

Oconto County Lakes Project

DRAFT 032521

STAR LAKE MANAGEMENT PLAN

Oconto County Lakes Project Reports:

**State of the
Oconto County
Lakes**

**Lake Study
Summary
Reports**

**Operational Strategy and
Plan for Surface Water
Management and
Protection**

**Lake
Management
Plans**

2021

VISION

*Star Lake will a quiet, Northwoods retreat with excellent
water quality, good fishing and helpful neighbors.*

Star Lake Management Plan

The authors would like to acknowledge the commitment and enthusiasm of 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 Star 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.

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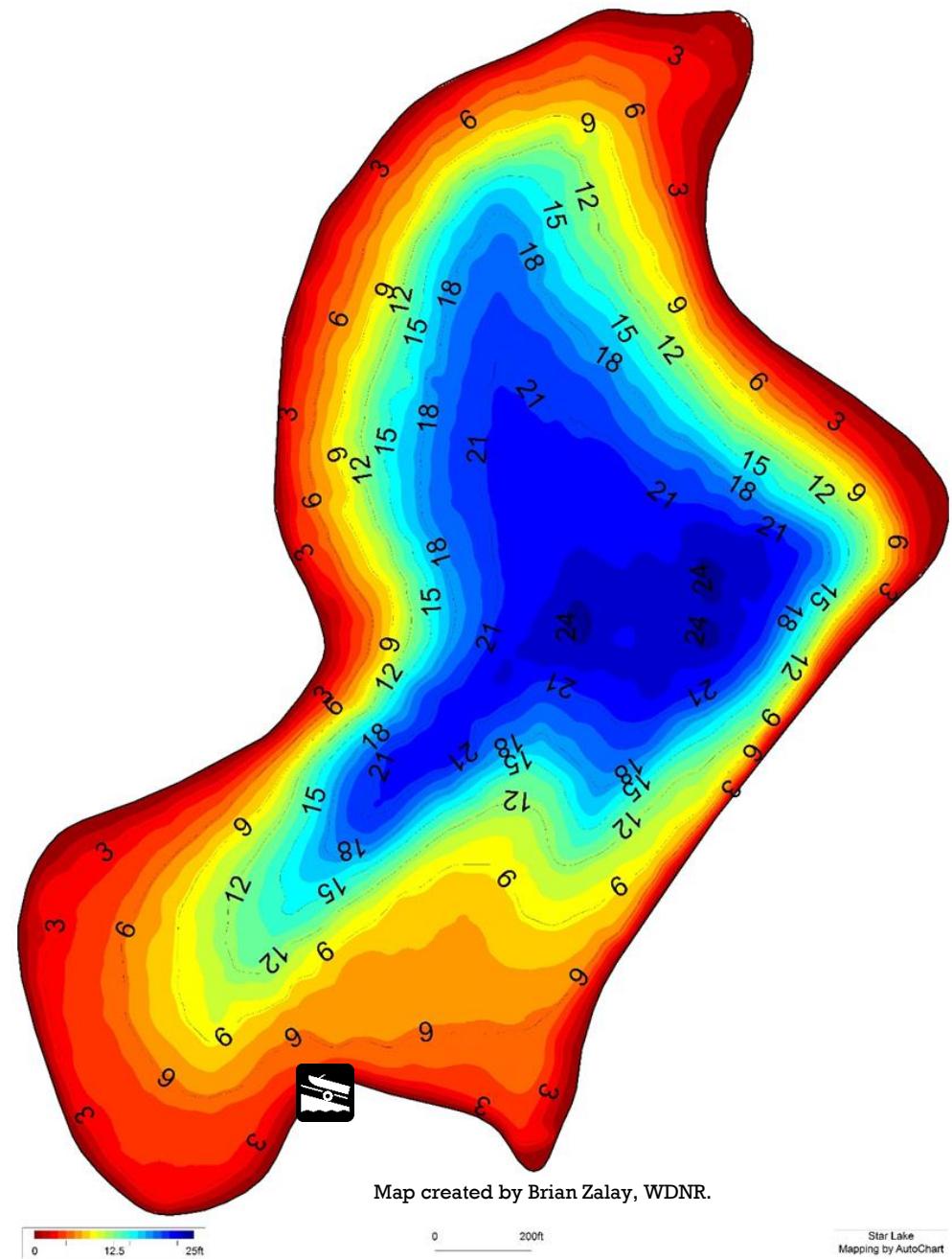
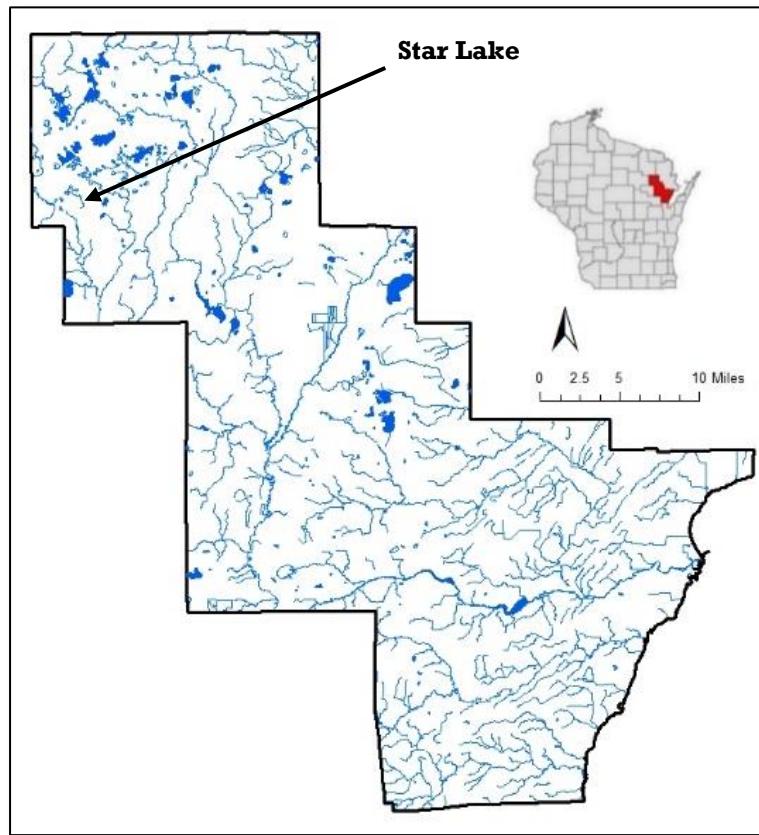
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| Resource | Acronym or Truncated Name |
|--|---------------------------|
| Citizen Lake Monitoring Network | CLMN |
| Clean Boats Clean Waters | CBCW |
| Lumberjack Resource Conservation & Development Council | LRCD |
| Oconto County Land & Water Conservation Dept. | OC LCD |
| Oconto County Board of Supervisors | OC Board |
| Oconto County Lakes and Waterways Association | OCLAWA |
| Town of Doty | TOD |
| 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 STAR LAKE

