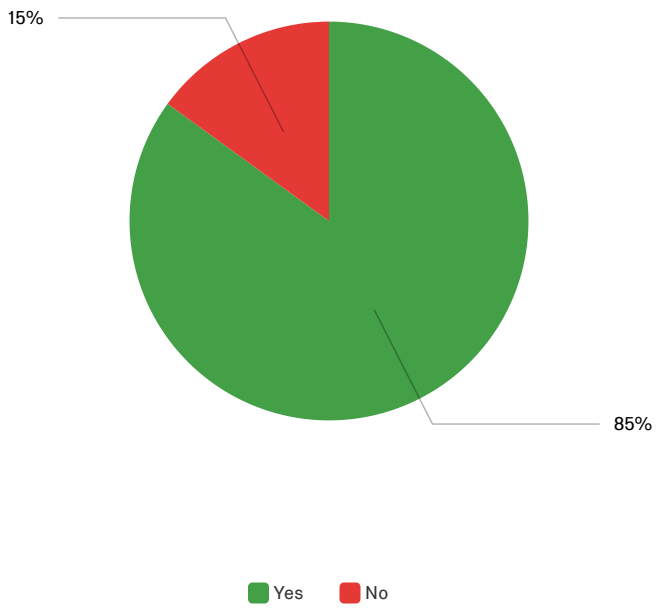
Q5 - How long have you lived on, visited or recreated on the lake?



#	Field	Choice Count
1	<2 years	0% 0
2	2-5 years	15% 3
3	6-10 years	5% 1
4	11-20 years	10% 2
5	>20 years	70% 14
		20

Showing rows 1 - 6 of 6

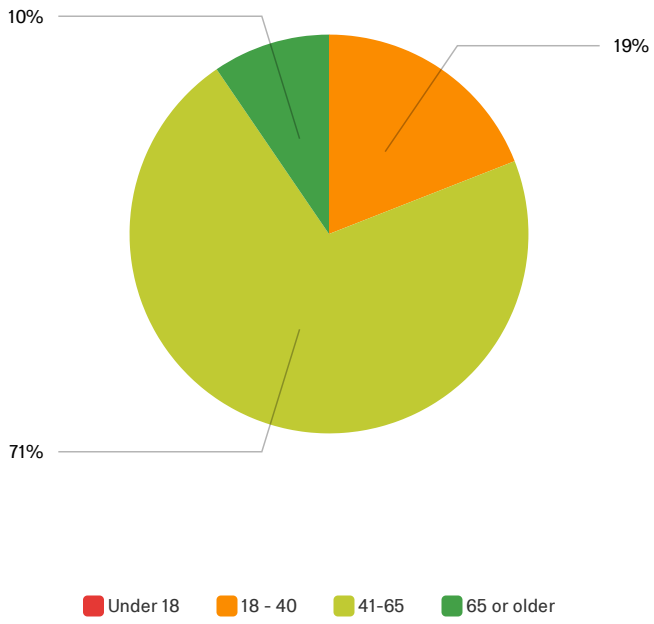
Q6 - Are you a member of the Anderson Lake Association?



#	Field		Choice Count
1	Yes	85%	17
2	No	15%	3
			20

Showing rows 1 - 3 of 3

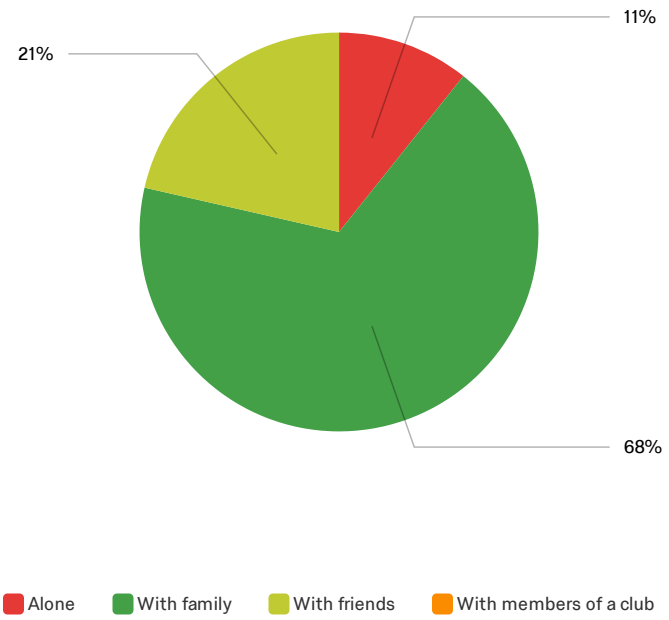
Q8 - Which category below includes your age?



#	Field	Choice Count
1	Under 18	0% 0
2	18 - 40	19% 4
3	41-65	71% 15
4	65 or older	10% 2
		21

Showing rows 1 - 5 of 5

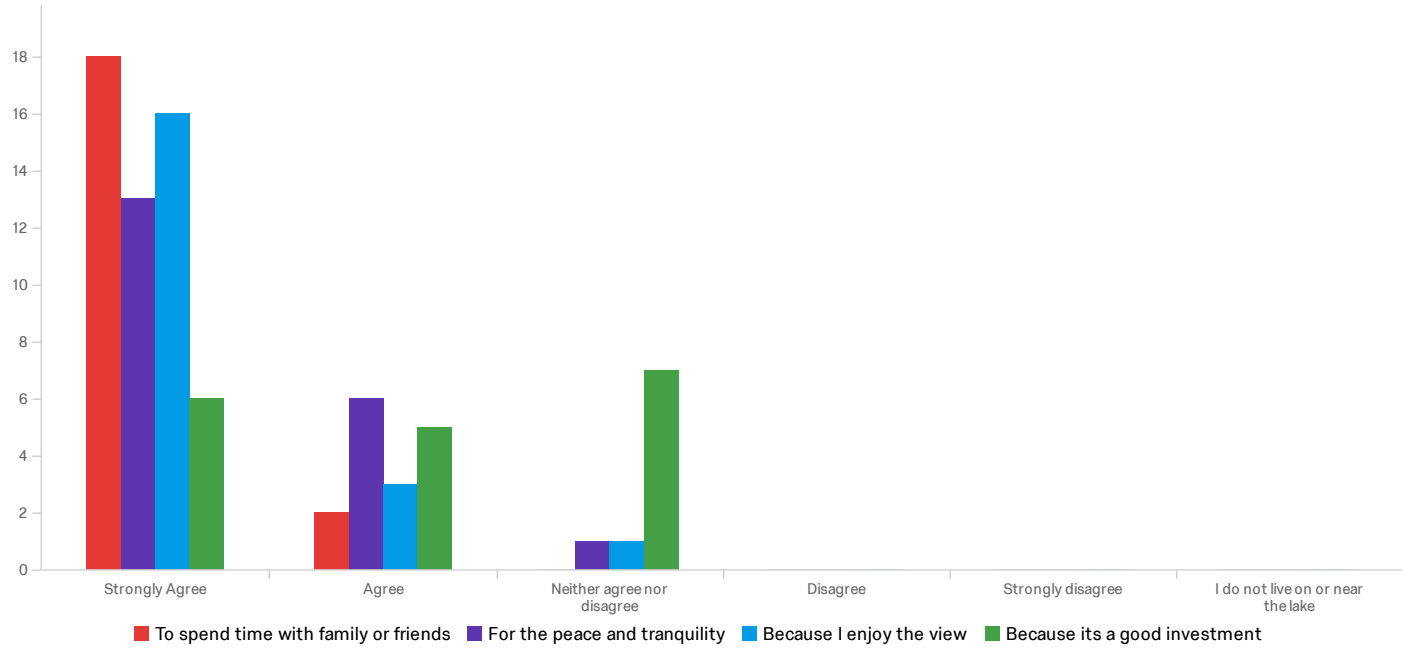
Q9 - When you visit Anderson Lake, are you typically ...(check all that apply)



#	Field	Choice Count
1	Alone	11% 3
2	With family	68% 19
3	With friends	21% 6
4	With members of a club	0% 0
		28

Showing rows 1 - 5 of 5

Q10 - I live on or near the lake...



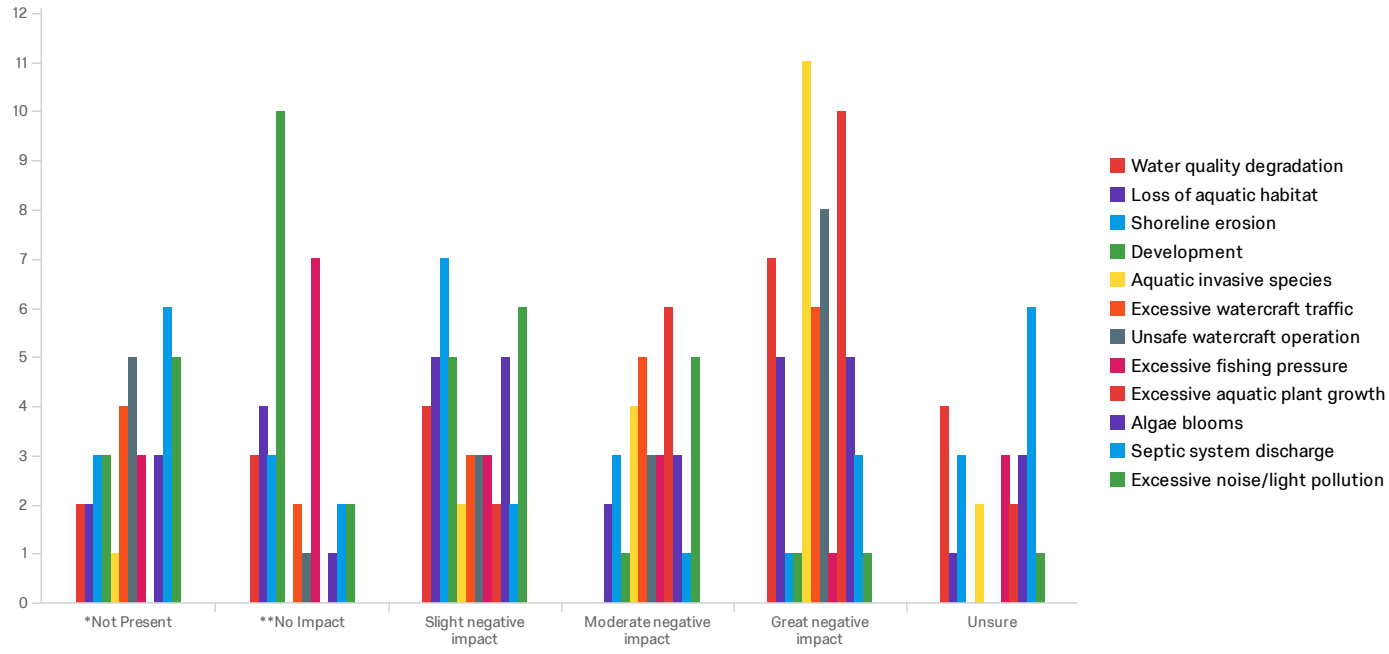
#	Field	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	I do not live on or near the lake	Total
1	To spend time with family or friends	90% 18	10% 2	0% 0	0% 0	0% 0	0% 0	20
2	For the peace and tranquility	65% 13	30% 6	5% 1	0% 0	0% 0	0% 0	20
3	Because I enjoy the view	80% 16	15% 3	5% 1	0% 0	0% 0	0% 0	20
4	Because its a good investment	33% 6	28% 5	39% 7	0% 0	0% 0	0% 0	18

Showing rows 1 - 4 of 4

Q11 - What do you value most about Anderson Lake?

What do you value most about Anderson Lake?
Spending time with family and future family members
natural quality without chemicals
Swimming and skiing in a safe environment
Small lake with friendly people and low boat traffic
Small peaceful lake to ski and swim in
swimming, water activities
Fishing
Loons, lack of traffic during week, great for swimming until recent/massive weed growth.
The beautiful lake and to get away from home. Love that its 1.15 hours away.
The beauty and tranquility
The lake view
Have been on the lake since 1957. We value the lake's natural continuation w/o outside interruptions. Unfortunately, it has already been overtaken with invasive Milfoil weeds which will lead to overwhelming changes.
Peace and tranquility
Not that busy
Peaceful lake with good neighbors and good fishing
Anderson Lake provides a family 'getaway' that is peaceful (not overcrowded) which offers many outdoor activities.
We love our view of the lake, and share it with family and friends year round.
Undeveloped County Land on the West shore helps keep the lake good for recreating and fishing

Q42 - Below is a list of negative impacts commonly found in Wisconsin lakes. To what level do you believe each of the following factors may be impacting Anderson Lake? *Not Present means that you believe the issue does not exist on Anderson Lake**No Impact means that the issue may exist, but is not negatively impacting Anderson Lake

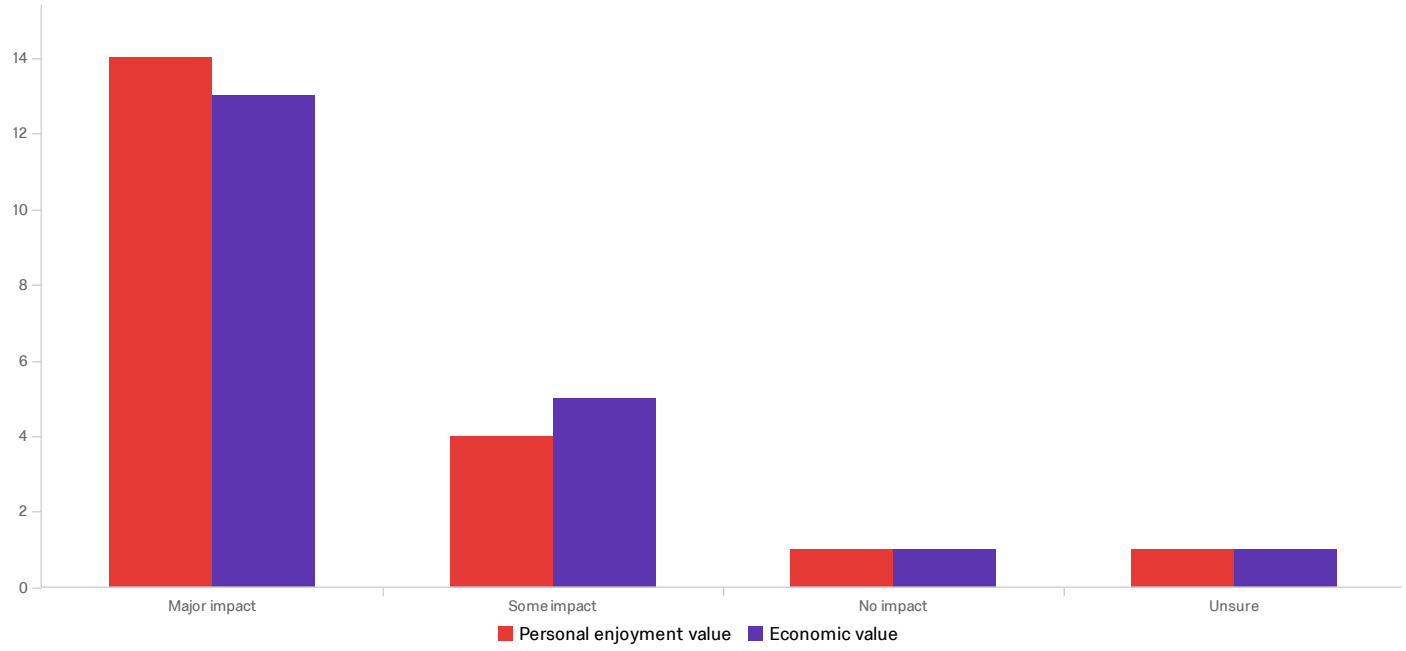


#	Field	*Not Present	**No Impact	Slight negative impact	Moderate negative impact	Great negative impact	Unsure	Total
1	Water quality degradation	10% 2	15% 3	20% 4	0% 0	35% 7	20% 4	20
2	Loss of aquatic habitat	11% 2	21% 4	26% 5	11% 2	26% 5	5% 1	19
3	Shoreline erosion	15% 3	15% 3	35% 7	15% 3	5% 1	15% 3	20
4	Development	15% 3	50% 10	25% 5	5% 1	5% 1	0% 0	20
5	Aquatic invasive species	5% 1	0% 0	10% 2	20% 4	55% 11	10% 2	20
6	Excessive watercraft traffic	20% 4	10% 2	15% 3	25% 5	30% 6	0% 0	20
7	Unsafe watercraft operation	25% 5	5% 1	15% 3	15% 3	40% 8	0% 0	20
8	Excessive fishing pressure	15% 3	35% 7	15% 3	15% 3	5% 1	15% 3	20

#	Field	*Not Present	**No Impact	Slight negative impact	Moderate negative impact	Great negative impact	Unsure	Total
9	Excessive aquatic plant growth	0% 0	0% 0	10% 2	30% 6	50% 10	10% 2	20
10	Algae blooms	15% 3	5% 1	25% 5	15% 3	25% 5	15% 3	20
11	Septic system discharge	30% 6	10% 2	10% 2	5% 1	15% 3	30% 6	20
12	Excessive noise/light pollution	25% 5	10% 2	30% 6	25% 5	5% 1	5% 1	20

Showing rows 1 - 12 of 12

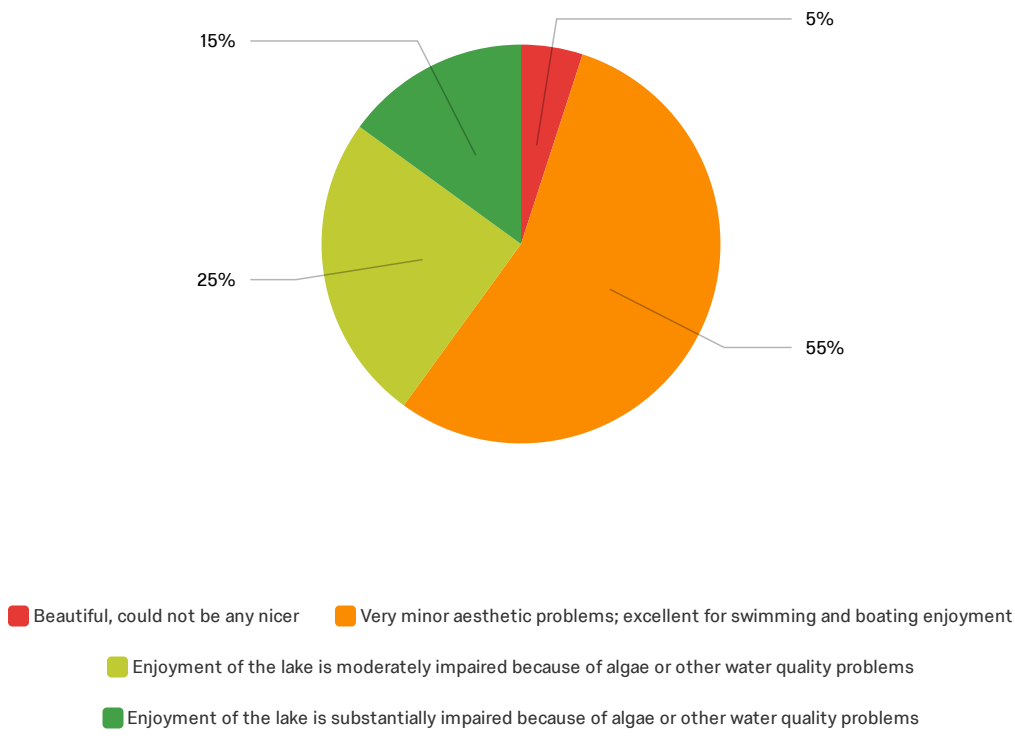
Q16 - How much impact does the water quality of Anderson Lake have on the following?



#	Field	Major impact	Some impact	No impact	Unsure	Total
1	Personal enjoyment value	70% 14	20% 4	5% 1	5% 1	20
2	Economic value	65% 13	25% 5	5% 1	5% 1	20

Showing rows 1 - 2 of 2

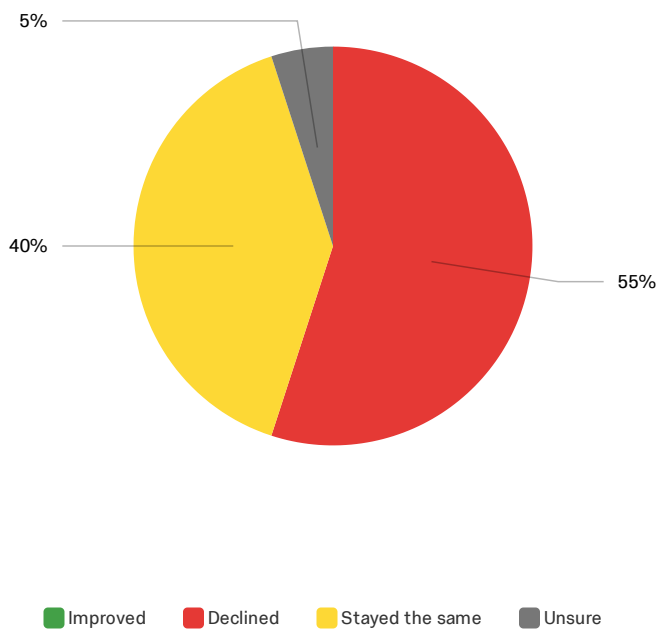
Q17 - Which statement best describes water clarity during the times you spend most on the lake?



#	Field	Choice Count	
1	Beautiful, could not be any nicer	5%	1
2	Very minor aesthetic problems; excellent for swimming and boating enjoyment	55%	11
3	Enjoyment of the lake is moderately impaired because of algae or other water quality problems	25%	5
4	Enjoyment of the lake is substantially impaired because of algae or other water quality problems	15%	3
			20

Showing rows 1 - 5 of 5

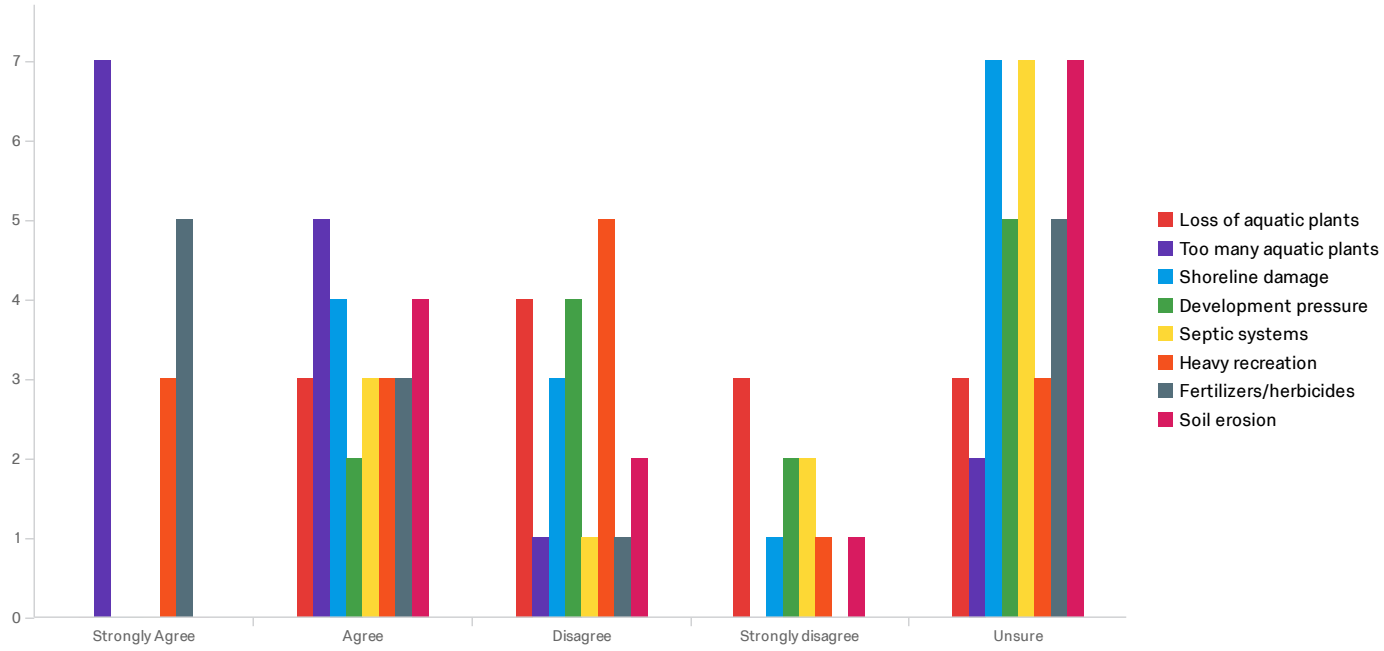
Q18 - During the time that you have lived on, visited or recreated on the lake, how would you say the water quality has changed?