Star Lake is located in the Town of Doty, in northeast Wisconsin. This 57-acre seepage lake has a maximum depth of 21 feet with clear water. Its bottom sediments are primarily sand with muck and some gravel. Visitors have access to the lake from one public boat landing on the lake's south side, which is owned and maintained by the Town of Doty. Water enters and leaves Star Lake primarily from groundwater.



What Is A Lake Management Plan?

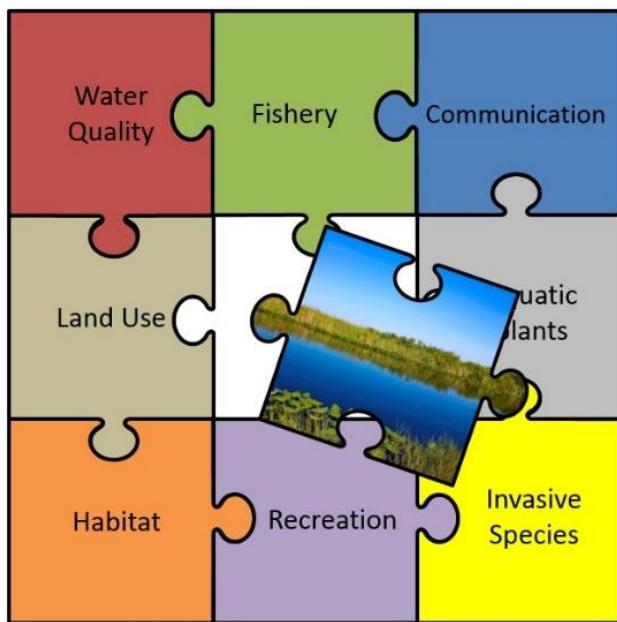
LAKE MANAGEMENT PLANS (LMP)

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 addresses 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?

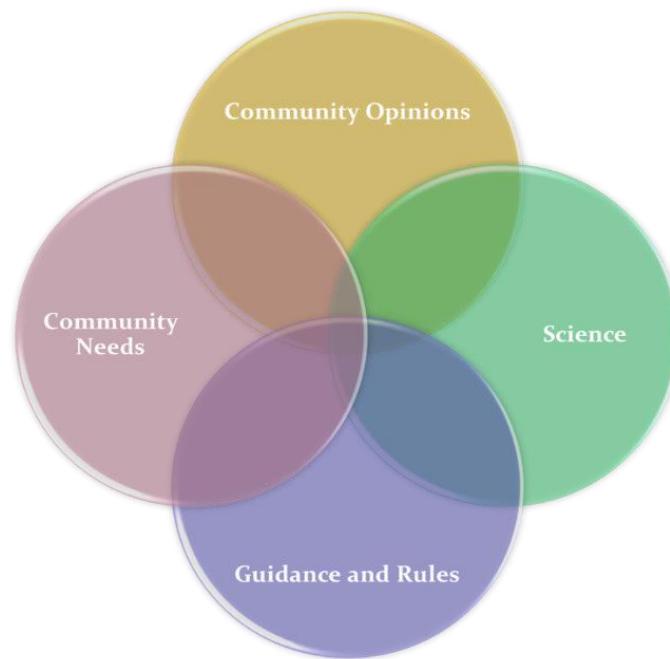
This plan was created to ensure that Star Lake is healthy now and for future generations. It was designed to learn about Star Lake and identify features important to the Star Lake community, in order to provide a framework for the protection and improvement of the lake.



Implementing the content of this LMP will enable citizens and others to work together to achieve the vision for Star 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 2018-2019 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 Star 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. Area residents, lake users, and representatives of local municipalities gathered at a public

meeting held on June 22, 2018 at the Doty Town Hall and January 28, 2021 via an online platform to learn from one another and make decisions about the fishery, water quality, habitat, and land management in the Star 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 Star 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 the lake can have the greatest influence on the lake by understanding and choosing lake-friendly options to manage their land and the lake.
- **A future lake association:** This plan provides an 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 Town of Doty:** 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 following table 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 STAR 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 Star 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

Star Lake Management Plan Goals

Goals for Star Lake

The following goals and actions were derived from the values and concerns of citizens interested in Star Lake and members of the planning committee, as well as the known science about Star 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 | Star Lake will maintain a healthy, well-balanced fishery. |
| Goal 2 | Star Lake will have a healthy, well-balanced and diverse aquatic plant community that provides essential habitat and good water quality while not significantly impacting recreation and remaining free of invasive species. |
| Goal 3 | Sensitive areas in Star Lake, which provide essential habitat and/or water quality benefits, will be protected. |
| Goal 4 | Property owners in the Star Lake watershed will know about and utilize resources for healthy land management practices. |
| Goal 5 | Shorelands around Star Lake will be healthy and protective of water quality and habitat. Over the next 5 years, 1,500 feet (15-20 properties) of mowed shoreline will be restored. |
| Goal 6 | Maintain or improve water quality in Star Lake. |
| Goal 7 | Lake users will be informed about and respectful of Star Lake. |
| Goal 8 | Increase participation in lake stewardship. |
| Goal 9 | Review plan regularly and update as needed. |