#	Field	Choice Count	
1	Improved	0%	0
2	Declined	55%	11
3	Stayed the same	40%	8
4	Unsure	5%	1
			20

Showing rows 1 - 5 of 5

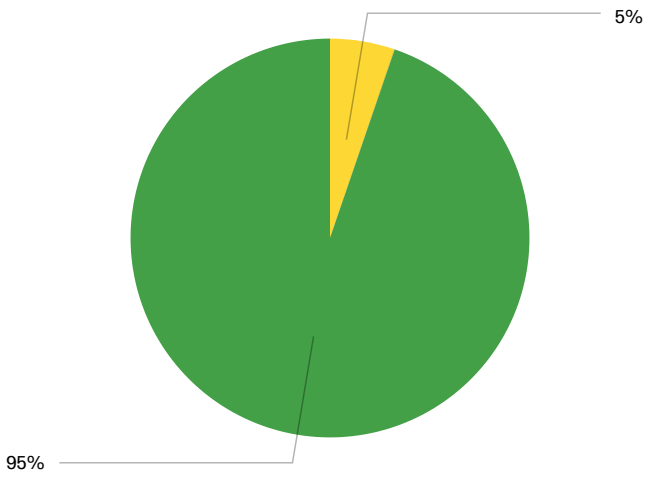
Q19 - If you think it has declined, what, in your opinion, are the primary causes?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Loss of aquatic plants	0% 0	23% 3	31% 4	23% 3	23% 3	13
2	Too many aquatic plants	47% 7	33% 5	7% 1	0% 0	13% 2	15
3	Shoreline damage	0% 0	27% 4	20% 3	7% 1	47% 7	15
4	Development pressure	0% 0	15% 2	31% 4	15% 2	38% 5	13
5	Septic systems	0% 0	23% 3	8% 1	15% 2	54% 7	13
6	Heavy recreation	20% 3	20% 3	33% 5	7% 1	20% 3	15
7	Fertilizers/herbicides	36% 5	21% 3	7% 1	0% 0	36% 5	14
8	Soil erosion	0% 0	29% 4	14% 2	7% 1	50% 7	14

Showing rows 1 - 8 of 8

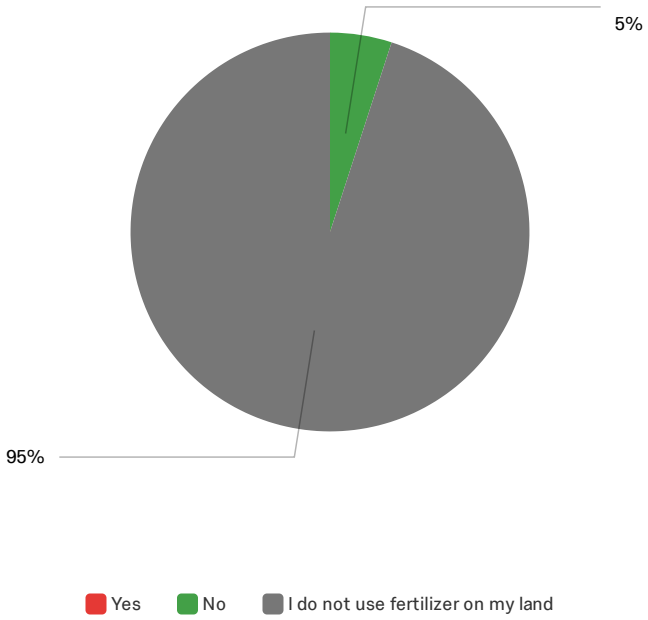
Q20 - If you use fertilizers or herbicides on your land, where are they applied?



#	Field	Choice Count
1	Lawn	0% 0
2	Garden	0% 0
3	Agricultural fields	5% 1
4	Other	0% 0
5	I do not use fertilizers or herbicides on my land	95% 18
		19

Showing rows 1 - 6 of 6

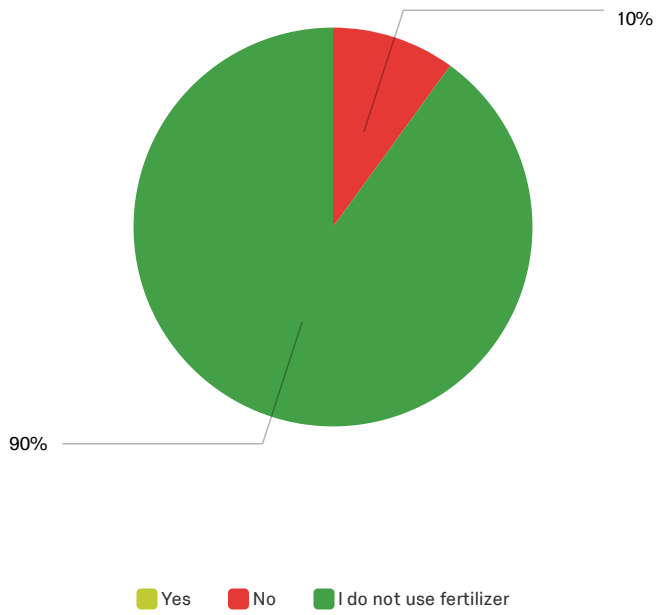
Q21 - Do you use fertilizer that contains phosphorus?



#	Field	Choice Count	
1	Yes	0%	0
2	No	5%	1
4	I do not use fertilizer on my land	95%	19
			20

Showing rows 1 - 4 of 4

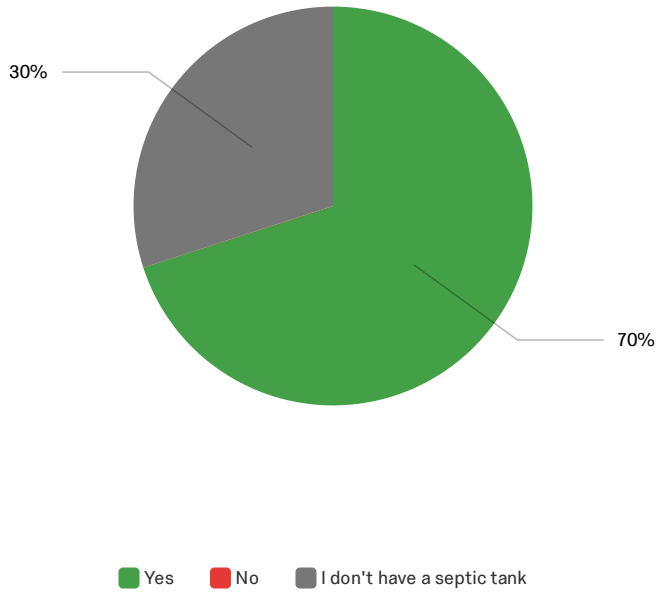
Q23 - Have you had your soil tested before using fertilizer?



#	Field	Choice Count
1	Yes	0% 0
2	No	10% 2
3	I do not use fertilizer	90% 18
		20

Showing rows 1 - 4 of 4

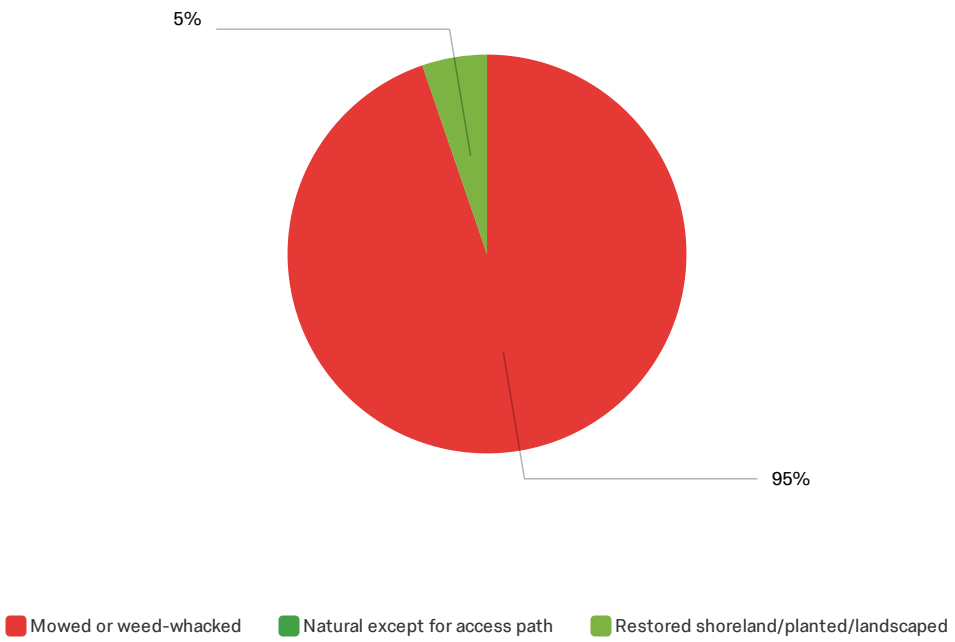
Q22 - Do you have your septic tank pumped regularly (at least every 3 years)?



#	Field		Choice Count
1	Yes	70%	14
2	No	0%	0
3	I don't have a septic tank	30%	6
			20

Showing rows 1 - 4 of 4

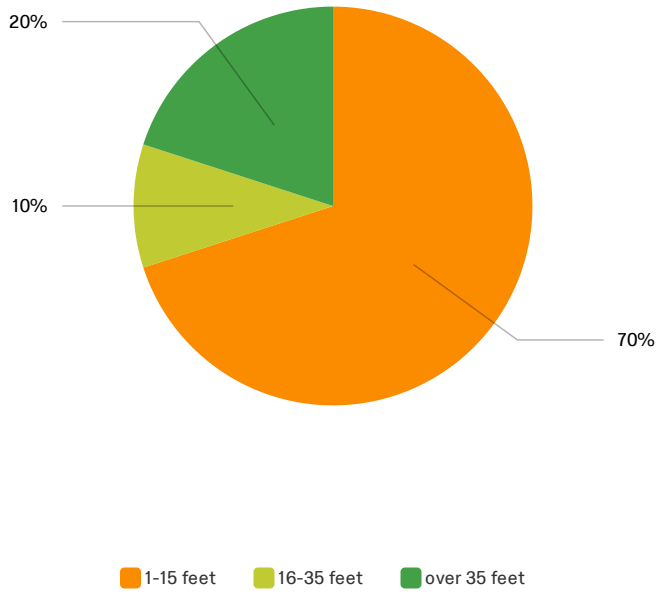
Q25 - How do you currently manage the majority of your property within 35 feet of the lake?



#	Field		Choice Count
1	Mowed or weed-whacked	95%	18
2	Natural except for access path	0%	0
3	Restored shoreland/planted/landscaped	5%	1
			19

Showing rows 1 - 4 of 4

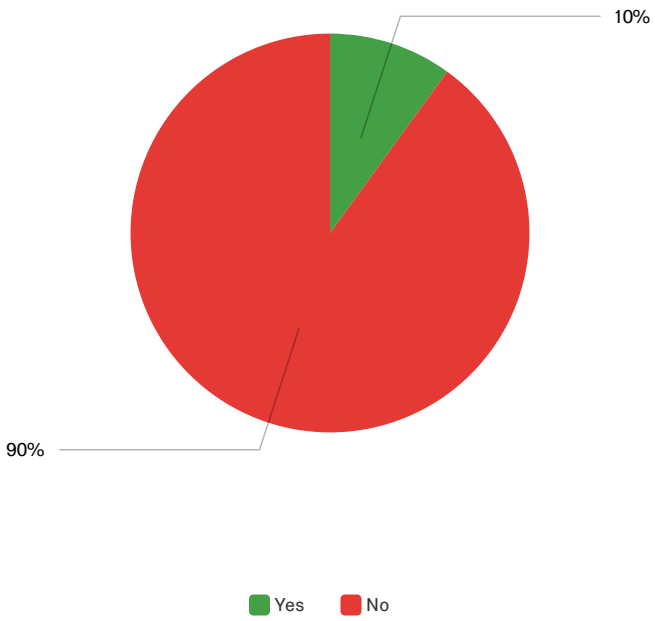
Q26 - If you have unmowed shoreland vegetation, how far inland from the water's edge does it extend?



#	Field		Choice Count
1	1-15 feet	70%	7
2	16-35 feet	10%	1
3	over 35 feet	20%	2
			10

Showing rows 1 - 4 of 4

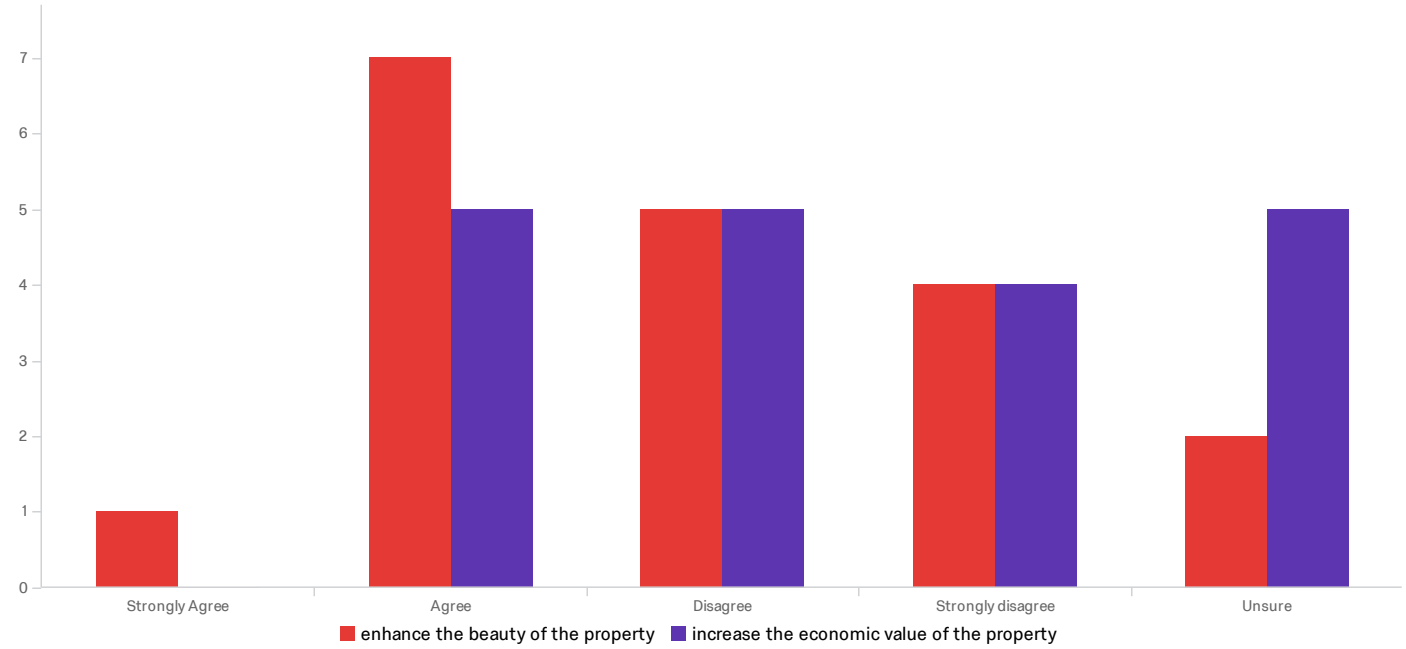
Q31 - Do you have woody structure such as fallen trees or large branches in the shallow water along your property?



#	Field		Choice Count
1	Yes	10%	2
2	No	90%	18
			20

Showing rows 1 - 3 of 3

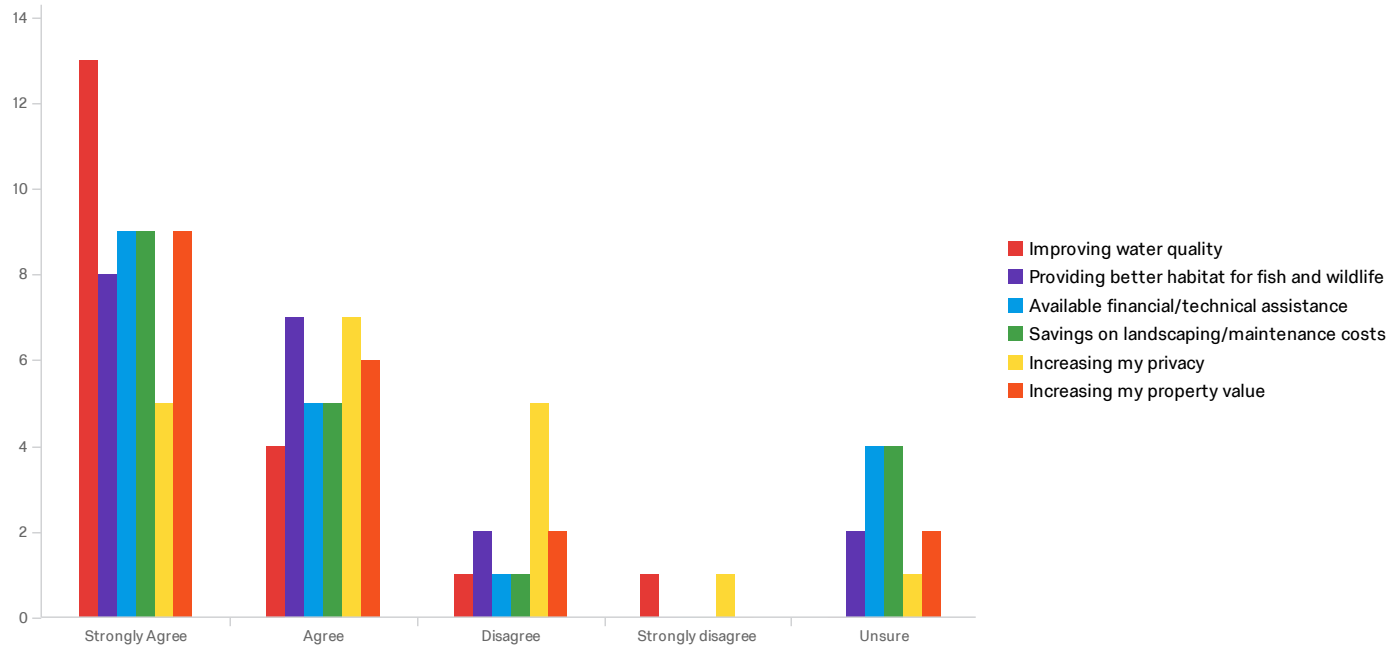
Q27 - In your opinion, does shoreland vegetation...



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	enhance the beauty of the property	5% 1	37% 7	26% 5	21% 4	11% 2	19
2	increase the economic value of the property	0% 0	26% 5	26% 5	21% 4	26% 5	19

Showing rows 1 - 2 of 2

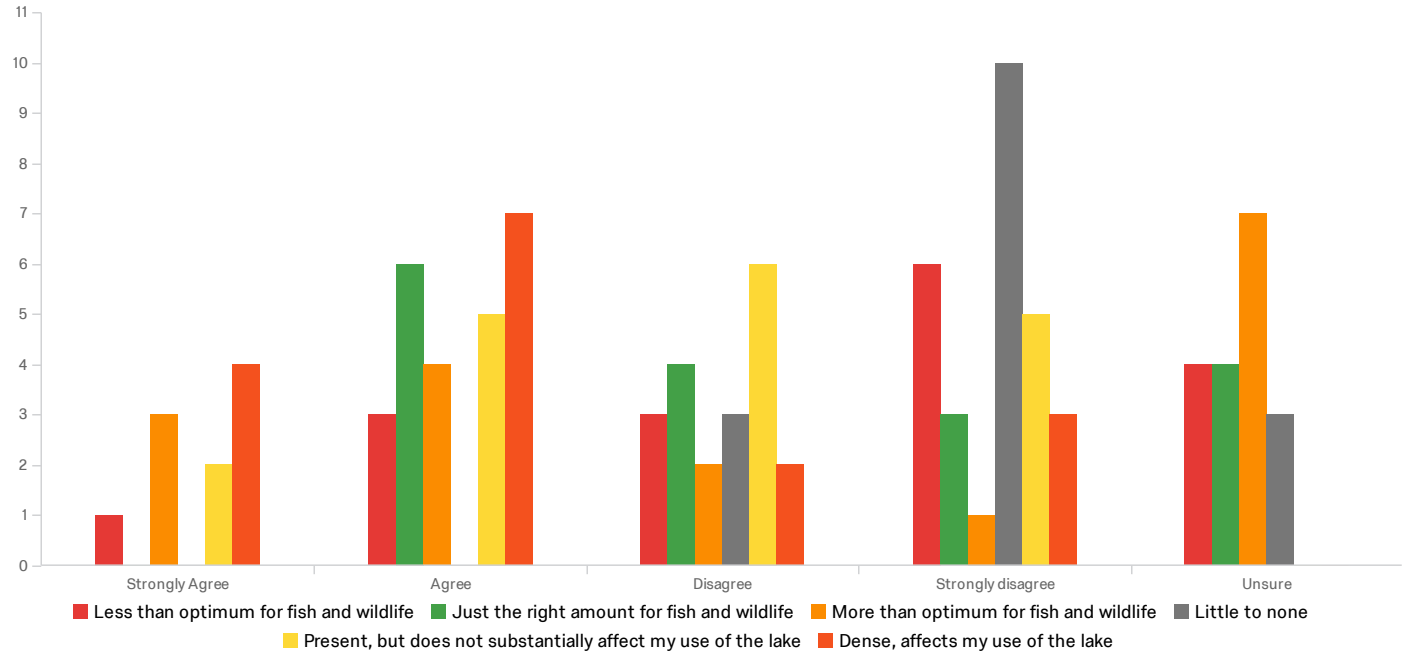
Q28 - What might motivate you to change how you manage your shoreland?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Improving water quality	68% 13	21% 4	5% 1	5% 1	0% 0	19
2	Providing better habitat for fish and wildlife	42% 8	37% 7	11% 2	0% 0	11% 2	19
3	Available financial/technical assistance	47% 9	26% 5	5% 1	0% 0	21% 4	19
4	Savings on landscaping/maintenance costs	47% 9	26% 5	5% 1	0% 0	21% 4	19
5	Increasing my privacy	26% 5	37% 7	26% 5	5% 1	5% 1	19
6	Increasing my property value	47% 9	32% 6	11% 2	0% 0	11% 2	19

Showing rows 1 - 6 of 6

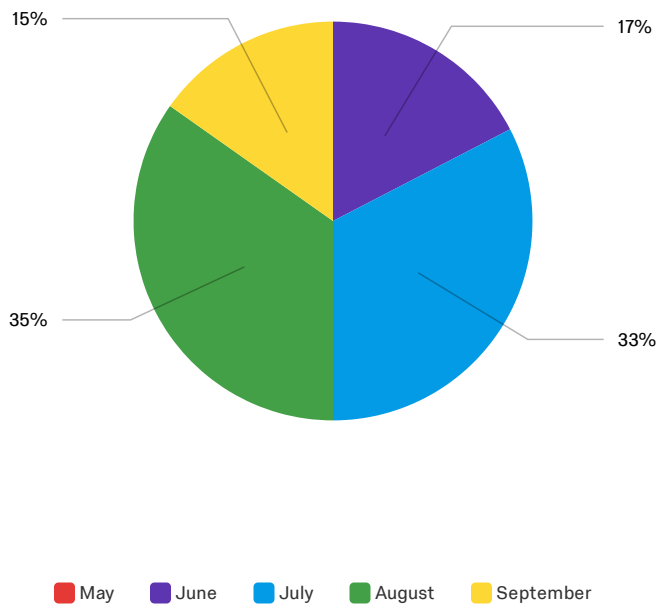
Q32 - In your opinion, which statement best describes the amount of aquatic plant growth in Anderson Lake?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Less than optimum for fish and wildlife	6% 1	18% 3	18% 3	35% 6	24% 4	17
2	Just the right amount for fish and wildlife	0% 0	35% 6	24% 4	18% 3	24% 4	17
3	More than optimum for fish and wildlife	18% 3	24% 4	12% 2	6% 1	41% 7	17
4	Little to none	0% 0	0% 0	19% 3	63% 10	19% 3	16
5	Present, but does not substantially affect my use of the lake	11% 2	28% 5	33% 6	28% 5	0% 0	18
6	Dense, affects my use of the lake	25% 4	44% 7	13% 2	19% 3	0% 0	16

Showing rows 1 - 6 of 6

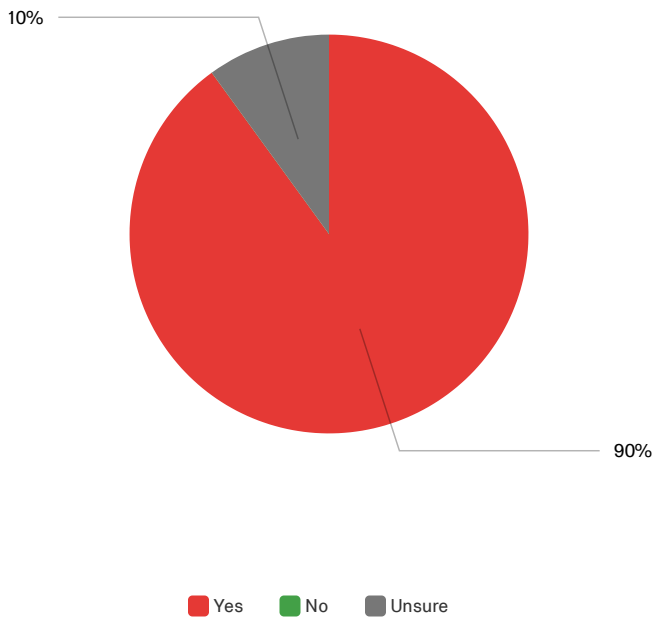
Q33 - If you think the plant growth in Anderson Lake is dense, what month(s) do the problems occur? Check all that apply.



#	Field	Choice Count
1	May	0% 0
2	June	17% 8
3	July	33% 15
4	August	35% 16
5	September	15% 7
		46

Showing rows 1 - 6 of 6

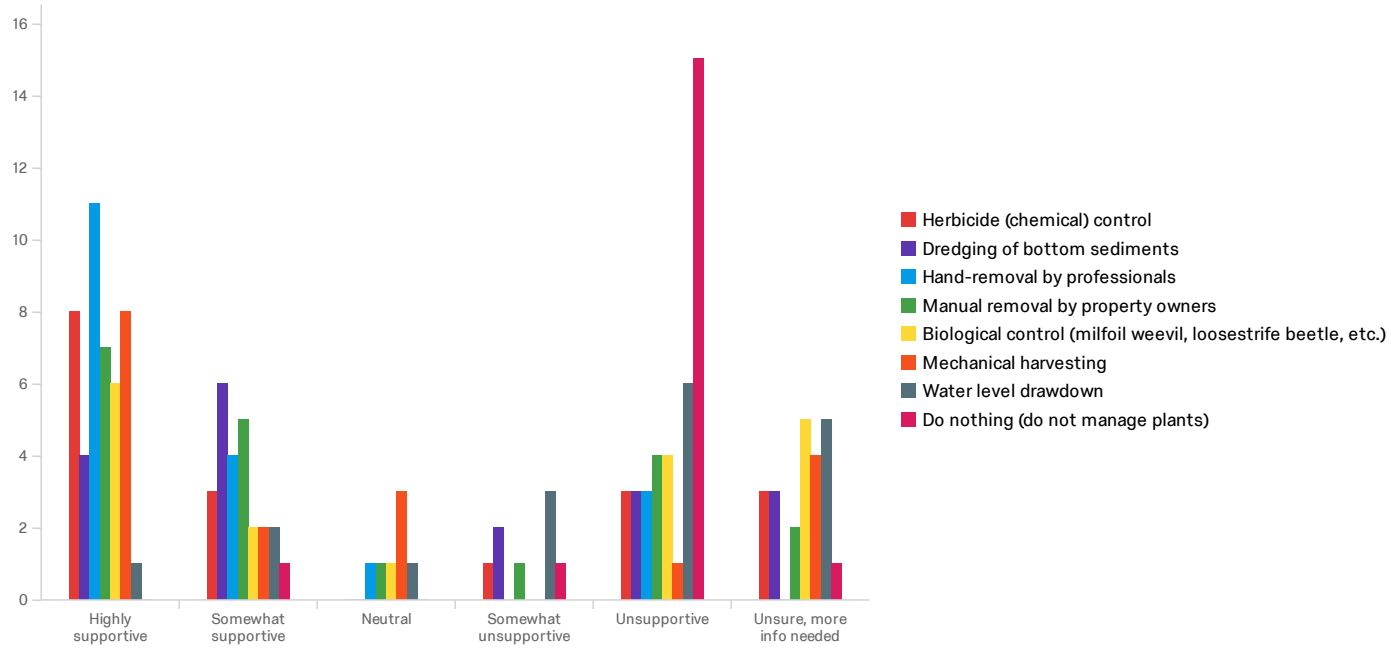
Q34 - Do you believe aquatic plant control is needed on Anderson Lake?



#	Field		Choice Count
1	Yes	90%	18
2	No	0%	0
3	Unsure	10%	2
			20

Showing rows 1 - 4 of 4

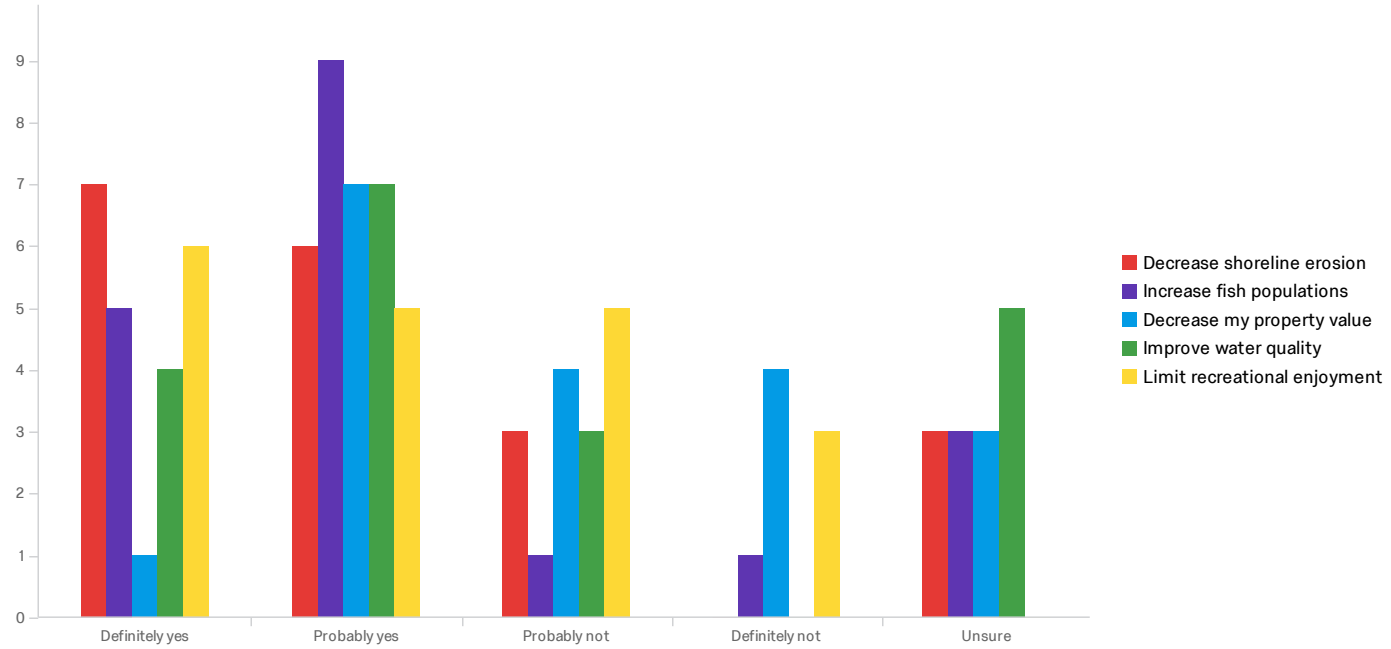
Q35 - What is your level of support for the responsible use of the following techniques to manage aquatic plants on Anderson Lake?



#	Field	Highly supportive	Somewhat supportive	Neutral	Somewhat unsupportive	Unsupportive	Unsure, more info needed	Total
1	Herbicide (chemical) control	44% 8	17% 3	0% 0	6% 1	17% 3	17% 3	18
2	Dredging of bottom sediments	22% 4	33% 6	0% 0	11% 2	17% 3	17% 3	18
3	Hand-removal by professionals	58% 11	21% 4	5% 1	0% 0	16% 3	0% 0	19
4	Manual removal by property owners	35% 7	25% 5	5% 1	5% 1	20% 4	10% 2	20
5	Biological control (milfoil weevil, loosestrife beetle, etc.)	33% 6	11% 2	6% 1	0% 0	22% 4	28% 5	18
6	Mechanical harvesting	44% 8	11% 2	17% 3	0% 0	6% 1	22% 4	18
7	Water level drawdown	6% 1	11% 2	6% 1	17% 3	33% 6	28% 5	18
8	Do nothing (do not manage plants)	0% 0	6% 1	0% 0	6% 1	83% 15	6% 1	18

Showing rows 1 - 8 of 8

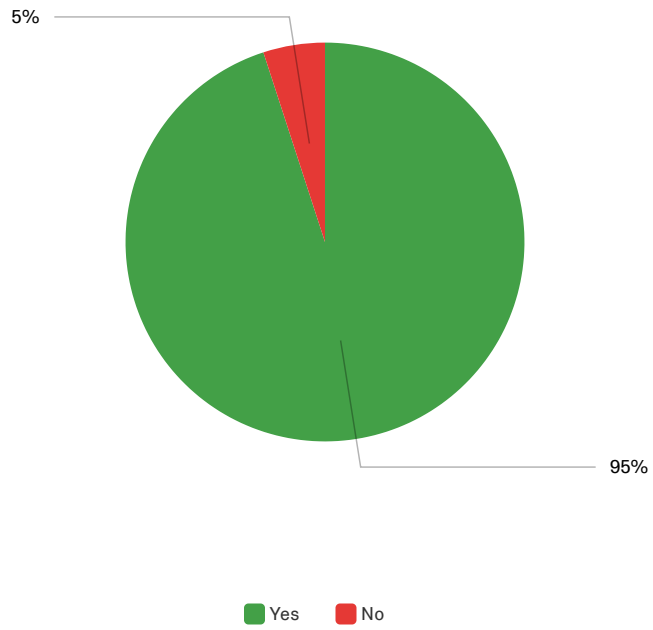
Q36 - In your opinion, does establishing or maintaining native vegetation in the water in the near-shore area...



#	Field	Definitely yes	Probably yes	Probably not	Definitely not	Unsure	Total
1	Decrease shoreline erosion	37% 7	32% 6	16% 3	0% 0	16% 3	19
2	Increase fish populations	26% 5	47% 9	5% 1	5% 1	16% 3	19
3	Decrease my property value	5% 1	37% 7	21% 4	21% 4	16% 3	19
4	Improve water quality	21% 4	37% 7	16% 3	0% 0	26% 5	19
5	Limit recreational enjoyment	32% 6	26% 5	26% 5	16% 3	0% 0	19

Showing rows 1 - 5 of 5

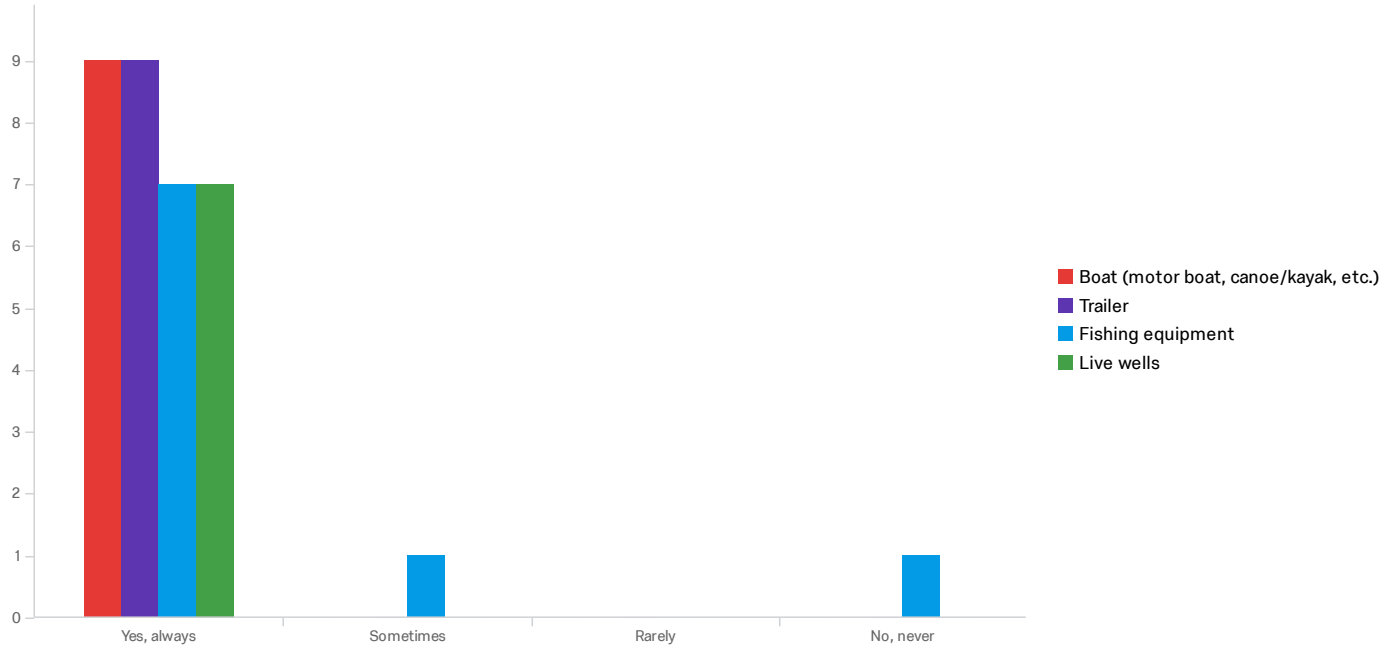
Q37 - Are you aware of invasive species (in general)?



#	Field		Choice Count
1	Yes	95%	19
2	No	5%	1
			20

Showing rows 1 - 3 of 3

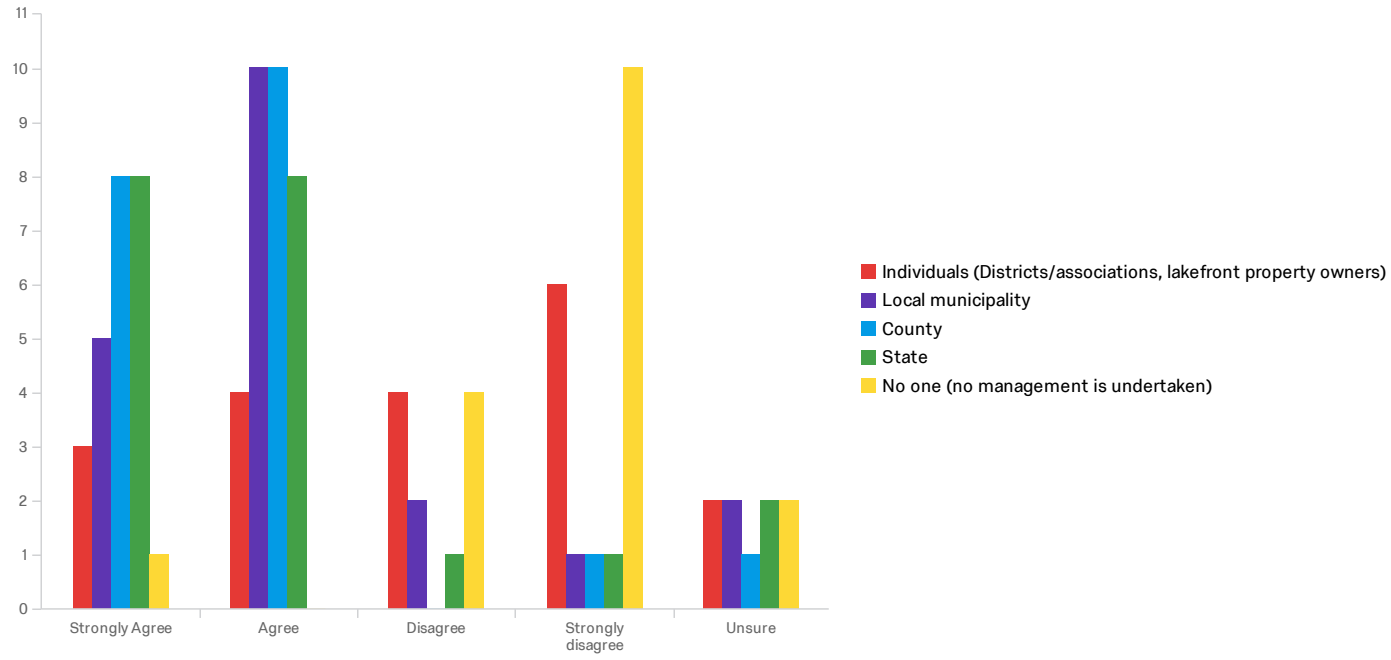
Q39 - After you have been to another lake, do you clean your.... before bringing it back to Anderson Lake?



#	Field	Yes, always	Sometimes	Rarely	No, never	Total
1	Boat (motor boat, canoe/kayak, etc.)	100% 9	0% 0	0% 0	0% 0	9
2	Trailer	100% 9	0% 0	0% 0	0% 0	9
3	Fishing equipment	78% 7	11% 1	0% 0	11% 1	9
4	Live wells	100% 7	0% 0	0% 0	0% 0	7

Showing rows 1 - 4 of 4

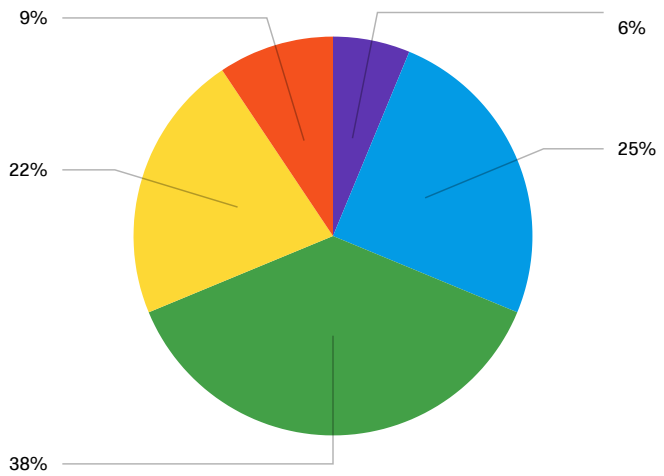
Q40 - Who should pay the cost of managing invasive aquatic plants?



#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Individuals (Districts/associations, lakefront property owners)	16% 3	21% 4	21% 4	32% 6	11% 2	19
2	Local municipality	25% 5	50% 10	10% 2	5% 1	10% 2	20
3	County	40% 8	50% 10	0% 0	5% 1	5% 1	20
4	State	40% 8	40% 8	5% 1	5% 1	10% 2	20
5	No one (no management is undertaken)	6% 1	0% 0	24% 4	59% 10	12% 2	17

Showing rows 1 - 5 of 5

Q41 - What is the most effective way to inform others about aquatic invasive species?



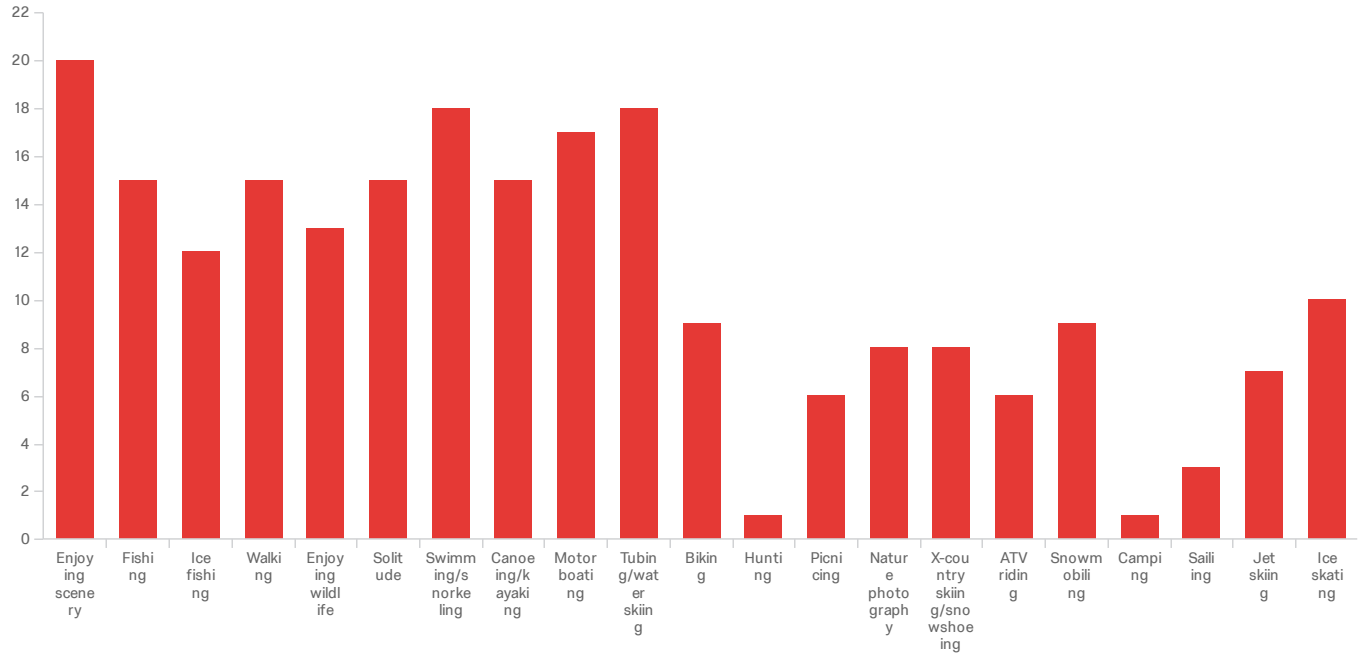
#	Field	Choice Count
1	Newspaper	0% 0
2	Billboard	6% 2
3	Info pamphlets	25% 8
4	Lakeside signs/kiosks	38% 12
5	Volunteer staff at boat launch	22% 7
6	Other	9% 3
		32

Showing rows 1 - 7 of 7

Q12 - In your opinion, what should be done to restore, maintain or improve Anderson Lake?