Fish Community

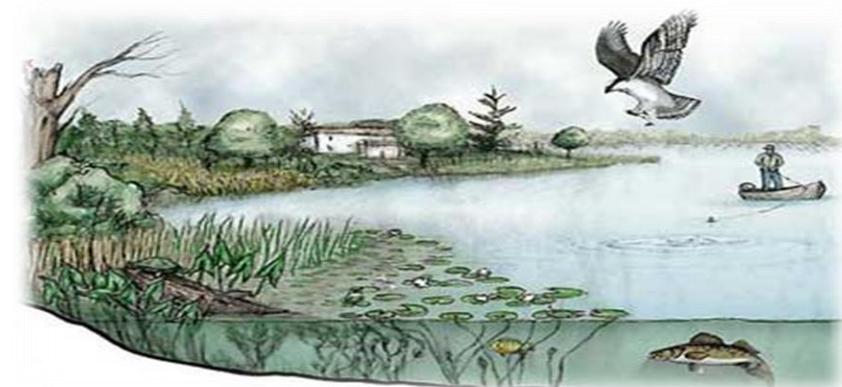
IN-LAKE HABITAT AND A HEALTHY LAKE

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 Star 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.

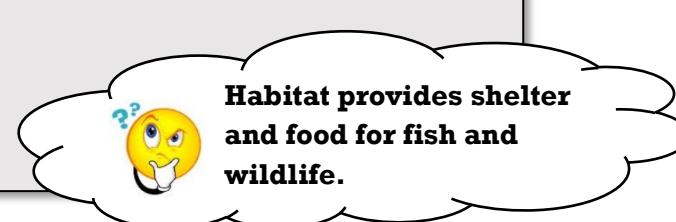
What can affect the fishery?

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 Star Lake

Peaceful lake.
Fairly clear lake.
Peace and quiet.
Clean water, serenity.



Fish Community

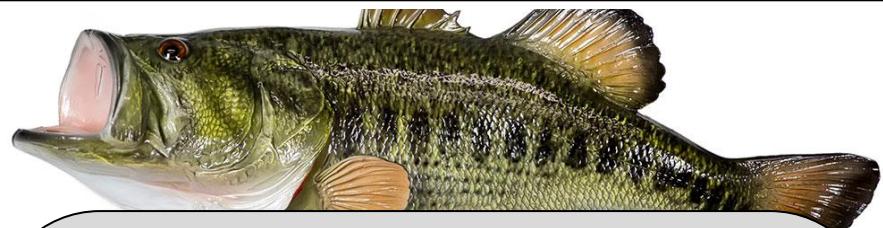
Can the fishery be improved?

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 | Age Class |
|---------------|-----------------|-----------|------------|
| 1939 | Bluegill | 500 | Adult |
| 1939 | Yellow perch | 100 | Adult |
| 1939 | Yellow perch | 10000 | Fingerling |
| 1944 | Largemouth bass | 1500 | Fingerling |
| 1949 | Largemouth bass | 1000 | Fingerling |
| 1950 | Largemouth bass | 800 | Fingerling |
| 1952 | Largemouth bass | 600 | Fingerling |
| 1953 | Largemouth bass | 300 | Fingerling |
| 1979 | Northern pike | 50 | Fingerling |

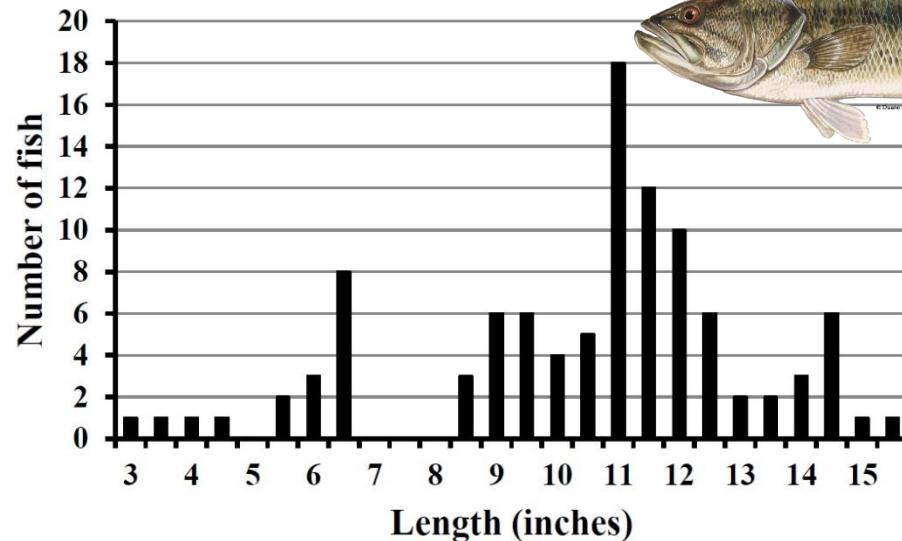
| Common Name of Fish | June 2016 | | | August 1994 | | |
|---------------------|-----------|---------|-----------------------|-------------|---------|-----------------------|
| | Number | Percent | Length Range (Inches) | Number | Percent | Length Range (Inches) |
| Largemouth bass | 102 | 74 | 3.1 - 15.8 | 85 | 36 | 2.4 - 19.5 |
| Bluegill | 21 | 15 | 3.8 - 6.9 | 25 | 11 | 3.6 - 8.0 |
| Yellow perch | 6 | 4 | 3.7 - 5.9 | 9 | 4 | 4.0 - 6.9 |
| Rock bass | 4 | 3 | 3.7 - 7.2 | 98 | 41 | 2.8 - 9.5 |
| Black crappie | 1 | 1 | 6.5 | 7 | 3 | 2.3 - 11.1 |
| Green sunfish | 2 | 1 | 3.7 - 4 | 5 | 2 | 3.8 - 5.6 |
| Yellow bullhead | 2 | 1 | 9.2 - 11.6 | | | |
| Brown bullhead | | | | 6 | 3 | 7.8 - 10.5 |
| Walleye | | | | 1 | <1 | 21.2 |
| Northern pike | | | | 1 | <1 | 25.4 |
| Total | 136 | | | 237 | | |