In your opinion, what should be done to restore, maintain or improve Anders...
stop big farm run off, use fish to eat invasive species, no chemicals ever
Enforce no swimming at boat launch. Manage invasive vegetation. Educate homeowners on the dangers of lawn chemicals.
Enforcement of no loitering at boat launch, checking for boating licenses, enforcing boating safety laws (especially related to distance from shore and between other boats)
after 40 years the water does not seem to have changed to much, not quite as clear as i remember swimming as a kid; but, still much better than some of the surrounding lakes. I've been told that lakes have a cycle and if we elminate one plant, then in 3-5 years we'll have another invasive plant to try and control. why is this an issue now ? maybe the increased boat traffic should be controlled instead.
Track and reduce PPM contaminants such as iron and sulfur. Remove all invasive plants in water.
The most effective, evidence-based process to remove the invasive weeds- perhaps chemical application
Eradicate the invasive weeds choking out the ecosystem
Try to eliminate Eurasian milfoil ASAP. It took over in 2019 and definitely is affecting swimming and safety because swimmers are going out deeper/ psst the weeds and/or floating /anchoring boats around the lake.
Better signage at the public boat launch, a hose at the boat launch to rise/wash boats as they are launched into Anderson Lake and when leaving.
Invasive plant control
Repost sign at boat landing and make sure all lake rules are enforced before someone gets hurt or worse! Stop planting muskie and weed control
We need to address the invasive Milfoil in the lake and get it under control. Although, I know it is impossible to rid the lake of this invasion. You need to stop adding predator fish to our lake. The pan fish our disappearing!
Due to how fast milfoil is spreading and some property owners harvesting it incorrectly and causing more of the spread, a herbicide is needed asap
Weed/plant control
Although we have a minimal amount of Eurasian water-milfoil, the amount has increased over the past few years.We are looking to have the EWM removed via mechanical Diver Assisted Suction Harvest.
hand harvesting of Euroasian Milfoil by properly trained land owners and professional companies
Establish uniform boating ordinances for the two townships

Q45 - What recreational activities do you partake in on Anderson Lake (check all that apply)?



#	Field	Choice Count
1	Enjoying scenery	9% 20
2	Fishing	7% 15
3	Ice fishing	5% 12
4	Walking	7% 15
5	Enjoying wildlife	6% 13
6	Solitude	7% 15
7	Swimming/snorkeling	8% 18
8	Canoeing/kayaking	7% 15
9	Motor boating	8% 17
10	Tubing/water skiing	8% 18
11	Biking	4% 9
12	Hunting	0% 1
13	Picnicing	3% 6

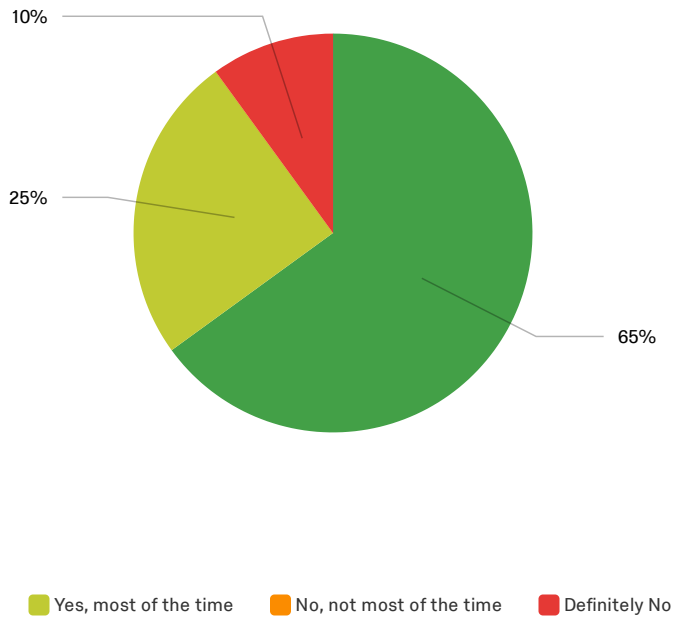
#	Field		Choice Count
14	Nature photography	4%	8
15	X-country skiing/snowshoeing	4%	8
16	ATV riding	3%	6
17	Snowmobiling	4%	9
18	Camping	0%	1
19	Sailiing	1%	3
20	Jet skiing	3%	7
21	Ice skating	4%	10
			226

Showing rows 1 - 22 of 22

Q46 - Other recreational activities not included above:

Other recreational activities not included above:
Star gazing, broom ball
Paddle board
None

Q47 - "No Wake" is allowed on Anderson Lake between 6pm and 10am. Do you like the current "No Wake" rules as they are?



#	Field	Choice Count	
1	Definitely Yes	65%	13
2	Yes, most of the time	25%	5
3	No, not most of the time	0%	0
4	Definitely No	10%	2
5	Unsure	0%	0
			20

Showing rows 1 - 6 of 6

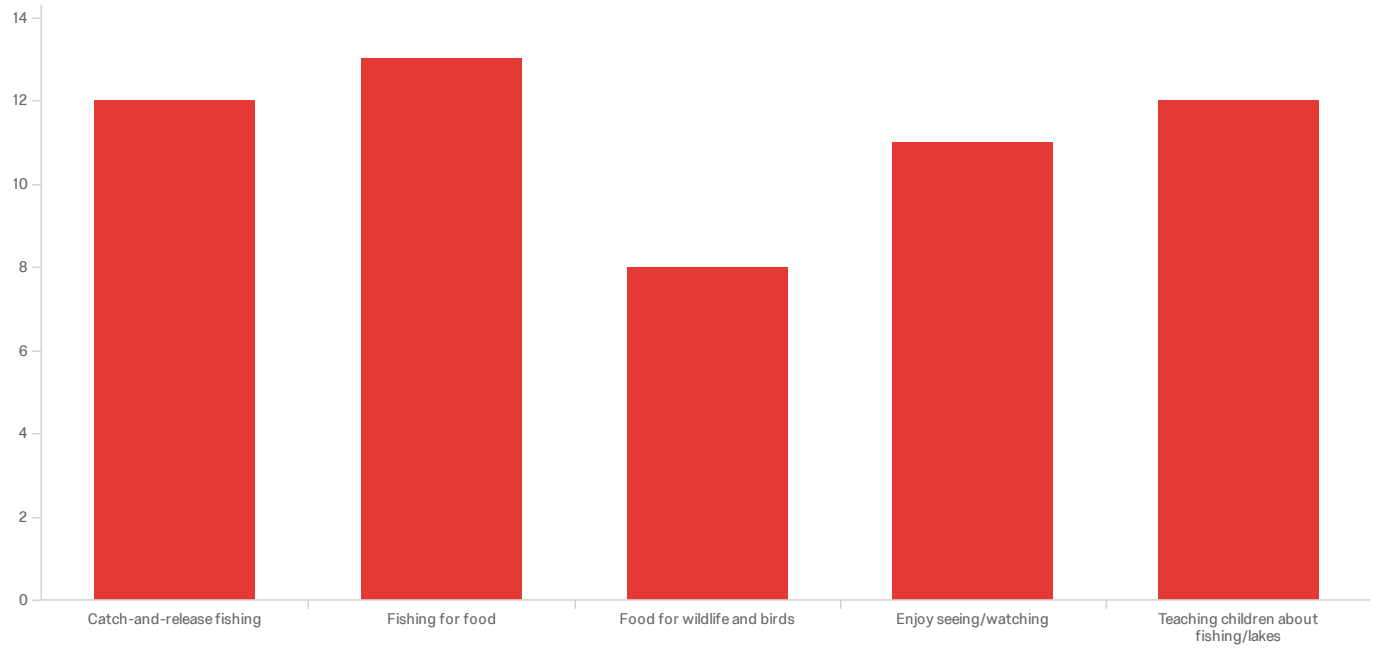
Q48 - If you think the "No Wake" rules should be adjusted...in what way?

If you think the "No Wake" rules should be adjusted...in what way?
I do like the times but it would be nice if they were inforced!
enforce what we have...rules but no enforcement
6pm-9am
no change needed
Any extra time would be greatly appreciated
change to 9:00am-7pm, also clarify is it NO Wake or No Skiing/tubing? Since fishing boats and others drive fast across the lake later than posted.
No...do not change
Skiing should be allowed earlier, at 9:00am. (Unrealistic but jet skis not allowed until an hour later) it's been my understanding that it is “no water sports “ not no wake from 10-6. If ”no wake” is the rule it is not followed and if it is for fisherman, I feel that extending boating hours in morning would be more beneficial than extending later,
fine the way it is.
They need to be reposted at boat landing
We have a no water sports on the lake from 6pm until 10am. The fisherman should be able to make a wake!!
It should be enforced as their are many violators
If they were to change I would want less "No Wake"
If there is actually a no wake ordinance on the lake, it is not enforced.

Q49 - What could be done to improve your recreation experience on Anderson Lake?

What could be done to improve your recreation experience on Anderson Lake?
Everybody going around the lake in the same direction !
Enforce no swimming at boat launch. Eliminating northern.
Enforcement of boating rules
post the rules, clear the boat landing area - it's not a public beach. some drivers are circling in wrong direction and approaching too close to docks & swimmers.
Stopping jet skis from driving illegally / dangerously. Stop letting people illegally use boat launch as a beach.
No Jet skis. Control Geese population since crap all over the docks and then ends up in the water.
Eradicate invasive weeds
Eliminate heavy weed areas. Educate wave runners on boating safety.
Its really quite fine.
Control of invasive plants
Having law enforcement follow through with boat launch rules!
Return the fishing to it's natural status by not adding any more predator fish!
No swimming enforced at the boot landing for a change
too many weeds
May consider not allowing Jetski's on the lake.
punish the abusers not following safe boating rules and terrorizing the neigbors around the lake
Enforcement of existing regulations, rules, and ordinances--both county and state.

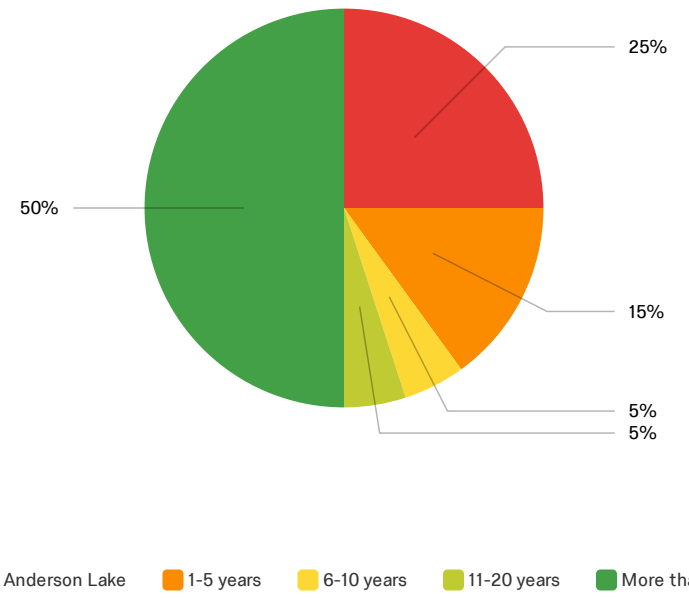
Q51 - For what purposes do you value the fishery in Anderson Lake? (Check all that apply)



#	Field		Choice Count
1	Catch-and-release fishing	21%	12
2	Fishing for food	23%	13
3	Food for wildlife and birds	14%	8
4	Enjoy seeing/watching	20%	11
5	Teaching children about fishing/lakes	21%	12
			56

Showing rows 1 - 6 of 6

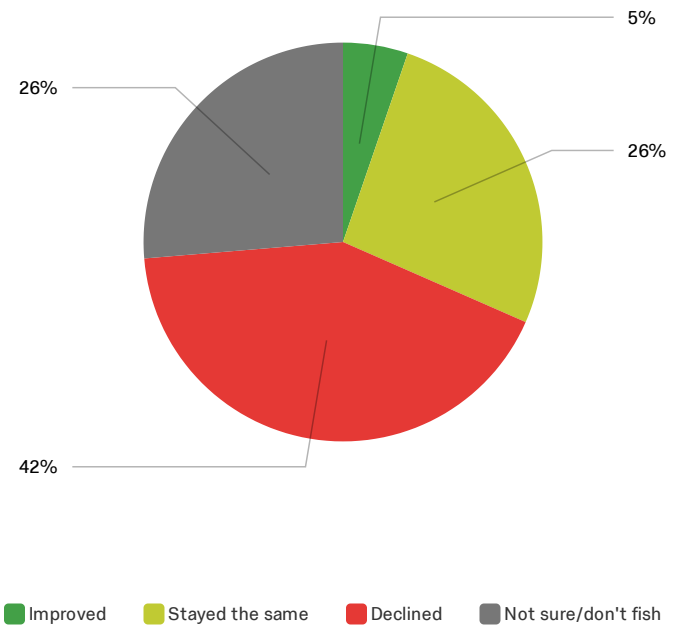
Q52 - How many years experience do you have fishing Anderson Lake?



#	Field		Choice Count
1	I don't fish Anderson Lake	25%	5
2	1-5 years	15%	3
3	6-10 years	5%	1
4	11-20 years	5%	1
5	More than 20 years	50%	10
			20

Showing rows 1 - 6 of 6

Q53 - In the time you have been fishing Anderson Lake, would you say the quality of fishing has...



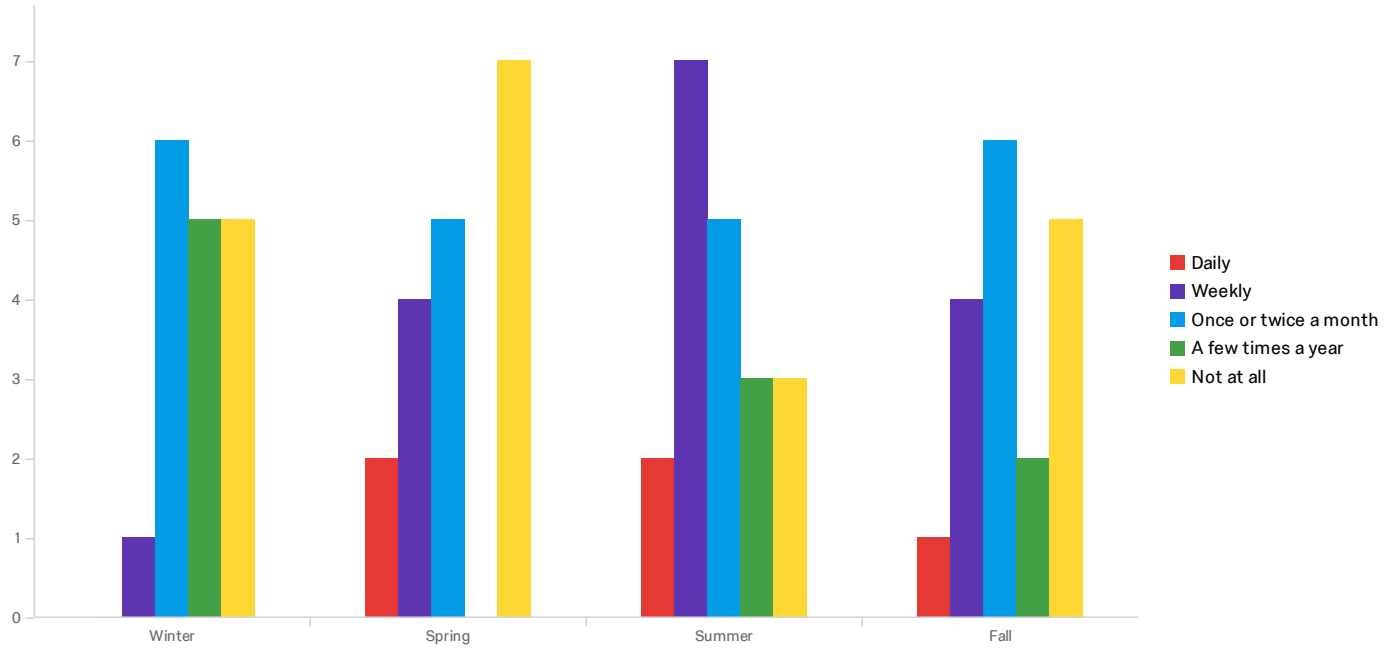
#	Field	Choice Count	
1	Improved	5%	1
2	Stayed the same	26%	5
3	Declined	42%	8
4	Not sure/don't fish	26%	5
			19

Showing rows 1 - 5 of 5

Q54 - What do you think has contributed to the change in fishing?

What do you think has contributed to the change in fishing?
muskie planting in the lake
Pressure and invasive species
not sure because we haven't fished the lake in many years.
Planting muskie
Stocking the lake with fish that are not natural to it's environment.
milfoil
Unsure
planting fish, increasing habitat like tree drops and cribs

Q55 - When and how often do you fish Anderson Lake?



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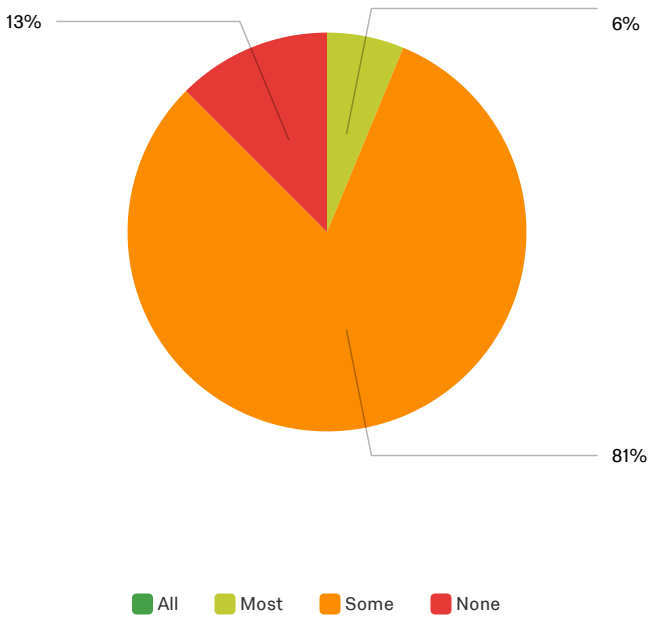
Q56 - What type of fish do you catch on Anderson Lake?

What type of fish do you catch on Anderson Lake?
Bass, pan
crappie, blue gill, large mouth bass
Walleye bass crappie northern pike bluegill
Bass,walleye, crappie
bluegill, bass, northern...always release when we do fish.
I mostly panfish
Northern , used to catch blue till and crappy
We like to catch Bass, Crappie, Perch and Bullhead. Unfortunately, they do not appear to be in abundance any longer.
perch
pan fish
Bass Bluegill Crappy Northern
Northern Pike
pan fish and walley, some northerns
bass, northern, panfish

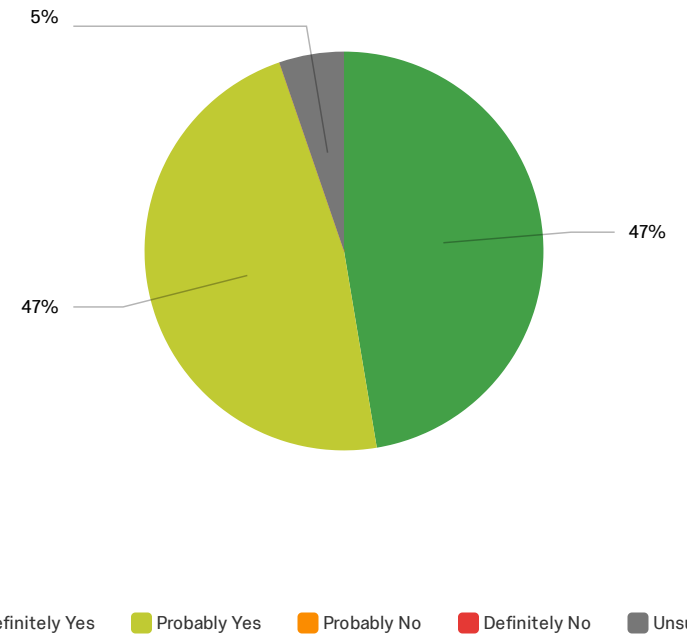
Q57 - In general, how many of the fish you catch are big enough to keep?



#	Field	Choice Count
1	All	0% 0
2	Most	6% 1
3	Some	81% 13
4	None	13% 2
		16

Showing rows 1 - 5 of 5

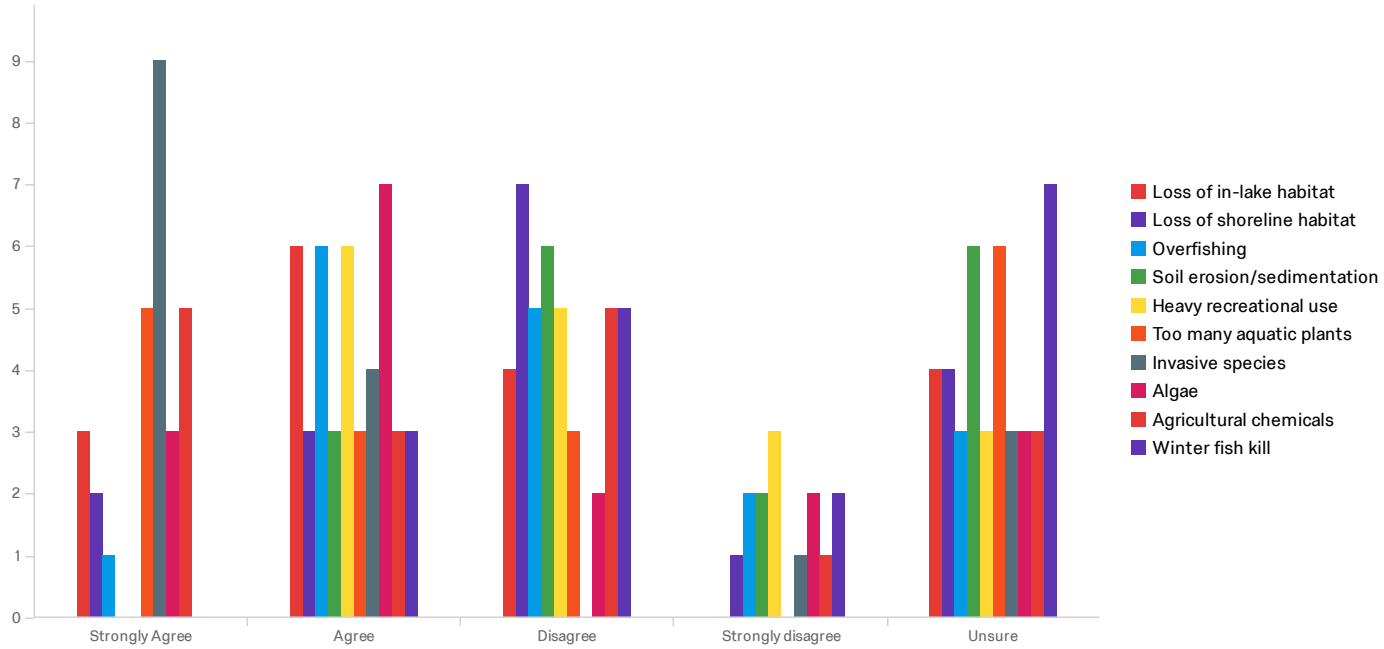
Q58 - Do you believe fish from Anderson Lake are safe to eat?



#	Field		Choice Count
1	Definitely Yes	47%	9
2	Probably Yes	47%	9
3	Probably No	0%	0
4	Definitely No	0%	0
5	Unsure	5%	1
			19

Showing rows 1 - 6 of 6

Q59 - What do you think is the greatest threat to the fishery in Anderson Lake in the next 10 years?



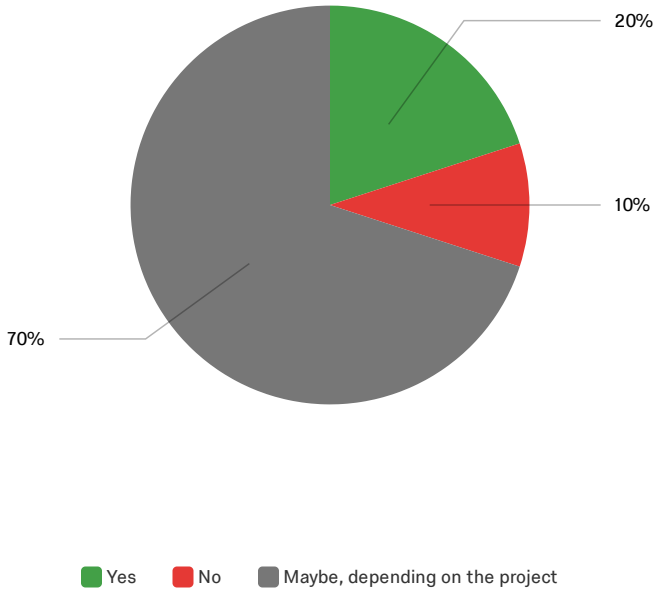
#	Field	Strongly Agree	Agree	Disagree	Strongly disagree	Unsure	Total
1	Loss of in-lake habitat	18% 3	35% 6	24% 4	0% 0	24% 4	17
2	Loss of shoreline habitat	12% 2	18% 3	41% 7	6% 1	24% 4	17
3	Overfishing	6% 1	35% 6	29% 5	12% 2	18% 3	17
4	Soil erosion/sedimentation	0% 0	18% 3	35% 6	12% 2	35% 6	17
5	Heavy recreational use	0% 0	35% 6	29% 5	18% 3	18% 3	17
6	Too many aquatic plants	29% 5	18% 3	18% 3	0% 0	35% 6	17
7	Invasive species	53% 9	24% 4	0% 0	6% 1	18% 3	17
8	Algae	18% 3	41% 7	12% 2	12% 2	18% 3	17
9	Agricultural chemicals	29% 5	18% 3	29% 5	6% 1	18% 3	17
10	Winter fish kill	0% 0	18% 3	29% 5	12% 2	41% 7	17

Showing rows 1 - 10 of 10

Q61 - Do you have any additional comments regarding Anderson Lake?

Do you have any additional comments regarding Anderson Lake?
get better at testing for failed septic in lake water, control large farm run off, dont use chemicals ever!
Would like to see the water level higher. It seemed low this summer.
Enforce boating rules, regulate loitering at the boat launch
someone needs to monitor the boat landing, just some periodic/random checks could be beneficial
We appreciate the help
Priority should be to eliminate Eurasian milfoil everywhere on the lake and do something about the Canadian Geese.
It's been a great lake in the 62 years we've owned property on it . . . let's not destroy it!
Would like to see more walleye and perch in Anderson Lake; can that happen?

Q63 - Would you be interested in volunteering on a project on your lake (such as shoreland restoration planting, invasive species monitoring/removal, water quality monitoring, highway cleanup, etc.)?



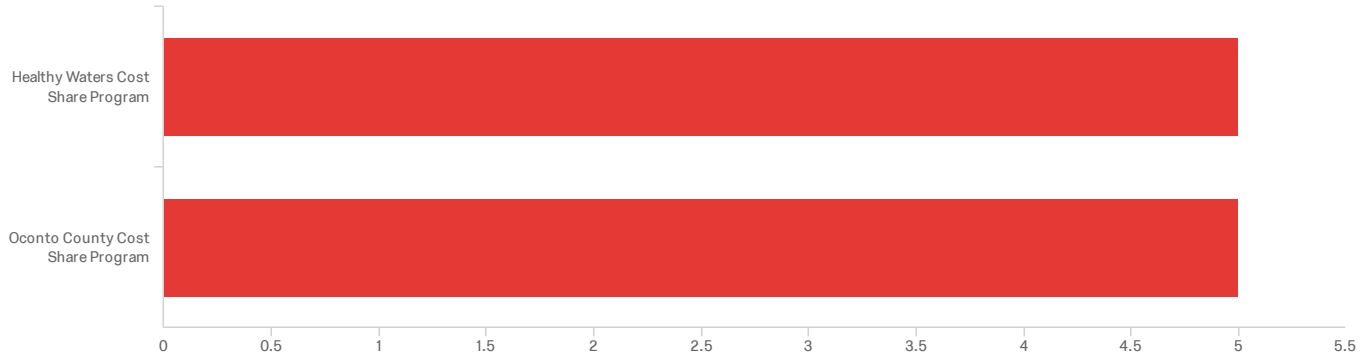
#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Would you be interested in volunteering on a project on your lake (such as shoreland restoration planting, invasive species monitoring/removal, water quality monitoring, highway cleanup, etc.)?	1	3	3	1	1	20

#	Field		Choice Count
1	Yes	20%	4
2	No	10%	2
3	Maybe, depending on the project	70%	14
			20

Showing rows 1 - 4 of 4

Q64 - Are you aware of the following programs available to you from Oconto County?

(Check all that apply)



#	Field		Choice Count
1	Healthy Waters Cost Share Program	50%	5
2	Oconto County Cost Share Program	50%	5
			10

Showing rows 1 - 3 of 3

End of Report

Appendix D

Appendix D. 2019 EWM Monitoring and Control Report (Onterra)

INTRODUCTION

Anderson Lake, Oconto County, is a 177-acre drainage lake with a maximum depth of 40 feet. A small water control structure exists on the lake's outlet (Weso Creek) before draining into the Oconto River south of Chute Pond (Figure 1).

Figure 1. Anderson Lake, Oconto County, WI.

The primary citizen-based organization leading management activities on Anderson Lake is the Anderson Lake Association (ALA). Eurasian watermilfoil (EWM) was first located in Anderson Lake in 2015. Regional Wisconsin Department of Natural Resources (WDNR) staff conducted a point-intercept survey during mid-August 2015, locating EWM at one sampling location. The ALA noticed an increase in the EWM population during 2016 and 2017. Onterra was contracted to conduct a meander-based EWM mapping survey in late-summer of 2017. The 2017 EWM mapping survey located three areas of colonized EWM and individual EWM plants throughout portions of the lake's littoral area (Map 1, left frame).

Discussions between the ALA and Onterra following the 2017 monitoring survey led to the successful application for a WDNR Aquatic Invasive Species (AIS) Early Detection and Response Grant in February 2018 (AIRR-232-18). During 2018, Onterra monitored the EWM through the completion of a Late-Summer EWM Mapping Survey which showed an increase in the EWM population as compared to the previous survey in 2017 (Map 1, right frame).

An informational meeting with ALA members and Onterra occurred in September 2018, during which general discussions took place about EWM control strategies, hand harvesting, herbicide treatment strategies, and the WDNR's EWM Long-Term Trends Monitoring Program. The ALA explored the idea of conducting a targeted herbicide spot-treatment on the north side of the lake around some of the densest EWM in the lake. Some attendees at the meeting expressed that non-herbicide control methods should be exhausted prior to the consideration of the use of aquatic herbicides. After considerations, ultimately, the ALA chose to manage the EWM population on a lake wide level in 2019 with a coordinated professional hand harvesting program that utilizes 5-6 days of Diver Assisted Suction Harvest (DASH). The DASH methodology includes divers harvesting EWM and feeding the plants into a suction hose for delivery to the deck of the harvesting vessel. DASH is considered a form of mechanical harvesting and requires a permit from the WDNR. The DASH system is thought to be more efficient than traditional hand harvesting efforts since divers do not need to surface to deliver plants. This report discusses the professional monitoring and coordinated EWM hand harvesting management program that took place in Anderson Lake during 2019. This report is the final deliverable for the ALA's AIS Early Detection and Response Grant (AIRR-232-18).

MONITORING METHODOLOGIES

A series of EWM mapping surveys were used to coordinate and monitor the 2019 hand-harvesting efforts (Figure 2). A preliminary hand harvesting strategy was developed based on the results of the 2018 Late-Summer EWM Mapping Survey. In late-spring/early summer 2019, an Early Season Aquatic Invasive Species Survey (ESAIS) was completed from which the hand-harvesting strategy was finalized. After the professional hand-harvesting activities were completed, Onterra completed the 2019 Late-Summer EWM Mapping Survey, the results of which serve as a post-harvesting assessment of the hand-removal efforts. The hand-removal program would be considered successful if the EWM population within the targeted areas was found to have been reduced and inhibited from expanding between the 2018 Late-Summer EWM Mapping Survey to the 2019 Late-Summer EWM Mapping Survey.

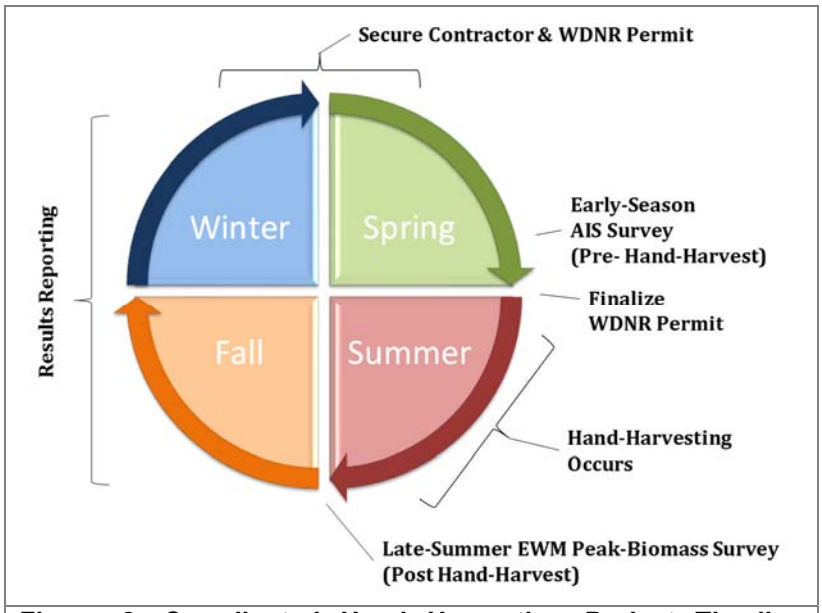


Figure 2. Coordinated Hand Harvesting Project Timeline Diagram.

EARLY SEASON AIS SURVEY RESULTS

Onterra ecologists completed the Early-Season AIS Survey on June 3, 2019. The entire littoral zone of Anderson Lake was meandered and EWM observed was mapped by using either 1) point-based or 2) area-based methodologies. Large colonies >40 feet in diameter are mapped using polygons (areas) and were qualitatively attributed a density rating based upon a five-tiered scale from *highly scattered* to *surface matting*. Point-based techniques were applied to EWM locations that were considered as *small plant colonies* (<40 feet in diameter), *clumps of plants*, or *single or few plants*. While EWM is usually not at its peak growth at this time of year, the water is typically clearer during the early summer allowing for more effective viewing of submersed plants, and EWM is often growing higher in the water column than many of the native aquatic plants at that time of year. The locations of EWM occurrences located during early summer are provided to professionals or volunteers to aid in their hand-removal efforts. Based on the Early-Season AIS Survey slight modifications were made to the preliminary strategy, mainly with the addition of site C-19 included in the final strategy.

Overall, the EWM footprint was slightly more than the previous survey conducted in August 2018, however the survey results did show expansion of the population in some areas of the lake (Map 2). A few relatively small colonies were mapped with area-based methodologies (polygons) whereas the majority of the population consisted of *single plants, clumps of plants*, or *small plant colonies* and was mapped with point-based methods. Site A-19 contained a large and dense EWM population that in of itself was likely too large and dense to meet control expectations with a hand-harvesting strategy. It was believed that the other harvesting sites (B-19, C-19, D-19, & E-19) were of a more reasonable size to expect to see some level of EWM population suppression with the amount of DASH efforts that was

planned. If additional time and funding allows, harvesting in site A-19 would be considered, potentially by focusing on creating navigational lanes lakeward from the public boat landing. Professional or volunteer-based hand-harvesting was thought to be applicable to any of the other known occurrences, particularly the somewhat isolated *singles* or *clumps of plants* located in shallower water depths. Onterra provided the spatial data from the ESAIS survey to the professional hand harvesting firm and to the ALA to guide the harvesting efforts.

PROFESSIONAL HAND-HARVESTING ACTIVITIES

The ALA contracted with Diver Assisted Suction Harvesting, LLC (DASH, LLC) to conduct professional hand-harvesting of EWM in 2019. Divers from DASH, LLC conducted hand-harvesting activities on June 17-21, 2019 and August 13-16, 2019. Divers removed a total of 4,238 pounds of EWM from the five permitted sites over the course of eight days (Table 1). Initial harvesting efforts were directed at the EWM population on the east side of Anderson Lake (B-19) followed by harvesting other known occurrences in the rest of the lake (A-19, C-19, D-19 and E-19). A detailed DASH summary provided by DASH, LLC is included with this report as Appendix A.

Table 1. 2019 DASH EWM Harvest Summary
Derived from DASH, LLC Summary Report

Site	Dive time (hours)	AIS removed (lbs)
A-19	11.37	294
B-19	17.34	2120
C-19	11.19	486
D-19	2.74	190
E-19	12.1	1148
Total	54.74	4238

Onterra uploaded the results of the ESAIS survey onto the ALA's Garmin GPS device. The ALA used the GPS to aid in their search for additional EWM occurrences around the lake that were not identified in the previous survey. If any new occurrences of EWM are located by ALA members during the course of their summer monitoring, the ALA would provide coordinates to Onterra in advance of the next scheduled professional mapping survey.

The ALA also spent 59 hours of organized EWM removal efforts in 2019 with the focus of the efforts being on removing dense colonies on the north side of the lake from shore to approximately 3.5 feet of depth.

2019 LATE-SUMMER EWM MAPPING SURVEY RESULTS

The Late-Summer EWM Mapping Survey was conducted on August 29, 2019 to understand the peak growth (peak-biomass) of the EWM population throughout the lake and to evaluate the sites that were targeted with professional hand harvesting efforts. The weather varied over the course of the survey with cloudy conditions at first followed by some light to moderate rain, before clearing up towards the end of the survey with some sunshine. To account for the conditions, the field crew worked at slower speeds, made passes closer together and did occasional turns of the boat to break the waves in some

areas. The crew took about a 30-minute break during a period of moderate rain to wait for conditions to improve before resuming the survey. The results of the 2019 Late-Summer EWM Mapping Survey are displayed on Map 3. The EWM population was found to have expanded somewhat since the previous survey completed in late-summer 2018.

Figure 3 represents the acreage of EWM colonies that are mapped with area-based methodologies (polygons), but does not account for EWM occurrences that are mapped with point-based methodologies (*single or few plants, clumps of plants,* or *small plant colonies*). *Highly scattered* colonies may vary from one survey to the next as a cluster of points could be considered *highly scattered* as well. This may partially be occurring between the years 2018 and 2019. A total of 7.6 acres of colonized EWM was located during the August 2019 survey. Of these 7.6 acres, 2.7 acres consisted of relatively dense colonies of *dominant*, *highly dominant* or *surface matted* plants, while another 4.9 acres consisted of less dense colonies described as *highly scattered* and *scattered* (Map 3). The largest concentration of EWM was located along the northern end of the lake west of the public access location. Additional EWM was mapped with point-based methods in many littoral areas of the lake. EWM occurrences were most prevalent between approximately 4 and 6 feet of water, although some plants were also located in shallower depths near shore.

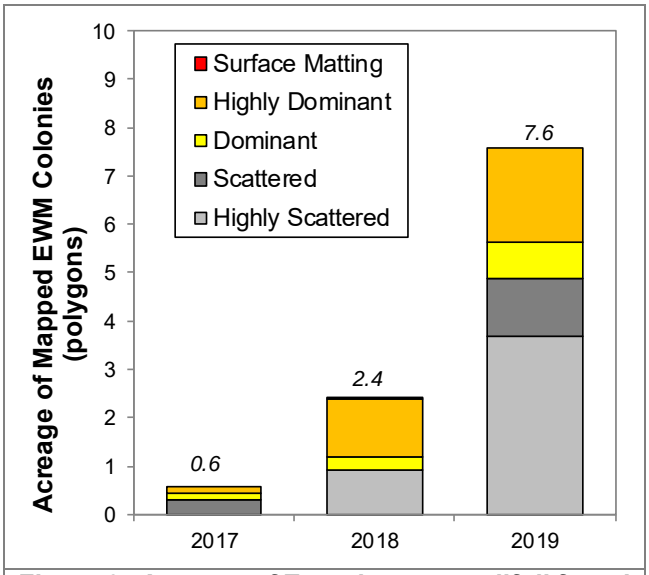


Figure 3. Acreage of Eurasian watermilfoil found in Anderson Lake from 2017 to 2019. Created using data from Onterra Late-Summer EWM Mapping Surveys.

Professional DASH Site Assessments

The sites that were targeted for professional hand harvesting efforts in 2019 are highlighted in Figures 4-6 where one frame displays the EWM population from the late-summer of 2018 (pre) and the other frame shows the EWM population from the late-summer of 2019 (post). Although the same areas were mapped during the June 2019 ESAIS survey, these results are not displayed on the figures below since the late-summer surveys are more directly comparable and are representative of the EWM populations at the same time period towards the end of the growing season.

Site A-19: Site A-19 was given last priority for harvesting efforts in 2019 versus the other permitted sites. Harvesting efforts in the site totaled 11.37 hours and resulted in the harvest of 294 pounds of EWM (Table 1). Harvesting was limited to targeting navigation lanes in the vicinity of riparian docks as well as lakeward from the public access location. The 2019 Late-Summer EWM Mapping Survey indicated little overall change in the EWM population in the site, however some lower density areas were delineated in sections of the site where harvesting efforts were likely focused (Figure 4).

Site B-19: The 2018 Late-Summer EWM Mapping Survey indicated that site B-19 contained two *highly dominant* EWM colonies as well as several *single or few plants*, *clumps of plants*, and a *small plant colony*. Professional hand harvesting efforts included 17.34 hours and yielded 2,120 pounds of EWM (Table 1). Following the removal efforts, the 2019 Late-Summer EWM Mapping Survey indicated a

decrease in the EWM footprint with no colonized areas present (Figure 5). The remnant EWM occurrences consisted of isolated *single or few plants* or *clumps of plants*. The reduction in EWM in site B-19 met lake managers expectations for the site.

Site C-19: The main target of the hand harvesting strategy in site C-19 was a *highly dominant* and smaller *dominant* colony which were identified during the August 2019 survey. Harvesting efforts in the site totaled 11.19 hours and resulted in the harvest of 486 pounds EWM (Table 1). After the removal efforts, the 2019 Late-Summer EWM Mapping Survey indicated the *highly dominant* and *dominant* EWM colonies remain at the same densities within the permitted harvesting area and further expansion of EWM was documented through the addition of a *scattered* colony within, and extending out from the southern end of the site (Figure 5). Hand harvesting activities fell short of expectations for this site as the removal efforts were unable to reduce the EWM population or inhibit expansion in the site.

Site D-19: Site D-19 surrounded a *surface matted* EWM colony that was mapped during the September 2018 survey. Professional harvesting efforts were limited to 2.74 hours in 2019 and yielded a harvest of 190 pounds of EWM (Table 1). The 2019 Late-Summer EWM Mapping Survey indicated the colony increased in size and remained dense as a *highly dominant* colony (Figure 6). The professional hand harvesting efforts in the site fell short of expectations as the EWM population expanded faster than the rate in which harvesting could address.

Site E-19: Site E-19 surrounded a *dominant* to *highly dominant* EWM colony as well as a number of *single or few plants* and *clumps of plants* that were mapped during the September 2018 survey. Professional harvesting efforts yielded a harvest of 1,148 pounds of EWM over 12.1 hours of diver time (Table 1). The 2019 Late-Summer EWM Mapping Survey indicated that despite the harvesting efforts, the EWM population expanded slightly (Figure 6). The hand harvesting efforts fell short of expectations for the site.

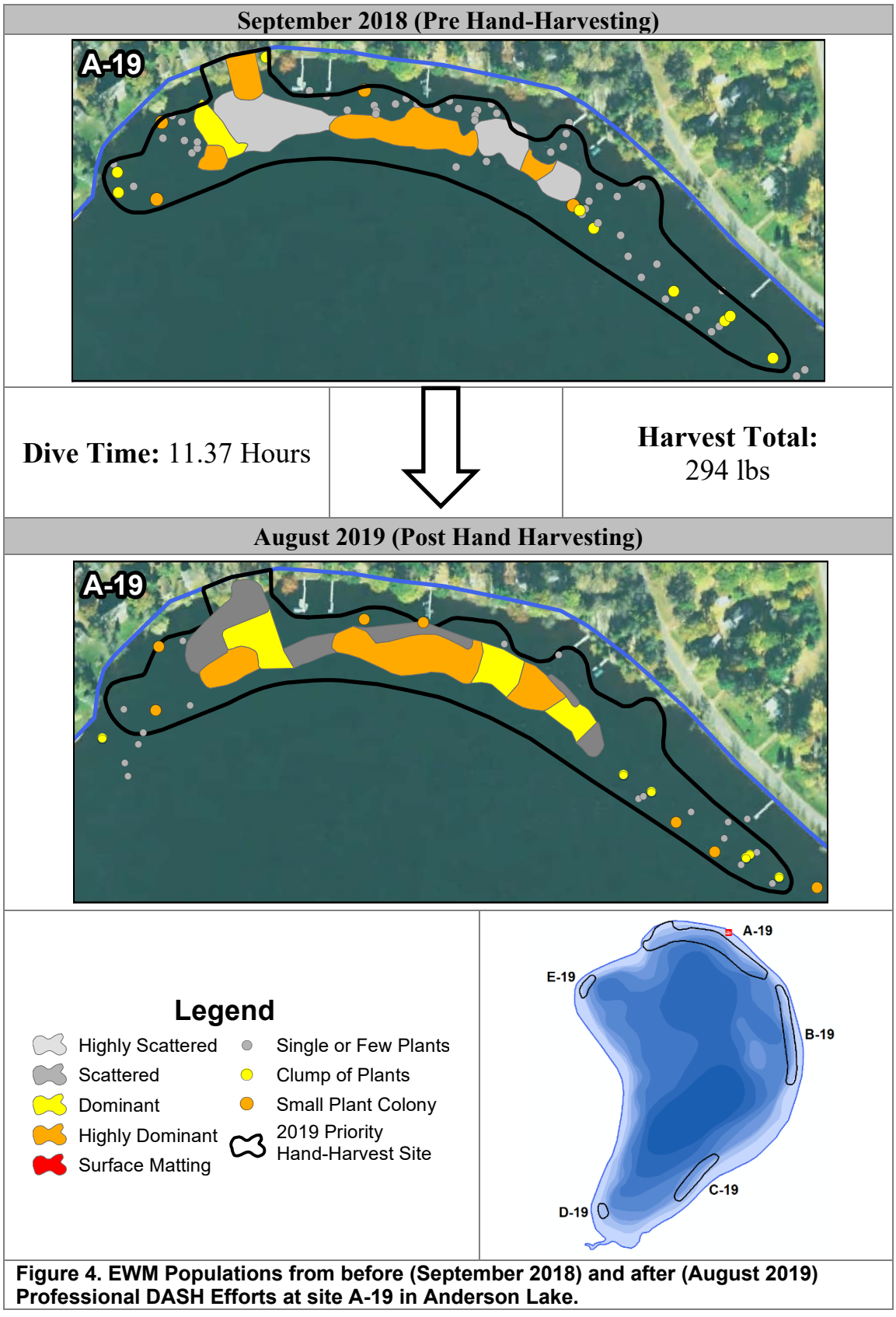


Figure 4. EWM Populations from before (September 2018) and after (August 2019) Professional DASH Efforts at site A-19 in Anderson Lake.