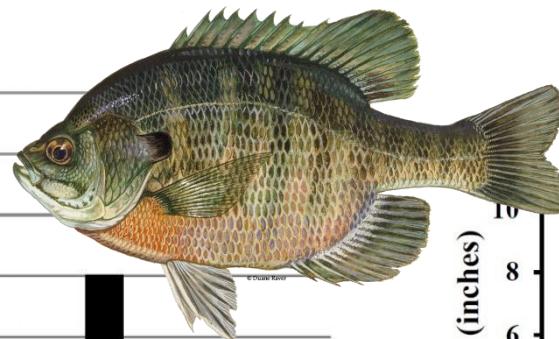
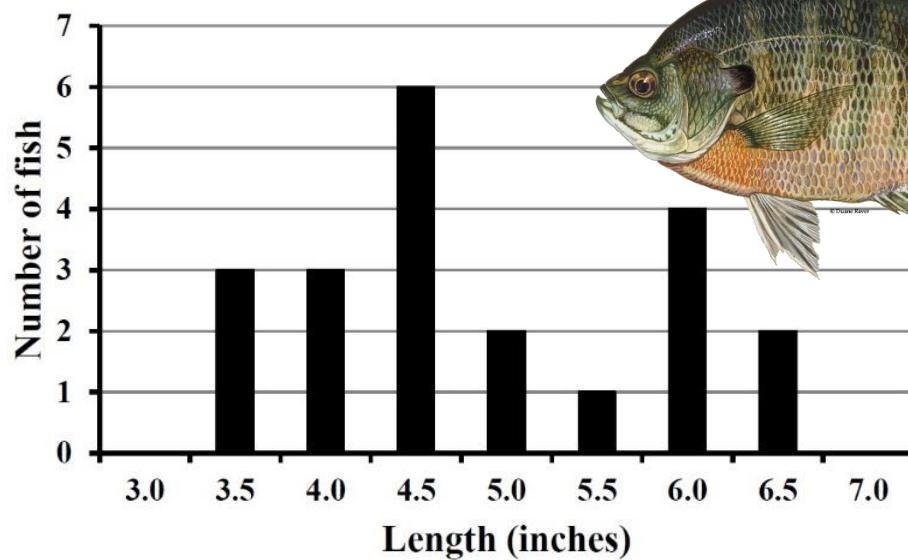
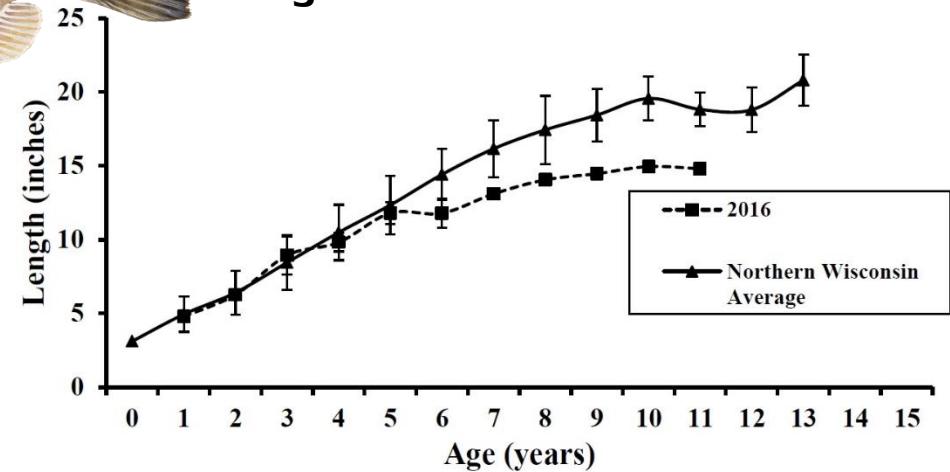
Star Lake June 2016 Fish Survey Summary

- ✓ Last previous survey in August 1994.
- ✓ Seven species observed: Largemouth bass, bluegill, yellow perch, rock bass, black crappie, green sunfish and yellow bullhead.
- ✓ Largemouth bass were most abundant (68/mile) followed by bluegill (14/mile).
- ✓ Largemouth bass growth was below average and ranged from 3.1-15.8 inches (PSD 36, RSD 2).
- ✓ Bluegill growth is slightly above average ranging from 3.8-6.9 inches (PSD 29, RSD 0).
- ✓ Rock bass abundance has declined significantly between 1994 (65/mile) and 2016 (2.7/mile). This could be due to differences in survey timing.

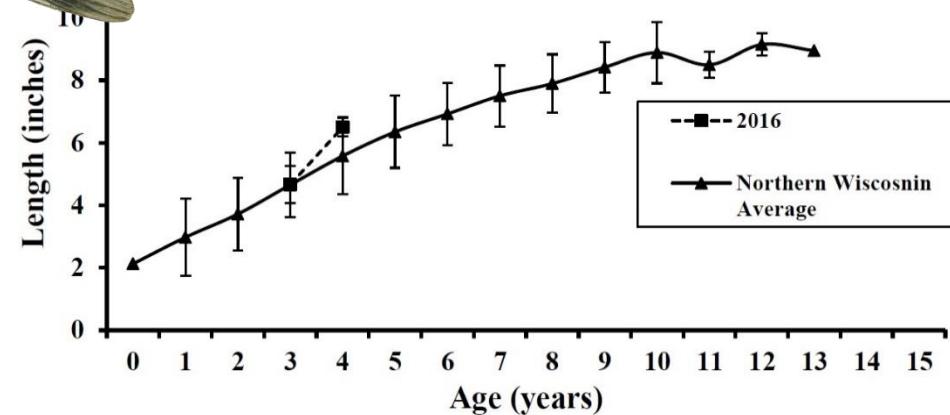
Fish Community



Largemouth bass



Bluegill



Fish Community

Goal 1. Star Lake will maintain a healthy, well-balanced fishery.

Objective 1.1 Continue to enhance fish and wildlife habitat in and around the lake.