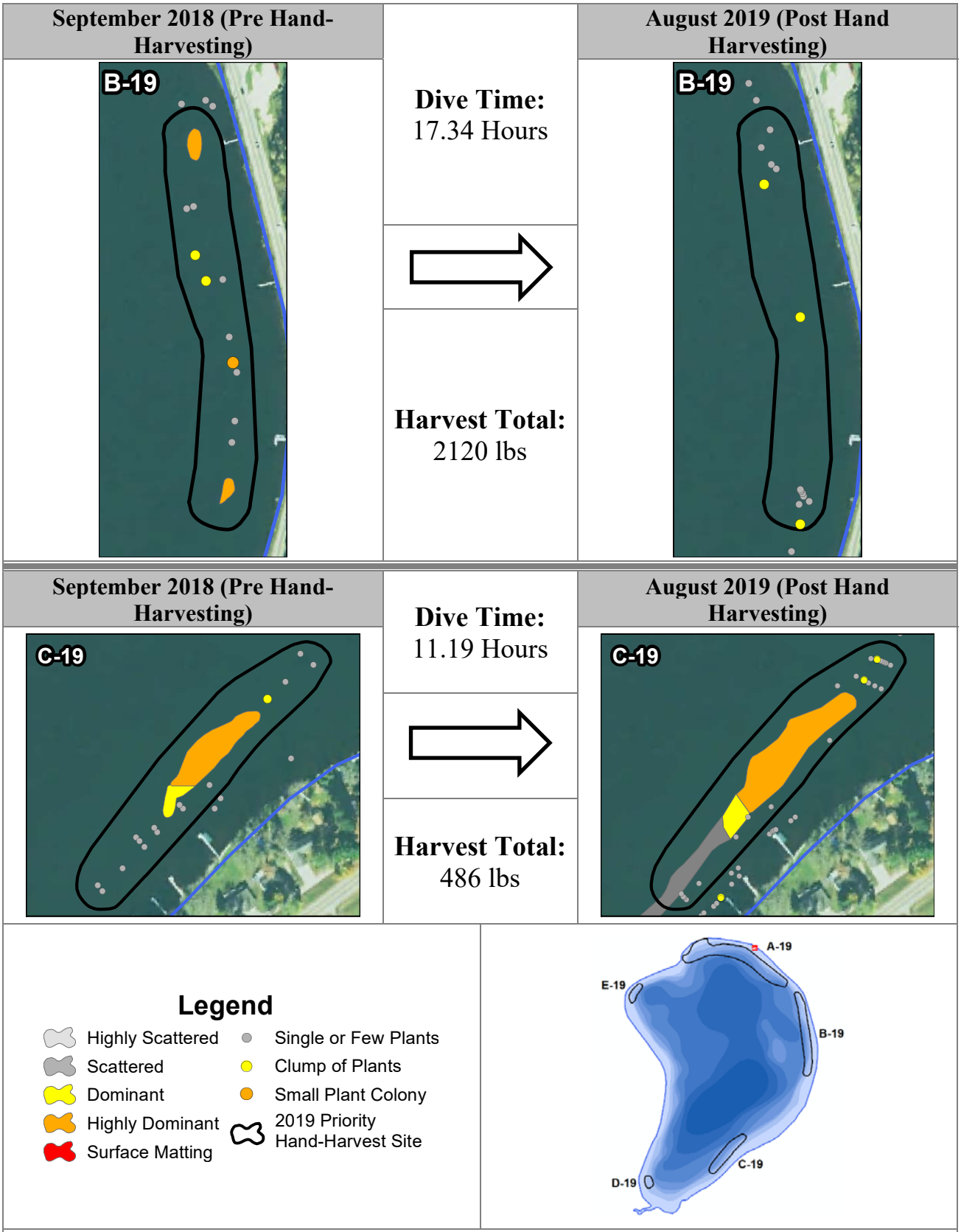


Figure 5. EWM results from before (September 2018) and after (August 2019) professional DASH efforts at site B-19 & C-19 in Anderson Lake.

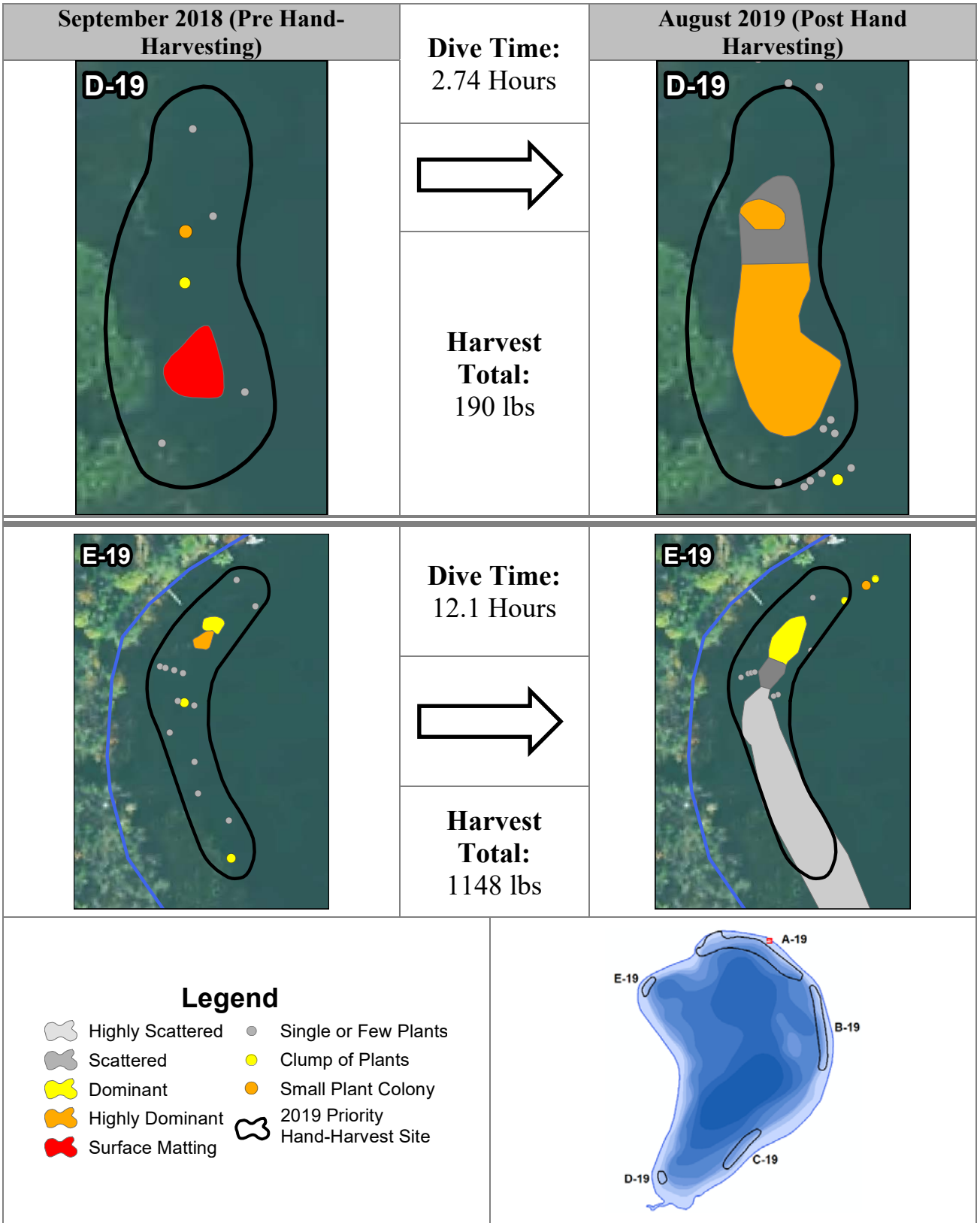


Figure 6. EWM results from before (September 2018) and after (August 2019) professional DASH efforts at sites D-19 and E-19 in Anderson Lake.

POINT INTERCEPT SURVEY RESULTS

Onterra ecologists completed a whole-lake point-intercept survey on Anderson Lake on August 9, 2019. The point-intercept method as described in the WDNR publication (WDNR PUB-SS-1068 2010) was used to complete this study. A point spacing of 39 meters was used resulting in approximately 469 total sampling locations, with between 99-109 sampling locations being located within the littoral zone during the period of study. This survey allows for a quantitative analysis of the aquatic plant community in the lake and is directly comparable to past or future surveys completed with the same methodology. Point-intercept surveys have been completed on Anderson Lake in 2015 by the WDNR and in 2019 by Onterra.

Figure 7 displays the littoral frequency of occurrence of aquatic plants located in the 2015 and 2019 survey. Littoral frequency of occurrence is used to describe how often each species occurred in the points that are within the maximum depth of plant growth (littoral zone), and is displayed as a percentage. A total of 42 species were physically encountered on the survey rake during the 2019 survey of which one, Eurasian watermilfoil, is a non-native exotic species. Expanded discussion on the three most common native species is also included in the following text.

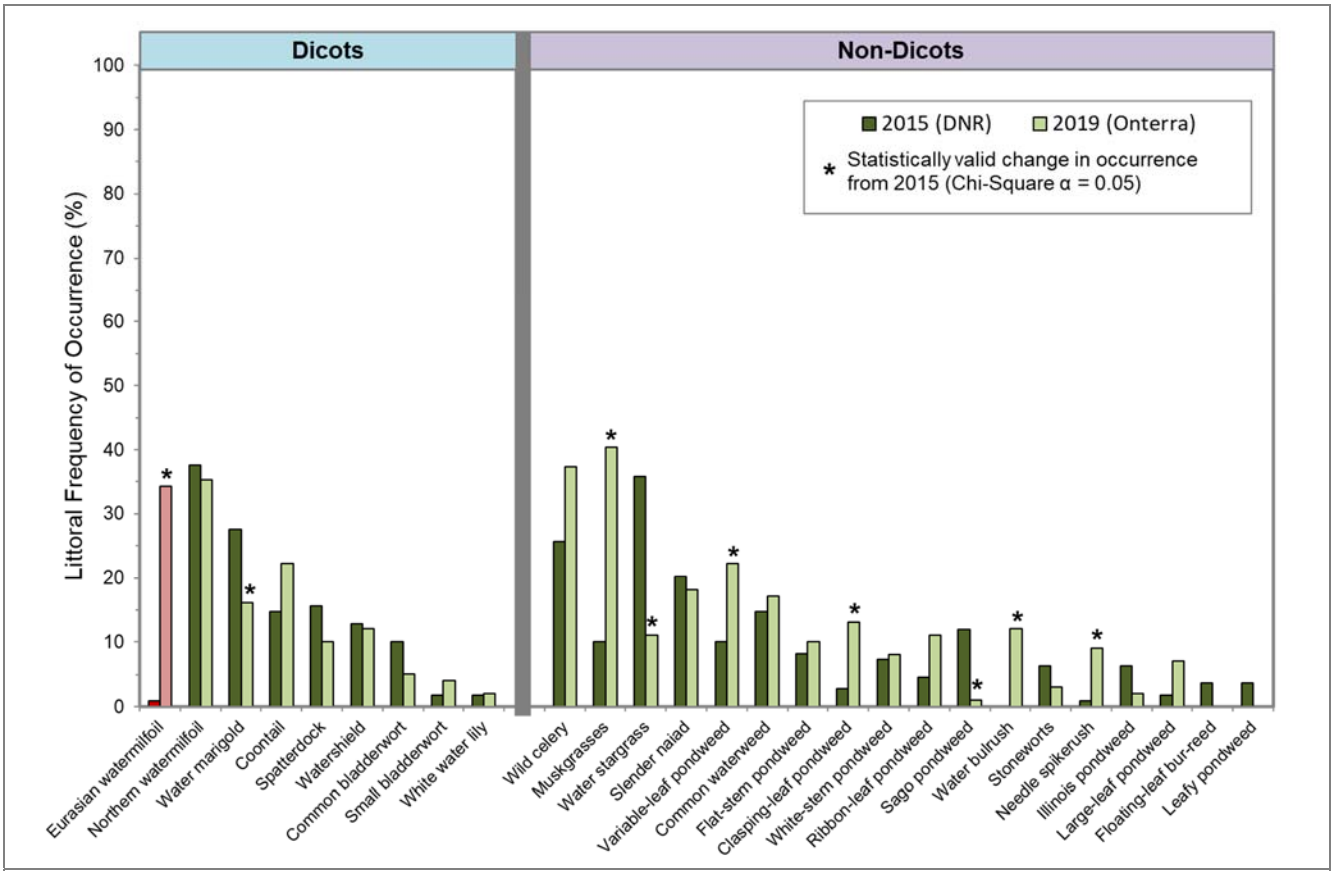


Figure 7. Littoral Frequency of Occurrence of aquatic plant species from a 2015 (WDNR) and 2019 (Onterra) whole-lake point-intercept survey in Anderson Lake.

Muskgrasses were the most frequently encountered plant in Anderson Lake, being located in 2019 at 40.4% of the sampling points within the littoral zone (Figure 7). Muskgrasses require lakes with good water clarity, and their large beds stabilize bottom sediments. Studies have also shown that muskgrasses

sequester phosphorus in the calcium carbonate incrustations which form on these plants, aiding in improving water quality by making the phosphorus unavailable to phytoplankton (Coops 2002).

Wild celery, the second-most frequently-encountered aquatic plant in 2019 with a littoral frequency of occurrence of 37.4%. Wild celery is relatively tolerant of low-light conditions and is able to grow in deeper water. Wild celery produces long, grass-like leaves which extend in a circular fashion from a basal rosette. To keep the leaves standing in the water column, lacunar cells in the leaves contain gas making them buoyant. Towards the late-summer when wild celery is at its peak growth stage, it is easily uprooted by wind and wave activity. It can then pile up on shorelines depending on the predominant wind direction. The leaves, fruits, and winter buds of wild celery are food sources for numerous species of waterfowl and other wildlife and are an important component of the Anderson Lake ecosystem. Wild celery has remained relatively stable between 2015 and 2019.

Northern watermilfoil was the third-most frequently encountered species in Anderson Lake during the 2019 point-intercept survey. Arguably the most common native watermilfoil species in Wisconsin lakes, northern watermilfoil is frequently found growing in soft sediments and higher water clarity. Northern watermilfoil is often falsely identified as Eurasian watermilfoil, especially since it is known to take on the reddish appearance of Eurasian watermilfoil as the plant reacts to sun exposure as the growing season progresses. The feathery foliage of northern watermilfoil traps filamentous algae and detritus, providing valuable invertebrate habitat. Because northern watermilfoil prefers high water clarity, its populations are declining state-wide as lakes are becoming more eutrophic.

Eurasian watermilfoil was found at 34 of the sampling locations during the 2019 point-intercept survey resulting in a littoral frequency of occurrence of 34.3%. In the 2015 point-intercept survey, EWM was present at just one sampling site resulting in a littoral frequency of occurrence of 0.9% (Figure 7).

Several species exhibited statistically valid changes in occurrence between the 2015 and 2019 point-intercept surveys in Anderson Lake. Aquatic plant populations vary from year to year largely based on environmental factors. The littoral frequency of occurrence of aquatic plants for each of the two point-intercept surveys that have taken place in Anderson Lake are included within Appendix B of this report. Note that some morphologically similar species are lumped together for analysis purposes due to the difficulty in distinguishing these species in a field setting. Several plant species are present in Anderson Lake in relatively low abundances and are not always encountered during each survey due the point-intercept surveys' sampling intensity.

CONCLUSIONS AND DISCUSSION

Surveys completed in 2019 in Anderson Lake showed the EWM population continues to trend higher. The EWM population has been monitored annually from 2017-2019 through the completion of a Late-Summer EWM Mapping Survey. Maps 1 and 2 display the EWM population progression in Anderson Lake. The 2019 point-intercept survey indicates that Anderson Lake contains a diverse community of aquatic plants and found that EWM was present at 34.3% littoral frequency of occurrence. Comparing the 2019 survey to the previous point-intercept survey completed in 2015 by the WDNR shows that some species have remained at approximately the same level, whereas other species exhibited statistically valid changes in littoral frequency of occurrence between the two surveys.

Professional hand harvesting actions have been attempted since the initial discovery of EWM in Anderson Lake and have proven to be unable to stop the EWM population from spreading to new areas and increasing in density in the lake. The professional harvesting efforts in 2019 resulted in the harvest of over 4,000 pounds of EWM over the course of eight days and the post-harvesting mapping survey showed mixed results in the targeted areas. A reduction in the EWM population was observed within DASH site B-19, whereas the other sites showed little change or an increase in EWM following the harvesting efforts. Overall, the hand harvesting strategy was not able to reduce the EWM population or inhibit the EWM from expanding in the majority of the targeted areas during 2019.

Board members from the ALA met with Onterra ecologist, Eddie Heath for a strategic planning meeting on November 15, 2019. The presentation materials are attached as Appendix C. During the meeting, discussions about EWM management options for Anderson Lake took place, including applicability of mechanical harvesting and herbicide treatment. These forms of management carry risks. The WDNR recently completed a *Strategic Analysis of Aquatic Plant Management in Wisconsin* (June 2019), which contains a detailed risk assessment discussion of potential EWM management options within Supplemental Chapter 3.3 (pg 128):

https://dnr.wi.gov/topic/EIA/documents/APMSA/APMSA_Final_2019-06-14.pdf

The ALA also wants to be aligned to received funding assistance for management activities through the WDNR. In order to be eligible to apply for WDNR AIS grants, the ALA needs to have an up to date Aquatic Plant Management Plan. Oconto County partnered with the University of Wisconsin – Stevens Point to create lake management plans for the majority of the lakes in the county including Anderson Lake. These plans provide great baseline studies and management guidance but lack the specific aquatic plant control plan required for grant eligibility. Within Goal 2 of the Anderson Lake Management Plan (UWSP, draft 2019), one of the management actions states:

> *Consider applying for AEPP grant to obtain an Aquatic Plant Management plan (a blueprint that is more detailed and specific to aquatic plant management than the comprehensive management plan).*

The following section provides a specific control and monitoring plan for the ALA.

Potential Anderson Lake EWM Management Plan

If herbicide management is sought, it is likely that the ALA would conduct a whole-lake 2,4-D treatment. A preliminary design includes direct herbicide application to approximately 30 acres of the lake to reach a lake-wide epilimnetic 2,4-D concentration of 0.325 ppm acid equivalent (ae). A rough cost estimate for the herbicide treatment would be $20,000.

A monitoring plan for a whole-lake 2,4-D treatment would include surveys during the *year prior to treatment*, *year of treatment*, and *year after treatment* as outlined within Table 2. During the year of treatment, additional volunteer-based monitoring would occur to understand the mixing depth (epilimnion) of the lake for final herbicide dosing as well as the post treatment collection of water samples to understand the concentrations and exposure times achieved from the strategy. Further, the project would plan for follow-up hand-harvesting efforts during the *year after treatment* in attempt to slow the inevitable rebound of EWM within the lake. Following this outline, the anticipated cost of the entire project including herbicide treatment would be $45,000-$50,000.

Table 2. Generalized whole-lake treatment monitoring schedule.

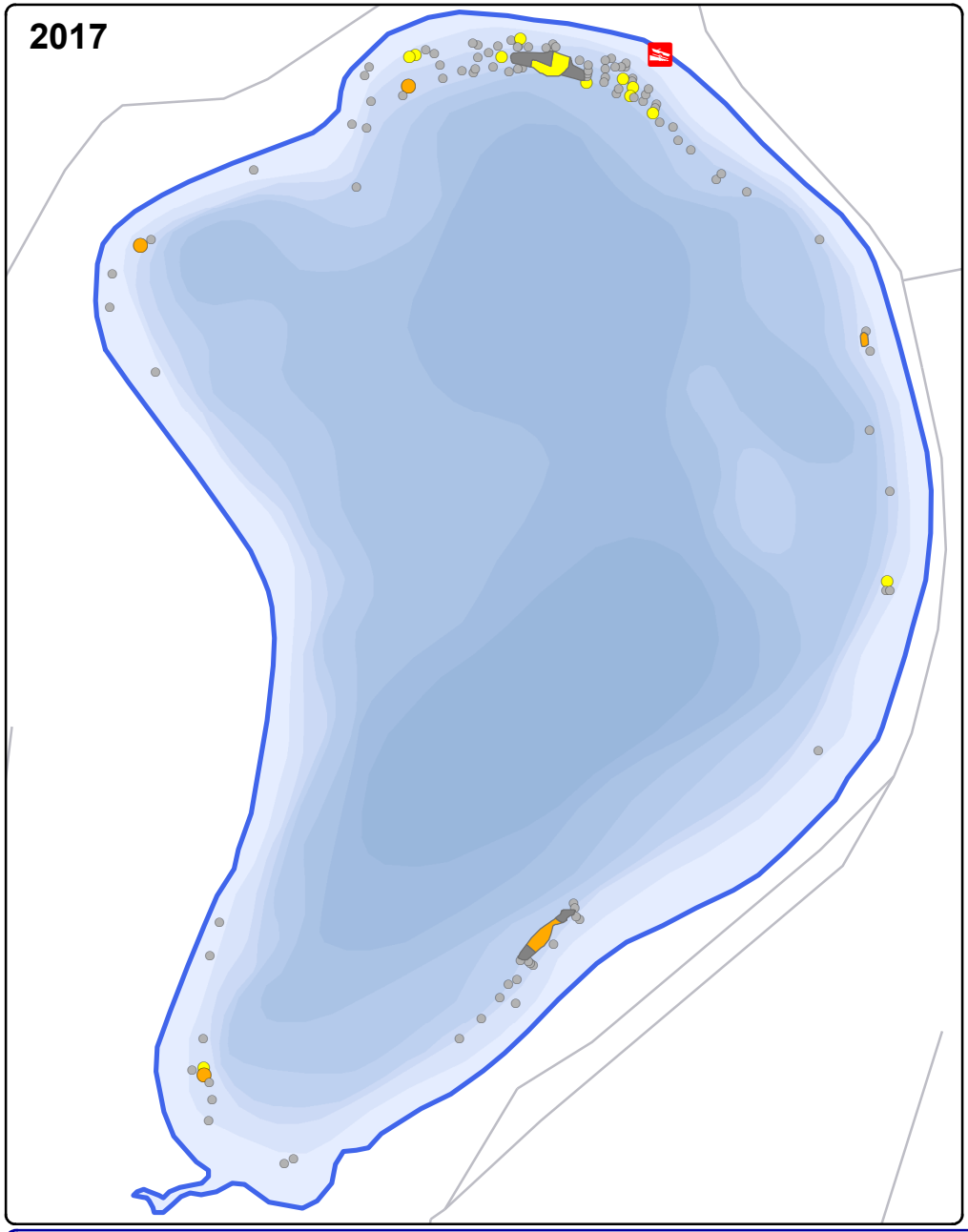
Year Prior to Treatment	Late-Season EWM Mapping
	Point-Intercept
	Treatment Dosing Plan
Year of Treatment	Spring Pretreatment Survey
	Volunteer Temperature Monitoring (depth of stratification)
	Herbicide Treatment
	Volunteer Herbicide Concentration Monitoring
	Late-Season EWM Mapping
	Point-Intercept
Year After Treatment	Hand-Harvesting (DASH) of rebounding EWM
	Late-Season EWM Mapping
	Point-Intercept

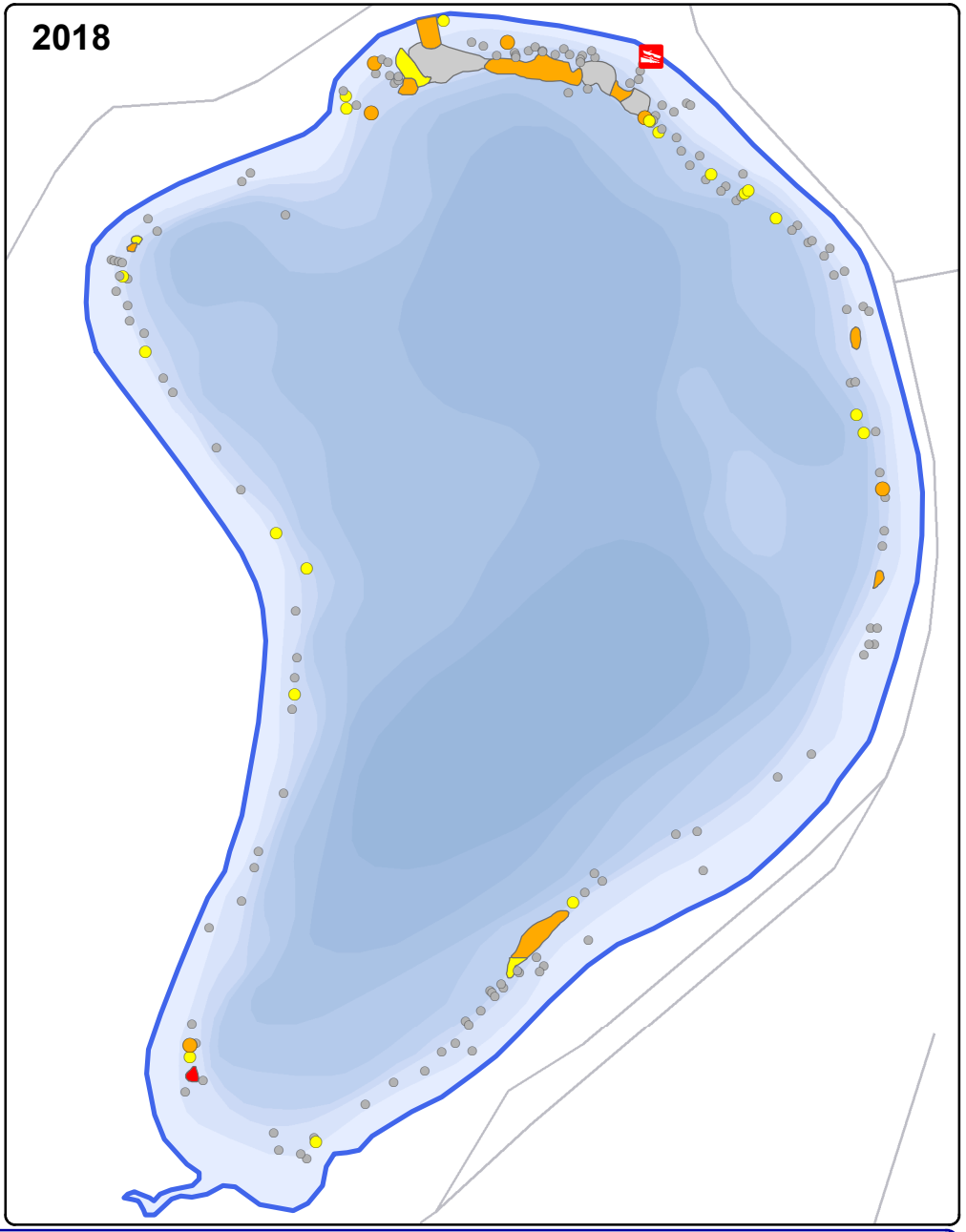
The ALA would apply for a 3-year WDNR AIS-Established Population Control Grant for cost coverage of herbicide treatment and monitoring costs. This grant program includes a 75% state share funding potential, with the ability to bring the overall net cash costs down a little further with volunteer time contributions. Using the estimates above, this project would have a net cash costs to the ALA of $11,250-$12,500 if the grant application is successful.