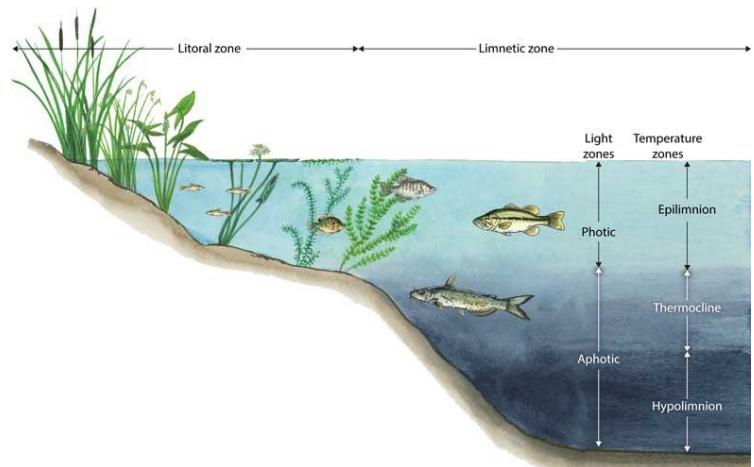
At least 5-10 fish stick clusters will be installed over the next 5 years.

 Fish cribs are good cover for small fish, but near shore habitat is essential for reproduction of most species.

| Actions | Lead person/group | Resources | Timeline |
|--|-------------------|-----------------------------------|----------|
| Identify willing landowners for fish stick installations (at least 10% of properties with fish sticks is recommended). Trees can be sourced by identifying other landowners who need a tree removed. | | WDNR-Chip Long | Ongoing |
| Educate and encourage landowners to leave logs, tree branches and limbs in place in the water, whenever possible. | | WDNR-Chip Long UWEX-Pat Goggin | Ongoing |
| Continue to protect and restore shoreland areas and avoid shoreland alterations to improve fish habitat (see Shoreland section). | | Shoreland property owners | Ongoing |

Objective 1.2 Continue to manage for a healthy balance of predator and panfish populations.

| Actions | Lead person/group | Resources | Timeline |
|---|-------------------|----------------|----------|
| Explore stocking of walleye (5/acre) in Star Lake. Would likely require funds. Lake group? Sportsman's group? | | WDNR-Chip Long | TBD |
| Explore reduced bag or size limit for largemouth bass to improve size structure. | | WDNR-Chip Long | TBD |



Aquatic Plant Community

Aquatic Plants

Aquatic plants provide the forested landscape within Star 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.

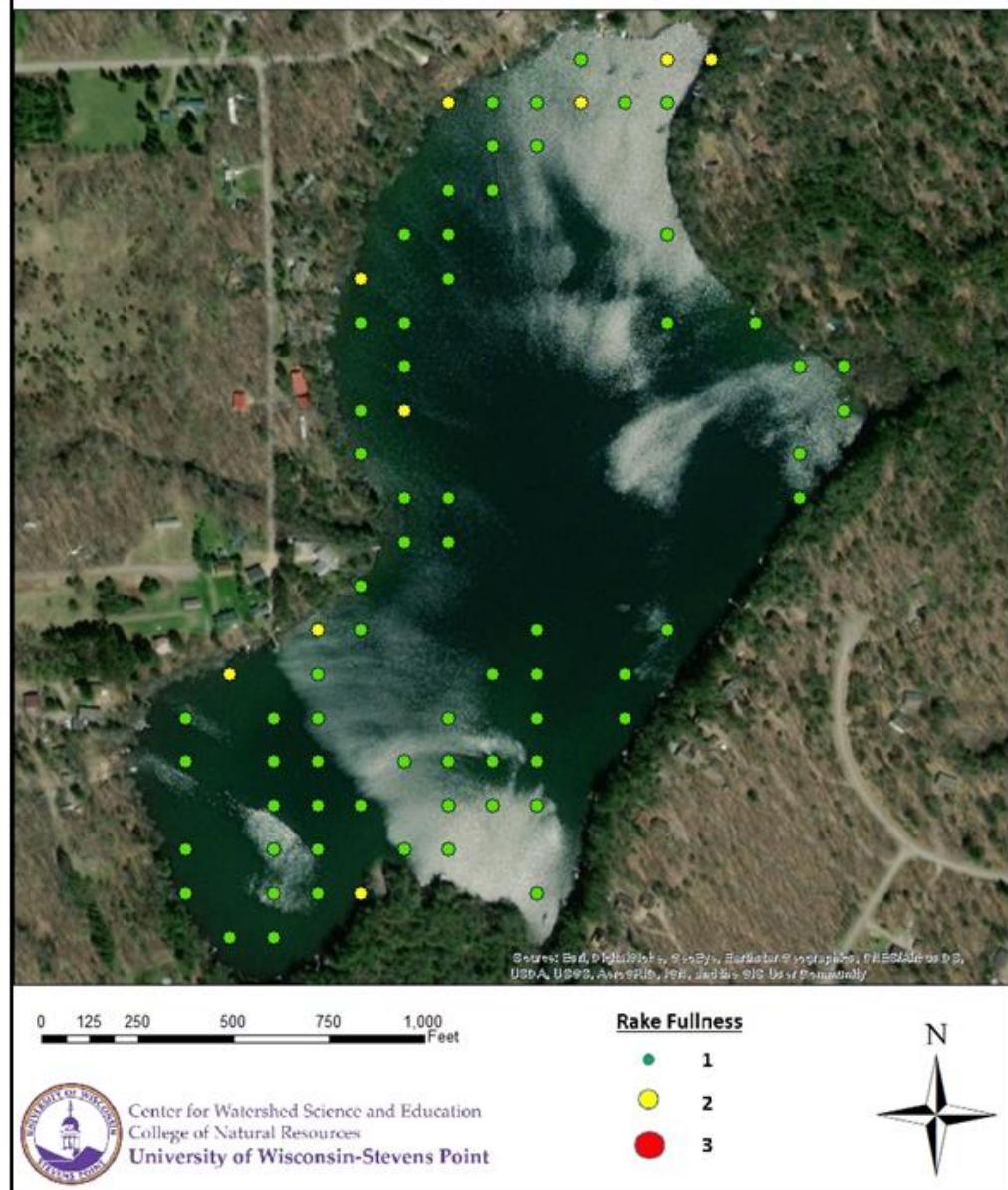
Aquatic plants near shore and in shallows provide food, shelter, and nesting material for shoreland mammals, shorebirds and waterfowl. It is not unusual for otters, beavers, muskrats, weasels, and deer to be seen along a shoreline in their search for food, water or nesting material. Aquatic plants also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

Star Lake 2018 Aquatic Plant Survey Highlights

- ✓ 44% (83 of 188) of the sites visited had vegetative growth.
- ✓ The greatest depth aquatic plants were found was 16.5 feet.
- ✓ 17 species of aquatic plants were identified. This is above the North Central Hardwood average of 16.2.
- ✓ The three most dominate species were slender naiad (73%), stiff pondweed (14%), flat-stem pondweed (12%).
- ✓ The Floristic Quality Index (FQI) was 23.9. The northcentral hardwood average is 23.3.
- ✓ No invasive species were observed.

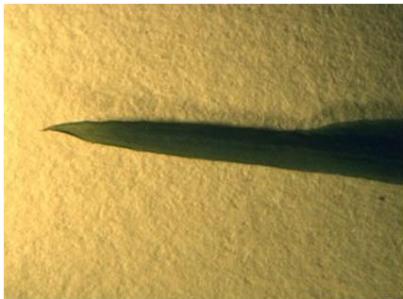
Native plants provide essential food and habitat for fish and wildlife.

Star Lake Aquatic Plant Survey 2018: Rake Fullness



Aquatic Plant Community

Slender naiad, also called nodding water-nymph, is a primary food source for waterfowl and provides habitat for many invertebrates.



Stiff pondweed, or narrow-leaved pondweed, is an important food source for fish, waterfowl and some mammals.



Flat-stem pondweed, usually found in soft sediment, is a food source for geese and ducks and some mammals. It provides food and cover for fish and invertebrates.

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.

No invasive species were observed during the 2018 survey.



However, **Banded mystery snails** were documented in Star Lake in 2010. Not a lot is known about the impacts of this species, but they have been shown to compete with native populations of snails and possibly serve as a vector for parasites and disease.

Ornamental water lilies, having escaped private ponds, are non-native lilies that aggressively root in the substrate and crowd out native species, disrupting habitat and the food chain. These were documented on Star Lake in 2016.



A point-intercept survey per the DNR protocol is recommended every 5 years to detect changes in the plant community and detect any AIS.

Aquatic Plant Management in Star Lake

Management strategies in Star 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 invasive species or nuisance native plants, while minimizing impacts to Star Lake as a whole, have

been identified. Depending upon conditions, the following options may be used alone or in combination with others.

Hand-pulling. No permit required.

Hand-pulling is the preferred method for removing invasive species. 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 Management Plan Review

A good aquatic plant management plan strategy should reduce the amount of management activity needed as time goes on. In Star 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. Star Lake will have a healthy, well-balanced and diverse aquatic plant community that provides essential habitat and good water quality while not significantly impacting recreation and remaining free of invasive species.

Objective 2.1 Protect against establishment of AIS.

| Actions | Lead person/group | Resources | Timeline |
|---|--------------------------|----------------------------|-----------------|
| Encourage or host training to identify and look for invasive species, particularly EWM. | | WDNR-Brenda Nordin LRCD | Summers |
| Identify Clean Boats Clean Waters volunteers or hire someone to staff boat launch on busy days. This can be paid for with a CBCW grant. | | CBCW | Summers |
| Educate landowners on importance of native aquatic plants for preventing AIS. Host a speaker or mail literature to property owners. | | WDNR-Brenda Nordin | Ongoing |
| If new AIS is suspected or observed, follow the guidance in Appendix B . | | WDNR-Brenda Nordin | Ongoing |



ILLUSTRATION: KAREN ENGELBRETSON

Aquatic Plant Community

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 AIS, provide food and habitat for wildlife, and protect the shoreline by sending educational materials and/or newsletter. | | 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 access, 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. | | 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. | | WDNR-Brenda Nordin Consultants | Every 10 years if no active plant management taking place |
| Reduce nutrient and sediment loading to lake (to limit abundance of plants and algae) by improving shoreland buffers (see Shorelands section) and implementing BMPs in the watershed (see Watershed section). | | 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.

Every waterbody has areas that are most important to the overall health of the lake.

Although Star Lake does not have an official critical habitat area designation, there are areas within Star 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. 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 in Star Lake, which provide essential habitat and/or water quality benefits, will be protected.

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

| Actions | Lead person/group | Resources | Timeline |
|---|--------------------------|--------------------|-----------------|
| Request a Critical Habitat Designation from WDNR. | | WDNR-Brenda Nordin | 2022 |
| If critical habitat is identified, communicate to property owners, visitors, and Town Board as to why these areas are important. Look for opportunities to protect these areas. | | | TBD |