Some changes to the WDNR AIS Grant program are forthcoming, including changing the annual grant application deadline to November of each year. The next opportunity to apply for grant funding is November 2020. All project costs would need to occur during the timeframe of the grant. If the ALA seeks grant funding in November 2020, the 2021 field season would be the *year prior to treatment* and the treatment would occur during spring 2022.

2020 Control & Monitoring Strategy

Following discussions with Onterra and WDNR partners, the ALA has decided to proceed with a plan in which with no professional active management or monitoring is scheduled to occur in 2020. Trained volunteers from the ALA will monitor EWM during 2020 with the aid of their GPS unit that would be loaded with spatial data from the most recent EWM mapping survey. Considering observations made during the 2020 growing season and the ALA's funding capacity, they will revisit their EWM management strategy for 2021 with guidance from WDNR, Onterra, and other partners. This may include application for a WDNR grant during fall of 2020 to initiate the control plan included above.





N
W E
S

650
Feet

Onterra LLC
Lake Management Planning
815 Prosper Road
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

Sources:
Roads and Hydro: WDNR
Bathymetry: Onterra
Aquatic Plants: Onterra, 2017, 2018
Orthophotography: NAIP, 2017
Map Date: December 13, 2018 AMS
Filename: Anderson_EMW_Comparison_2017-2018.mxd

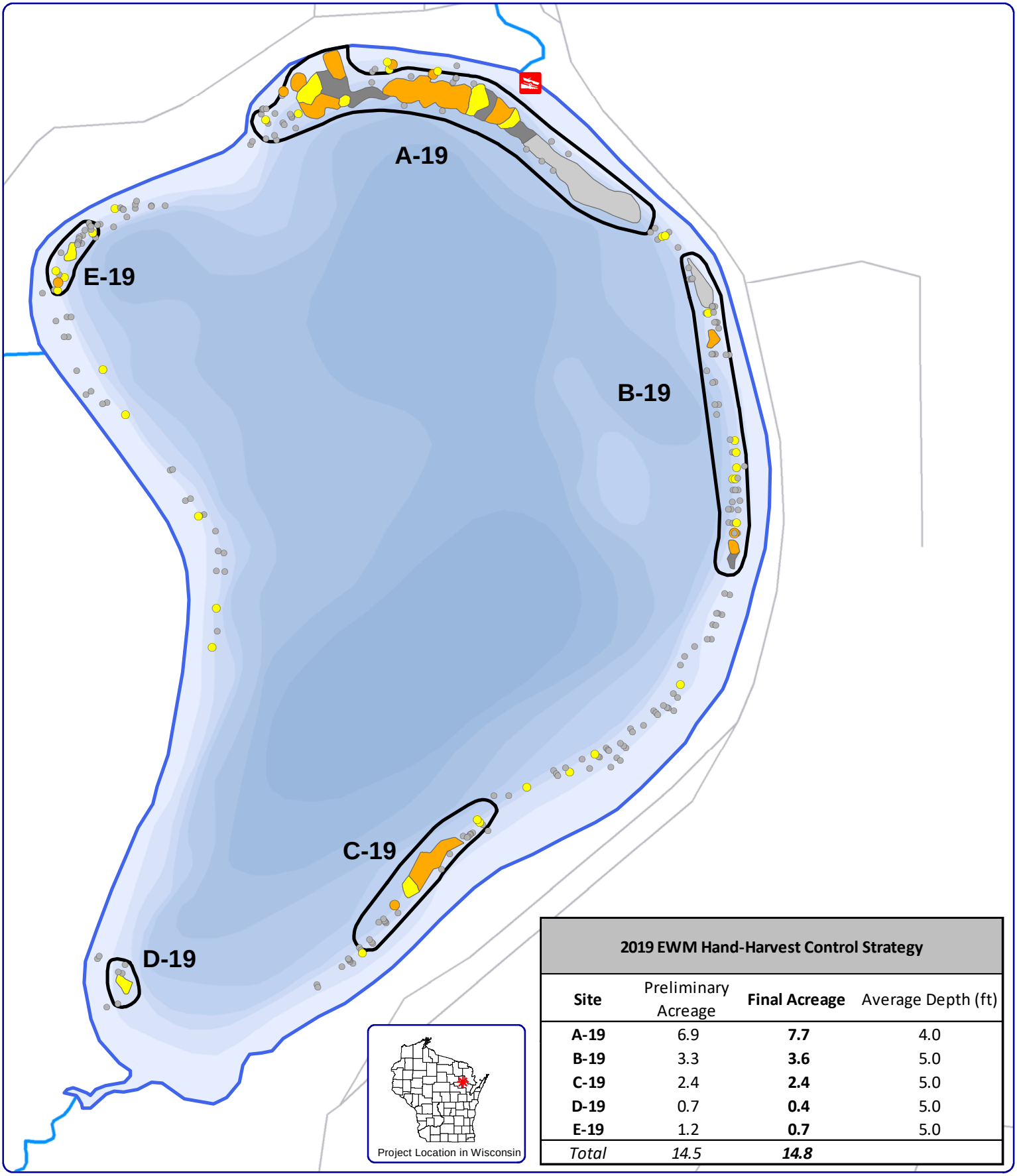
Project Location in Wisconsin

Legend

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clump of Plants
- Small Plant Colony

Map 1
Anderson Lake
Oconto County, Wisconsin

September 2017-2018
EWM PB Results



2019 EWM Hand-Harvest Control Strategy			
Site	Preliminary Acreage	**Final Acreage**	Average Depth (ft)
A-19	6.9	**7.7**	4.0
B-19	3.3	**3.6**	5.0
C-19	2.4	**2.4**	5.0
D-19	0.7	**0.4**	5.0
E-19	1.2	**0.7**	5.0
Total	*14.5*	***14.8***	

N
W E
S

475
Feet

Legend

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- Final Hand-Harvesting Site

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815 Prosper Rd
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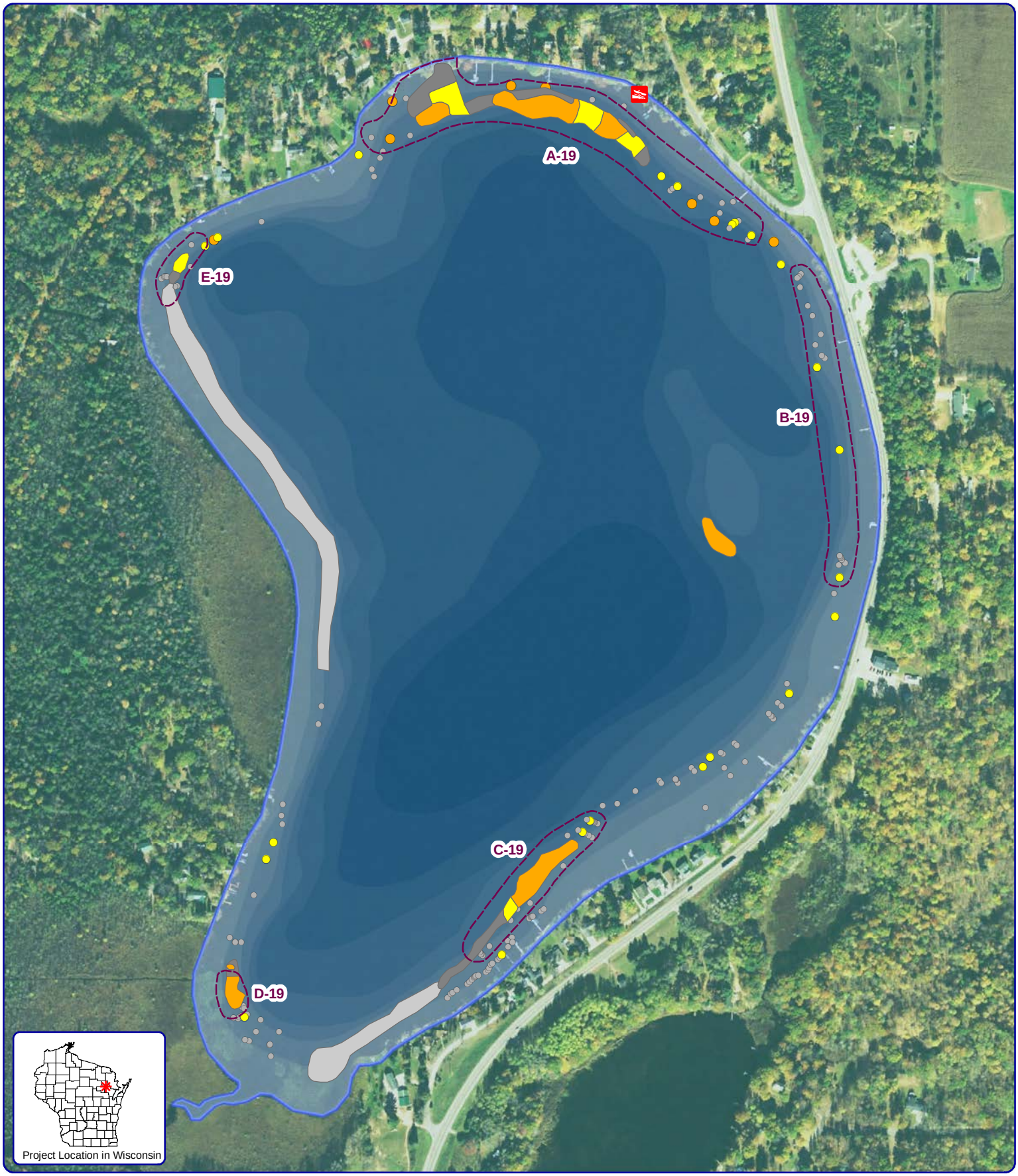
Sources
Roads and Hydro: WDNR
Bathymetry: Onterra
Aquatic Plants: Onterra, 2019
Orthophotography: NAIP, 2017
Map Date: June 10, 2019 AMS
Filename: *Anderson_HH_EMW_Perm1_2019.mxd*

Map 2
Anderson Lake
Oconto County, Wisconsin
June 2019 EWM Results & Final Hand-Harvest Sites



N
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500
Feet

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Lake Management Planning
815 Prosper Rd
De Pere, WI 54115
920.338.8860
www.onterra-eco.com

Sources
Roads and Hydro: WDNR
Bathymetry: Onterra
Aquatic Plants: Onterra, 2019
Orthophotography: NAIP, 2017
Map Date: September 13, 2019 AMS
Filename: *Anderson_EWMPB_Summer19.mxd*

Legend

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting
- Single or Few Plants
- Clumps of Plants
- Small Plant Colony
- 2019 Professional Hand-Harvesting Permit Sites

Map 3
Anderson Lake
Oconto County, Wisconsin

August 2019 EWM Survey Results

A

APPENDIX A

2019 EWM Hand-Harvesting Report – DASH, LLC

DASH
DIVER ASSISTED SUCTION HARVESTING LLC

2019 DASH SUMMARY
Anderson Lake, Oconto County

Diver Assisted Suction Harvesting (DASH) of Eurasian Water Milfoil (EWM) took place on June 17, 18, 19, 20 and 21, August 13, 14 and 16 on Anderson Lake, Oconto Co., Wisconsin. A survey performed by Onterra, LLC confirmed the locations of EWM on 14.5 acres at 5 separate areas that were targeted for harvest. All areas were exclusively targeted for EWM.

June 17, 2019
Area B-19 was harvested for EWM using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was calm, waves were calm, air temp was 70 degrees working at a depth of 8-10 feet.

Area B-19: 7.5 hours with a total of 352 lbs. of material harvested (approx. 10% non-target plants)

June 18, 2019
Areas B, A & D - 19 were harvested using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was calm, waves were calm, air temp was 70 degrees working at a depth of 8-10 feet.

Area B: 2 hours, 10 minutes with a total of 252 lbs. of material harvested (approx. 10% non-target plants)

Area A: 2 hours, 10 minutes with a total of 124 lbs. of material harvested (approx. 10% non-target plants)

Area D: 2 hours, 25 minutes with a total of 150 lbs. of material harvested (approx. 10% non-target plants)

June 19, 2019
Areas A, B and C - 19 were harvested using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was 0 mph, waves were calm, air temp was 70 degrees working at a depth of 5 feet.

Area A: 1 hour, 45 minutes with a total of 170 lbs. of material harvested (approx. 10% non-target plants)

Area B: 3 hours with a total of 68 lbs of material harvested (approx.. 10% non-target plants)

Area C: 1 hour, 50 minutes with a total of 72 lbs. of material harvested (approx.. 10% non-target plants)

June 20, 2019

Area E-19 was harvested for EWM using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was at 7mph, waves were calm, air temp was 70 degrees working at a depth of 8 feet.

Area E: 7 hours, 35 minutes with a total of 592 lbs. of material harvested (approx. 10% non-target plants)

June 21, 2019

Areas D & C-19 were was harvested for EWM using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was at 0mph, waves were calm, air temp was 70 degrees working at a depth of 8 feet.

Area D: 25 minutes with a total of 40 lbs. of material harvested (approx. 10% non-target plants)

Area C: 6 hours, 30 minutes with a total of 414 lbs. of material harvested (approx. 10% non-targeted plants)

August 13, 2019

Area B was harvested using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was 5 mph, waves were calm, air temp was 70 degrees working at a depth of 10 feet.

Area B: 6 hours, 40 minutes with a total of 556 lbs. of material harvested (approx. 10% non-target plants)

August 14, 2019

Area B was harvested using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was 0 mph, waves were calm , air temp was 70 degrees working at a depth of 6 feet.

Area B: 7 hours, 30 minutes with a total of 734 lbs. of material harvested (approx. 10% non-target plants)

August 16, 2019

Areas B & E were harvested using the DASH barge with one diver on hookah air supply and another person on the barge collecting the material in mesh bags. The wind was 15 mph, waves were calm, air temp was 75 degrees working at a depth of 10 feet.

Area B: 1 hour with a total of 158 lbs. of material harvested (approx. 10% non-target plants)

Area E: 4 hours, 30 minutes with a total of 556 lbs. of material harvested (approx.

10% non-target plants)

Procedures used during the DASH operations

The lake bed was not removed or redistributed by the suction efforts. A float was used to suspend the suction nozzle off of the lake bed.

All harvested materials were placed in onion type mesh bags, drained, weighed, evaluated for plant species, and transferred to the designated plant disposal site.

Any plant fragments not retained in the bags were skimmed from the lake surface by using a pool pole/net.

Non-targeted species were similar at all locations and estimated to be 10% consisting of mostly Pondweeds.

Table 1 shows the pounds harvested, time spent and lbs. per hour. Total acreage was 14.5 acres. See attached map for harvest locations.

Table 1 2019 DASH Harvest Total by Area, Anderson Lake, Oconto Co., WI

Table 1

Site	Acreage	lbs. Harvested	Time (man-hours)	lbs. / hour
A	6.9	294	11.37	25.8
B	3.3	2120	17.34	122.2
C	2.4	486	11.19	43.4
D	0.7	190	2.74	69.3
E	1.2	1148	12.1	94.8
Total	**14.5**	**4238**	**54.74**	**77.4**

Area GPS Coordinates

Area A: 45.11.90 / -88.42.10
Area B: 45.11.58 / -88.41.64
Area C: 45.11.01 / -88.42.09
Area D: 45.10.88 / -88.42.61
Area E: 45.11.69 / -88.42.66

B

APPENDIX B

Point-Intercept Aquatic Macrophyte Survey Results (2015 & 2019)

APPENDIX B

Littoral Frequency of Occurrence of aquatic plants from 2015 & 2019 point-intercept surveys.

	Scientific Name	Common Name	LFOO (%)	
			2015 (DNR)	2019 (Onterra)
Dicots	*Myriophyllum spicatum*	Eurasian water milfoil	0.9	34.3
	Myriophyllum sibiricum	Northern water milfoil	37.6	35.4
	Bidens beckii	Water marigold	27.5	16.2
	Ceratophyllum demersum	Coontail	14.7	22.2
	Nuphar variegata	Spatterdock	15.6	10.1
	Brasenia schreberi	Watershield	12.8	12.1
	Utricularia vulgaris	Common bladderwort	10.1	5.1
	Utricularia minor	Small bladderwort	1.8	4.0
	Nymphaea odorata	White water lily	1.8	2.0
Non-dicots	*Potamogeton crispus*		0.0	0.0
	Vallisneria americana	Wild celery	25.7	37.4
	Chara spp.	Muskgrasses	10.1	40.4
	Heteranthera dubia	Water stargrass	35.8	11.1
	Najas flexilis	Slender naiad	20.2	18.2
	Potamogeton gramineus	Variable-leaf pondweed	10.1	22.2
	Elodea canadensis	Common waterweed	14.7	17.2
	Potamogeton zosteriformis	Flat-stem pondweed	8.3	10.1
	Potamogeton richardsonii	Clasping-leaf pondweed	2.8	13.1
	Potamogeton praelongus	White-stem pondweed	7.3	8.1
	Potamogeton epihydrus	Ribbon-leaf pondweed	4.6	11.1
	Stuckenia pectinata	Sago pondweed	11.9	1.0
	Schoenoplectus subterminalis	Water bulrush	0.0	12.1
	Nitella spp.	Stoneworts	6.4	3.0
	Filamentous algae	Filamentous algae	9.2	0.0
	Eleocharis acicularis	Needle spikerush	0.9	9.1
	Potamogeton illinoensis	Illinois pondweed	6.4	2.0
	Potamogeton amplifolius	Large-leaf pondweed	1.8	7.1
	Fissidens spp. & Fontinalis spp.	Aquatic Moss	4.6	3.0
	Sparganium fluctuans	Floating-leaf bur-reed	3.7	0.0
	Potamogeton foliosus	Leafy pondweed	3.7	0.0
	Freshwater sponge	Freshwater sponge	1.8	2.0
	Sagittaria sp. (rosette)	Arrowhead sp. (rosette)	0.9	2.0
	Potamogeton friesii	Fries' pondweed	1.8	1.0
	Pontederia cordata	Pickerelweed	0.0	3.0
	Elodea nuttallii	Slender waterweed	0.0	3.0
	Lemna trisulca	Forked duckweed	0.0	2.0
	Schoenoplectus acutus	Hardstem bulrush	0.0	1.0
	Potamogeton strictifolius	Stiff pondweed	0.0	1.0
	Potamogeton pusillus	Small pondweed	0.0	1.0
	Potamogeton natans	Floating-leaf pondweed	0.0	1.0
	Isoetes spp.	Quillwort spp.	0.0	1.0
	Eleocharis palustris	Creeping spikerush	0.0	1.0

C

APPENDIX C

Strategic Planning Committee Meeting on EWM Management

1

Onterra, LLC

- Founded in 2005 by Tim Hoyman
- Staff
  - Three full-time ecologists
  - One part-time paleoecologist
  - Four full-time field technicians
  - Typically four summer interns
- Services
  - Science and planning
- Philosophy
  - Promote realistic planning
  - Assist, not direct

Onterra LLC Lake Management Planning

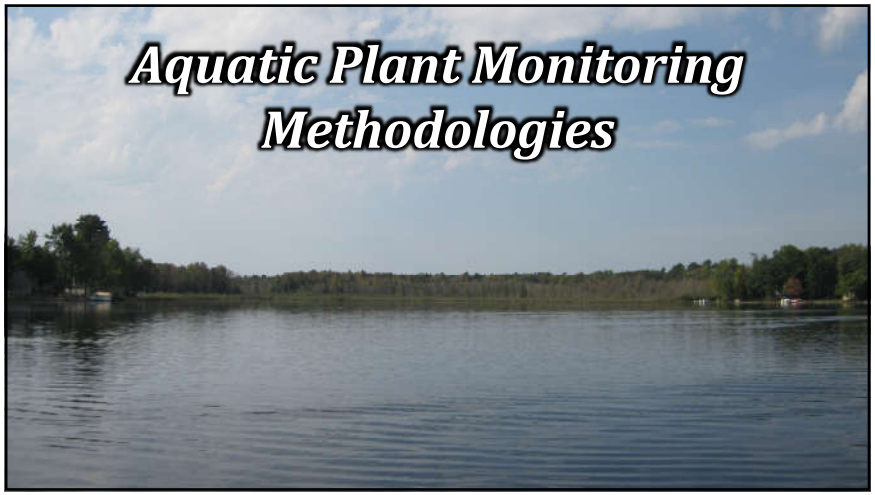
2

Presentation Outline

- Aquatic Plant Monitoring Methodologies
- Anderson Lake EWM Population
- Eurasian Watermilfoil Management 101
  - Management Philosophy
  - Herbicide Treatment
- 2020 Strategy Development Discussion

Onterra LLC Lake Management Planning

3

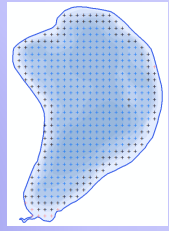


4

Types of Aquatic Plant Surveys

Quantitative

- Point-Intercept Survey
  - Numeric & systematic
  - Applied at various scales



Qualitative

- AIS Mapping Surveys
  - Fine-scale location accuracy
  - Subjective designations

Onterra LLC Lake Management Planning

5

AIS Mapping Surveys

Point-Based Mapping

- Single or Few Plants
- Clumps of Plants
- Small Plant Colony

Polygon-Based Mapping

- Highly Scattered
- Scattered
- Dominant
- Highly Dominant
- Surface Matting

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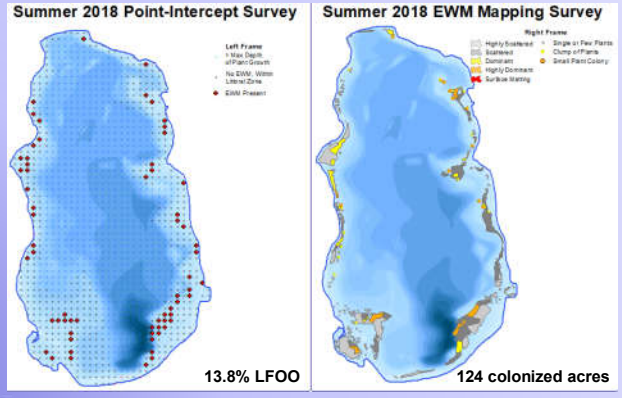
6