Watershed

LANDSCAPES AND THE LAKE

Star Lake Watershed

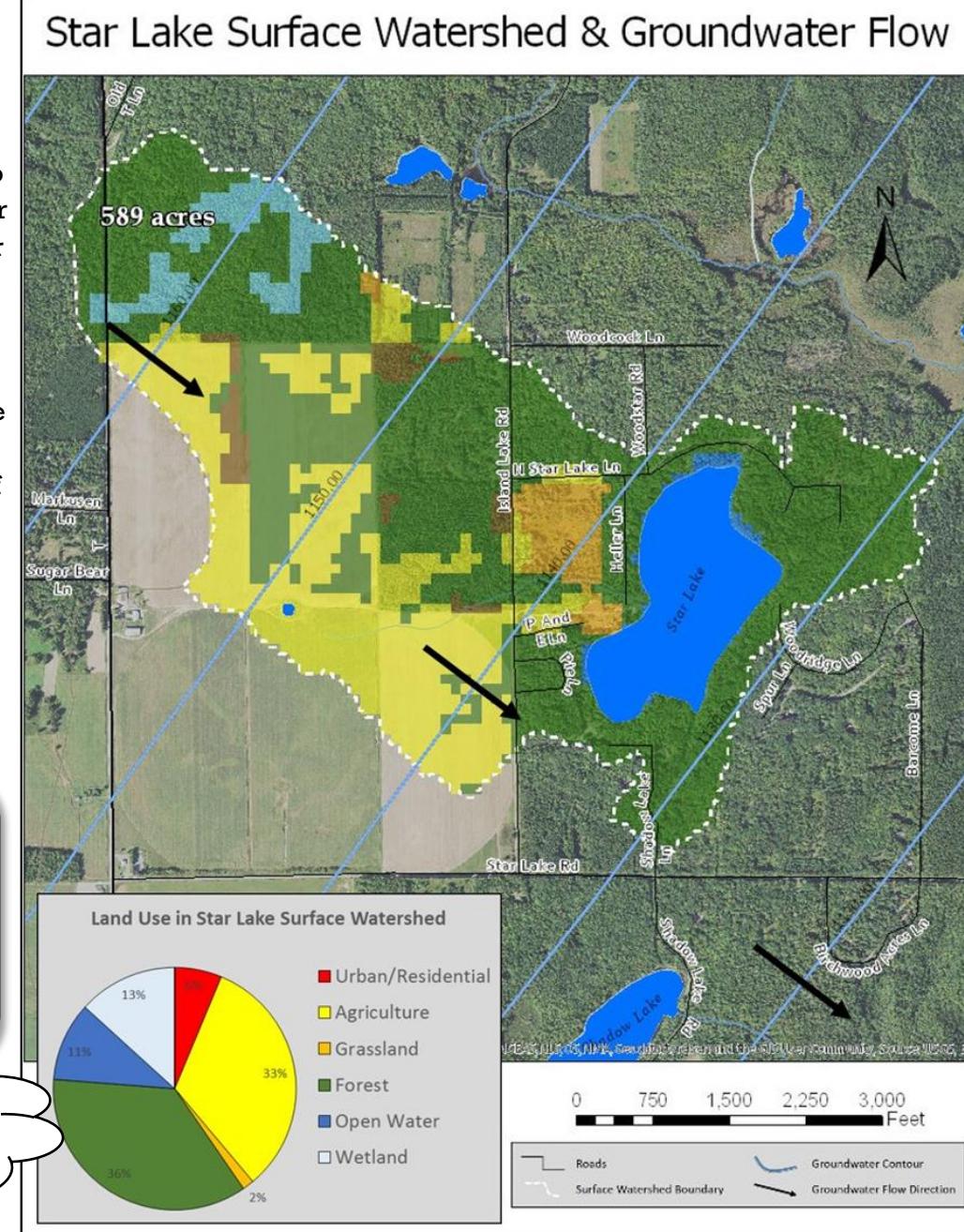
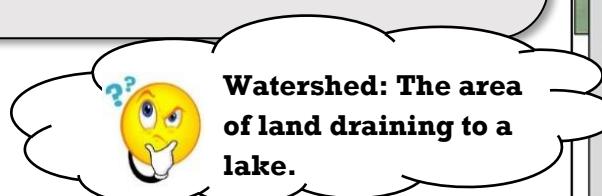
A Lake is a Reflection of its Watershed...

Understanding where Star 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 Star 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.

Star Lake's Watershed

The Star Lake watershed is 589 acres. Primary land use is forested land. The lake's shoreland is surrounded primarily by developed residential lots and forest. In general, the land closest to the lake has the greatest immediate impact on water quality.



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 used on lawns, gardens and crops 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:

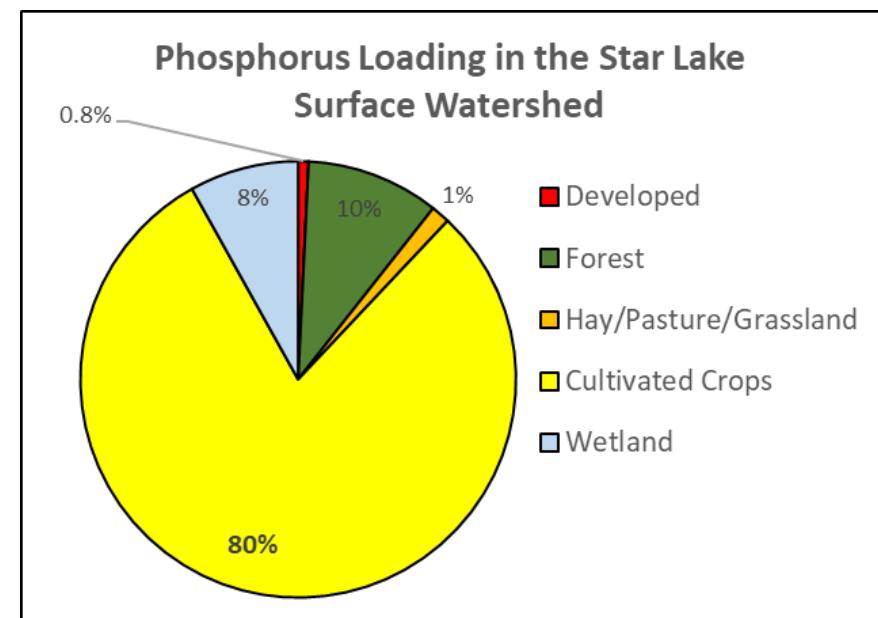
- eliminating/reducing the use of fertilizers,
- increasing the distance between the lake and a septic drainfield,
- protecting/restoring wetlands and native vegetation in the shoreland,
- controlling erosion,
- manure management and cropping practices.