Comparison of Methods



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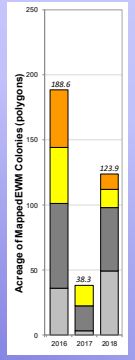
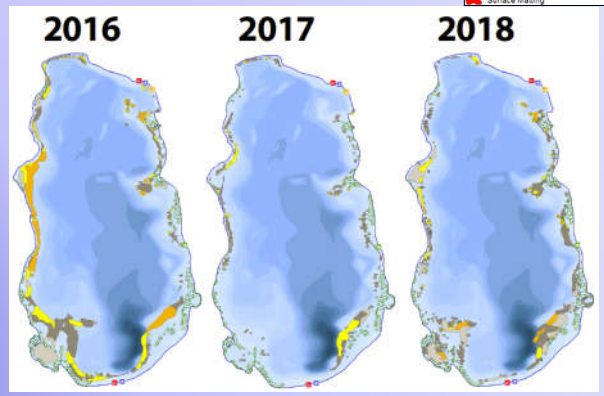
EWM Mapping Trends





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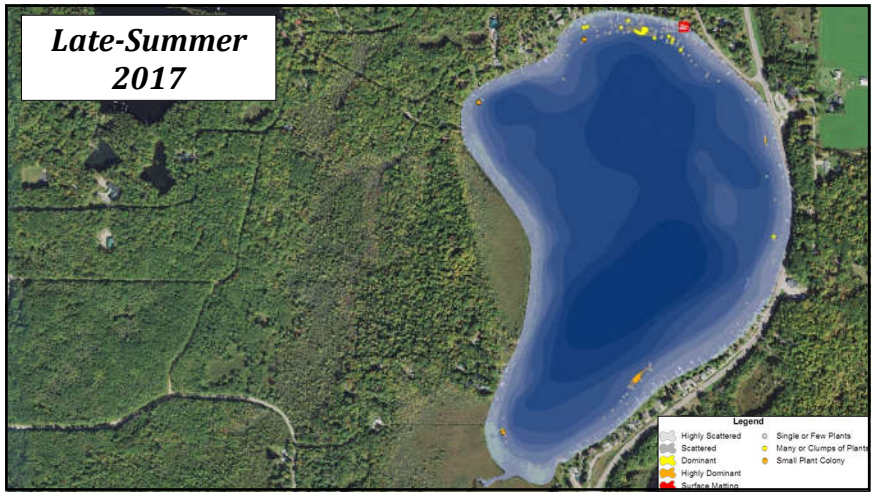
8


Anderson Lake Survey Results

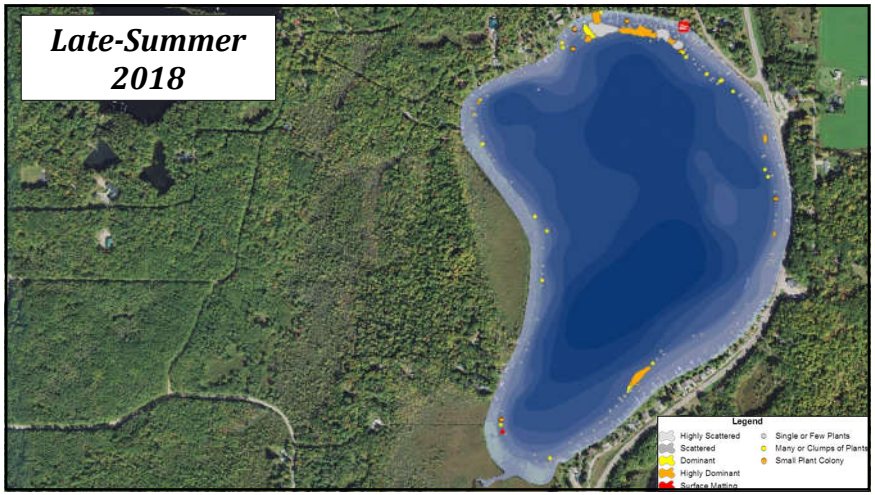
9


Non-Native Aquatic Plants
Eurasian Watermilfoil
• First "officially" documented in summer 2015
• DNA confirmed samples as pure-strain in 2015 (WDNR: n=1) and 2019 (Onterra: n=1)

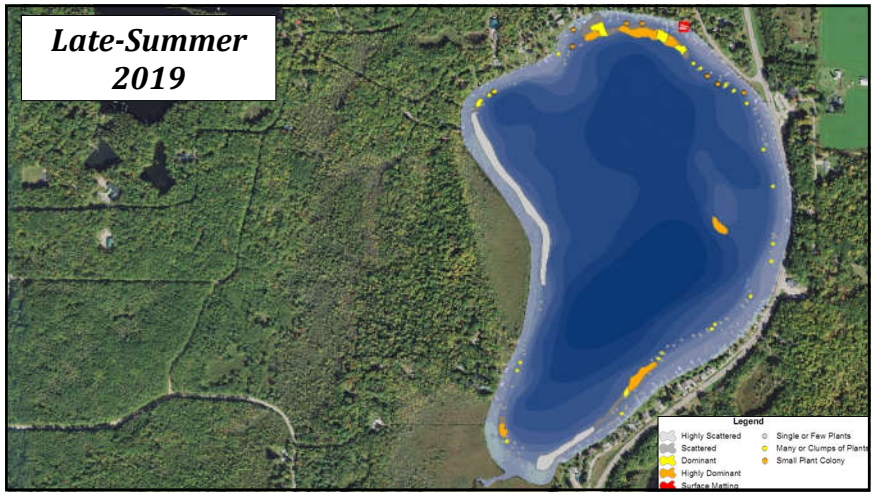
10


Late-Summer 2017
Legend
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Many or Clumps of Plants
Small Plant Colony

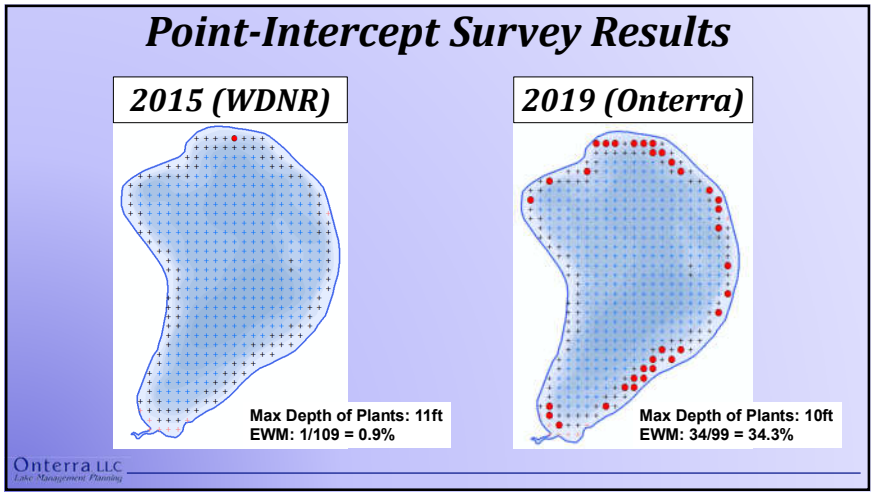
11


Late-Summer 2018
Legend
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Many or Clumps of Plants
Small Plant Colony

12


Late-Summer 2019
Legend
Highly Scattered
Scattered
Dominant
Highly Dominant
Surface Matting
Single or Few Plants
Many or Clumps of Plants
Small Plant Colony

13


Point-Intercept Survey Results
2015 (WDNR)
Max Depth of Plants: 11ft
EWM: 1/109 = 0.9%
2019 (Onterra)
Max Depth of Plants: 10ft
EWM: 34/99 = 34.3%
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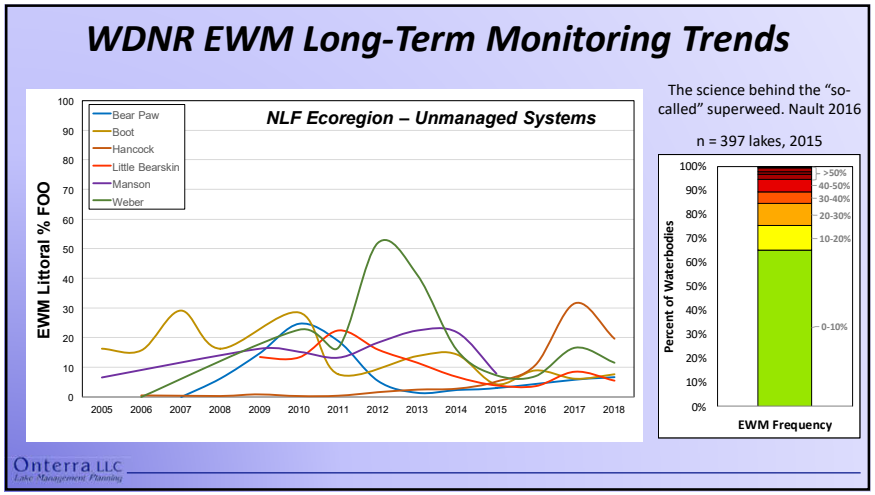
14


Eurasian Watermilfoil Management 101

15


WDNR EWM Long-Term Monitoring Trends
NLF Ecoregion – Unmanaged Systems
Bear Paw
Boot
Hancock
Little Bearskin
Manson
Weber
EWM Littoral % FOO
The science behind the "so-called" superweed. Nault 2016
n = 397 lakes, 2015
Percent of Waterbodies
EWM Frequency
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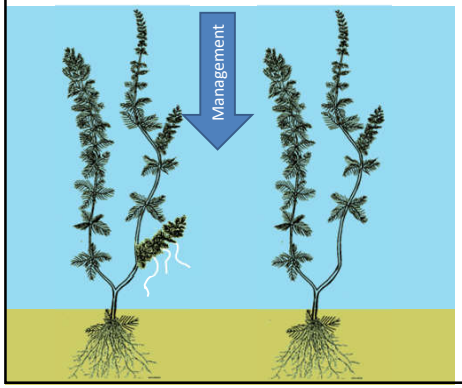
16

EWM Life-Cycle & Control Strategy Philosophy



- Herbicide needs to translocate to root crown (*hard to kill with herbicides*)
- Hand-harvesting that extracts roots is effective (*extremely time intensive*)
- Mechanical harvesting can minimize nuisance conditions (*spread to new areas not a concern for established populations)*
- Sometimes EWM does not cause nuisance conditions or ecological changes

17

Hand-Harvesting of EWM

- Removal of entire root material required to reduce rebound
- Scale limitations, not for large or dense areas
- Diver-Assisted Suction Harvest (DASH) can increase efficacy
- Limitations
  - –Density of EWM & native plants
  - –Clarity of water
  - –Sediment type
  - –Obstructions

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Are herbicides "safe?"

Registration by the EPA does not mean that the use of the herbicide poses no risk to humans or the environment.

Because product use is not without risk, the EPA does not define any pesticide as "safe."

Some folks believe the benefits outweigh the risks, but others would disagree.


WARNING
PESTICIDE TREATMENT AREA
THIS WATERBODY HAS BEEN CHEMICALLY TREATED FOR:
INVASIVE PLANTS
ALGAE
NAVIGATION/ACCESS
FISH REMOVAL
MOSQUITO/BLACK FLY
OTHER
PESTICIDE APPLIED
ACTIVE INGREDIENT
DATE TREATED
WATER USE RESTRICTIONS APPLY AS FOLLOWS:
TO THE ENTIRE WATERBODY
TO WATER WITHIN ___ FT OF THIS NOTICE AND ___ FT FROM SHORE
DO NOT USE TREATED WATER FOR THE FOLLOWING PURPOSES UNTIL:
SWIMMING
HOUSEHOLD USE
CONSUMING FISH
DRINKING WATER
IRRIGATION (CROP)
PET/LIVESTOCK WATER
IRRIGATION (OTHER)
SPONSOR
CONTACT
PHONE

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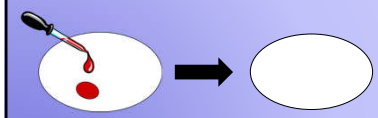
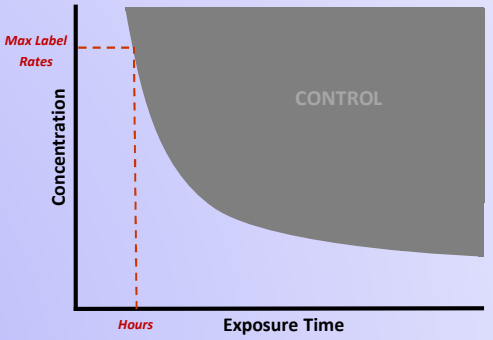
Ecological Definitions of Herbicide Treatment

Spot Treatment:

Herbicide applied at a scale where dissipation will not result in significant lake wide concentrations; impacts are anticipated to be localized to in/around application area.





High Concentration ► Short Exposure Time

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Horizontal Herbicide Mixing (Dissipation)

- ~25 acres of 305 acre lake (8%)
- Tracer Dye (Rhodamine WT) Survey

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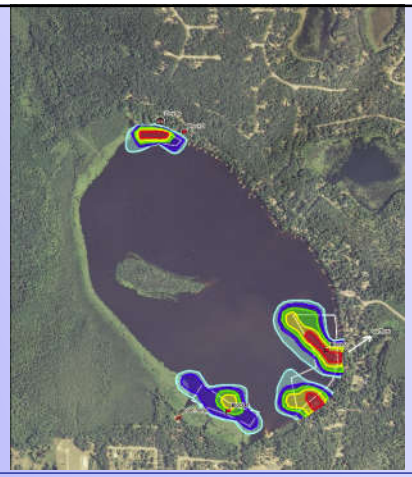
1 HAT

75-100%
50-75%
25-50%
10-25%
5-10%



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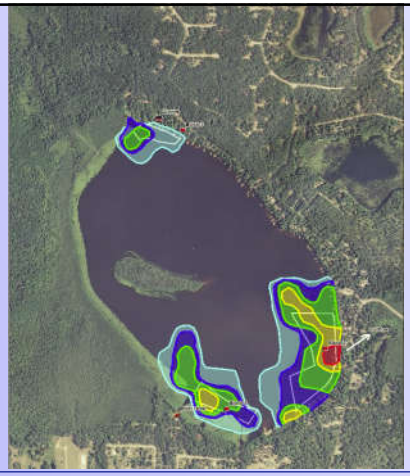
2.5 HAT

75-100%
50-75%
25-50%
10-25%
5-10%



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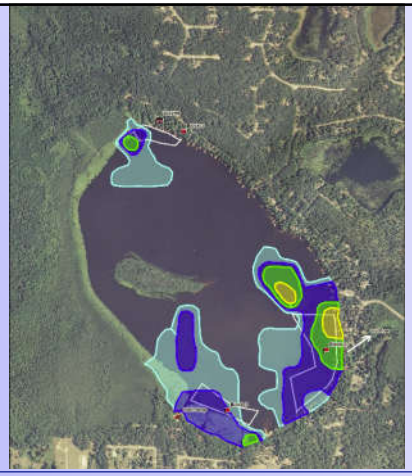
4 HAT

75-100%
50-75%
25-50%
10-25%
5-10%



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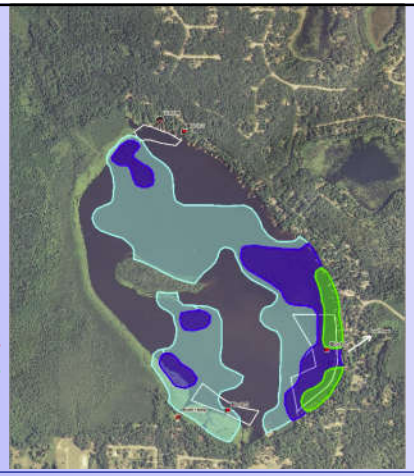
6 HAT

75-100%
50-75%
25-50%
10-25%
5-10%

2,4-D CET needed for EWM control based upon published studies:

- sustained 4.0 ppm for 12 hours
- sustained 2.0 ppm for 24 hours
- 0.1-0.3 ppm for 6 weeks (whole-lake)



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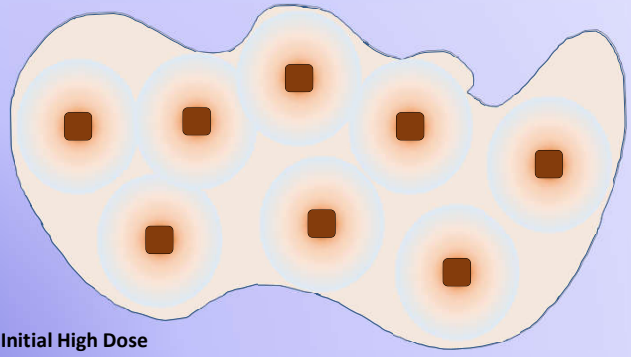
Whole-Lake Herbicide Treatment



Initial High Dose
Rapid Dissipation
Low-dose lake-wide concentration significant to cause impact (control)

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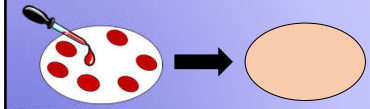
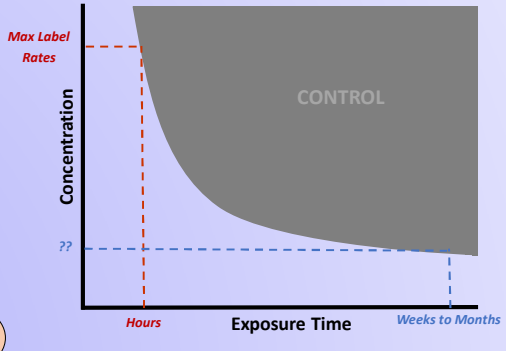
Ecological Definitions of Herbicide Treatment

Whole-Lake/Basin Treatment:

Herbicide applied at a scale where dissipation will result in significant lake wide concentrations; impacts are anticipated to be on a lake-wide scale.





Low Concentration ► Long Exposure Time

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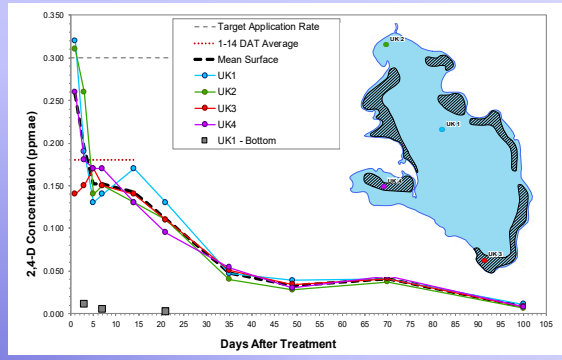
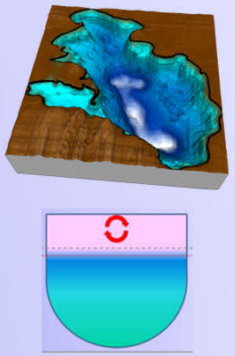
Whole-Lake 2,4-D Treatments on EWM





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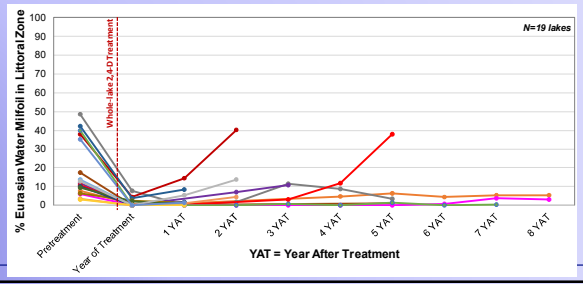
Whole-Lake 2,4-D Treatments on EWM

- EWM reduced almost to zero during year of treatment
- Integrated Pest Management (i.e. follow-up management) applied in years 2-4 in maintain low population
- EWM inevitably will rebound to pretreatment levels



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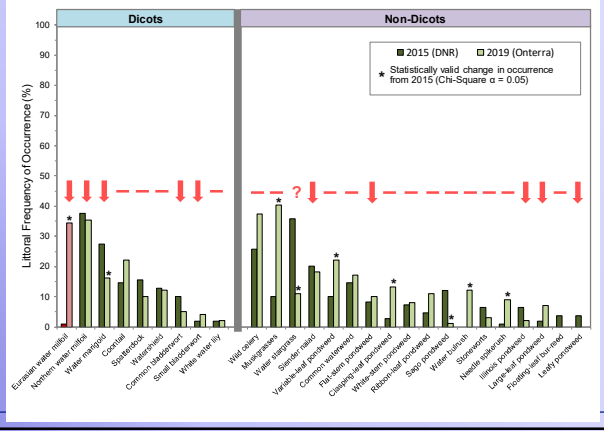
Whole-Lake 2,4-D on Native Plants



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Herbicide Treatment Guidance

- Spot treatments rarely meet expectations due to <u>dissipation</u>
  - Typically result in only a single season of EWM population suppression
  - Some site parameters lead to longer control
  - Herbicide combos and new chemistries being attempted
- Whole-lake treatments outcomes are more predictable
  - EWM suppression for 3-5 years with 2,4-D
  - Some native plants extremely vulnerable, others more tolerant
  - Alternative chemistries when targeting HWM

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AIS Management Perspectives

1. **No Coordinated Active Management (Let Nature Take its Course)**
   - Lake group does not lead efforts
   - Encourage nuisance abatement through manual removal by property owners
2. **Reduce AIS Population on a lake-wide level (Population Management)**
   - Most applicable for new discoveries, whole-lake herbicide, water level drawdown
   - Not possible on some systems with current management "toolbox"
   - Will not eradicate AIS
   - Set triggers (thresholds) of implementation and tolerance
3. **Minimize navigation and recreation impediment (Nuisance Mgmt)**
   - May be accomplished through mechanical harvesting or hand-harvesting
   - Prioritize areas based on human use & EWM density

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AIS Management Perspectives

1. **No Coordinated Active Management (Let Nature Take its Course)**
   - No Costs
2. **Reduce AIS Population on a lake-wide level (Population Management)**
   - Whole-lake 2,4-D treatment would cost ~$20K. IPM costs ~$10K per year.
   - Monitoring/Reporting would cost ~$3-$4K per year.
   - Grant eligible, but extremely difficult for ALA
3. **Minimize navigation and recreation impediment (Nuisance Mgmt)**
   - Hand-harvesting of spokes from docks to deep water (~$2.5K per day)
   - Mechanical harvesting of spokes from docks to deep water (~$3K per day)
   - Not currently grant eligible

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AIS-Established Population Control Grant

- Not for nuisance management
- Not for maintenance management
- 3 year timeframe with up to 75% cost share
- Funding prioritized on stakeholder use
- Requires CBCW (200 hours annually)
- Deadline on Feb 1 of each year
- Requires WDNR-approved management plan
  - Management plan must specifically outline control and monitoring strategy
  - Whole-lake treatments typically reviewed by state-wide tech team

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Closing Thoughts

- Onterra originally recommended wait-and-see approach
- EWM population expansion triggered action in 2019 with a hand-harvesting approach
- Hand-harvesting made localized impact, but not appropriate for lake-wide population management
- Onterra recommends the ALA to be mindful of:
  - EWM will never be eradicated from Anderson Lake
  - Annual EWM populations will be variable, even in absence of management
  - Herbicide spot treatments are currently not applicable to Anderson Lake
  - Whole-lake 2,4-D management may result in a 3-5 years of lowered EWM, but native plant impacts and other ecological impacts unavoidable
  - Long-term management strategy should be sustainable without grant funds
  - More and more groups choosing nuisance management strategies

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Thank You

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