Watershed

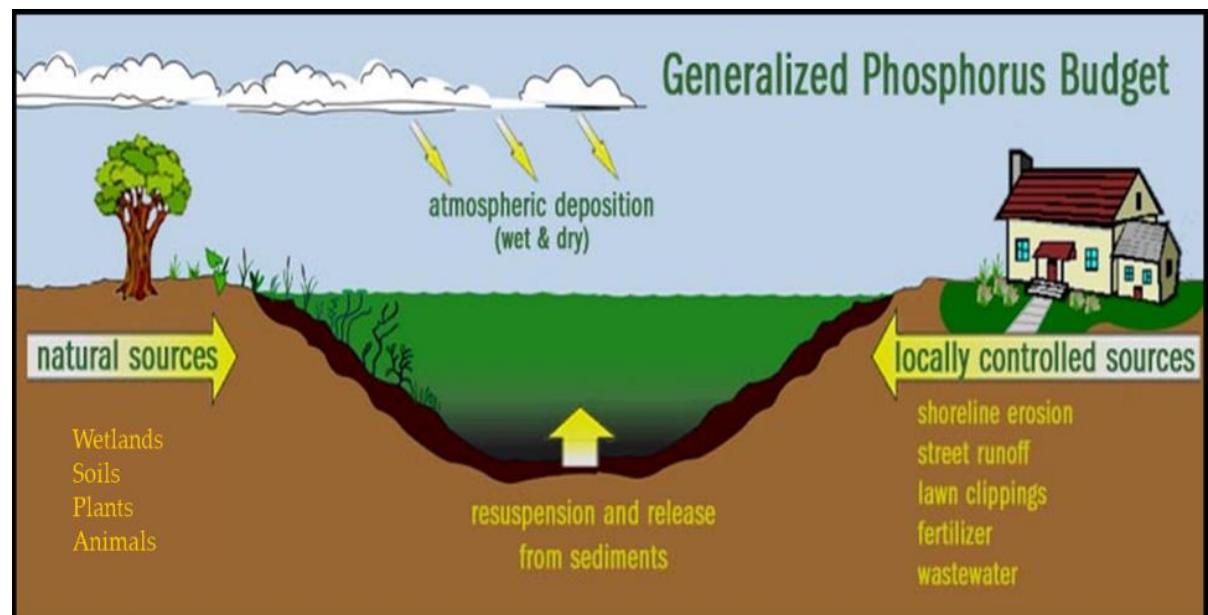
Phosphorus Modeling

Estimates of phosphorus from the landscape can help to understand the phosphorus sources to Star 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 Star Lake watershed, many of these sources are natural and cannot be changed.



Phosphorus Loading in Star Lake Watershed

Based on modeling results, agriculture had the greatest percentage of phosphorus contributions from the watershed. Efforts to reduce nutrient inputs to the lake must be focused on land uses that we have some control over such as production and developed areas.

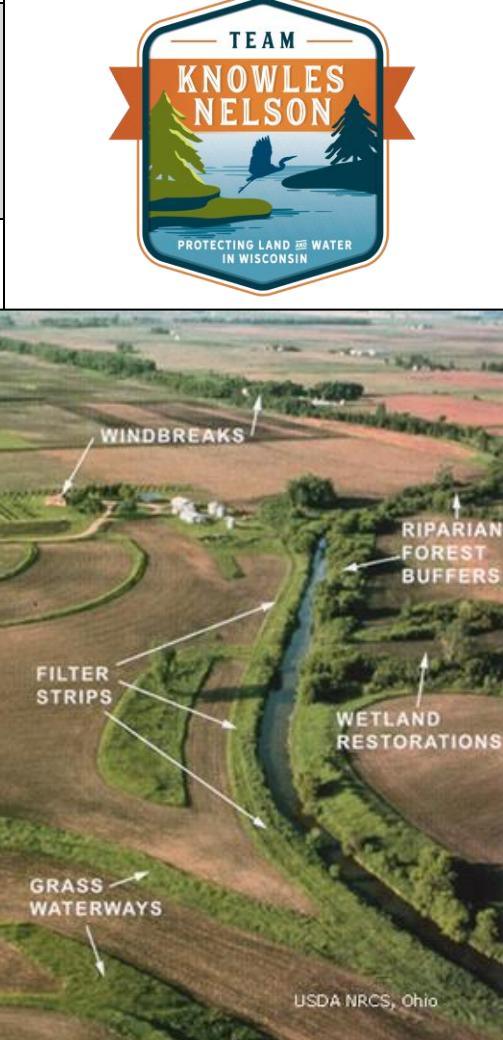


Watershed

Goal 4. Property owners in the Star Lake watershed will know about and utilize resources for healthy land management practices.

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

| Actions | Resources | Timeline |
|--|---|-----------|
| Encourage the County to support and follow-up with water quality-based best management practices (BMPs) within the lake's watershed. Include BMPs that reduce application of excess nitrogen and pesticides that leach to groundwater. | NRCS DATCP County Board Supervisors | Ongoing |
| Support landowners 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. | WDNR Lake Protection Grant Knowles-Nelson Stewardship Fund NWLT | As needed |
| Encourage and new development to manage runoff on site and consider ways to minimize impacts from septic systems on Star Lake. | Town of Doty Developers/builders | As needed |
| Encourage design of road and construction projects that will minimize impact to lakes. | Town of Doty OC Highway Dept./WDOT | As needed |
| Protect wetlands to maintain the water budget of Star Lake. Any altered wetlands should be mitigated within the lake's watershed. | WDNR | As needed |
| Work with Town of Doty to maintain and make improvements to boat launch to reduce erosion and runoff. | Town of Doty WDNR | As needed |



The graphic includes the 'TEAM KNOWLES NELSON' logo, which features a shield with a landscape, a crane, and the text 'TEAM KNOWLES NELSON' and 'PROTECTING LAND & WATER IN WISCONSIN'. Below the logo is an aerial photograph of a rural landscape with fields and a river. Labels with arrows point to various conservation features: 'WINDBREAKS' (a line of trees along a field edge), 'RIPARIAN FOREST BUFFERS' (a buffer strip along a waterway), 'FILTER STRIPS' (a strip of vegetation between fields and a waterway), 'WETLAND RESTORATIONS' (a restored wetland area), and 'GRASS WATERWAYS' (a grassy channel). The bottom right of the photograph is credited to 'USDA NRCS, Ohio'.

Shorelands

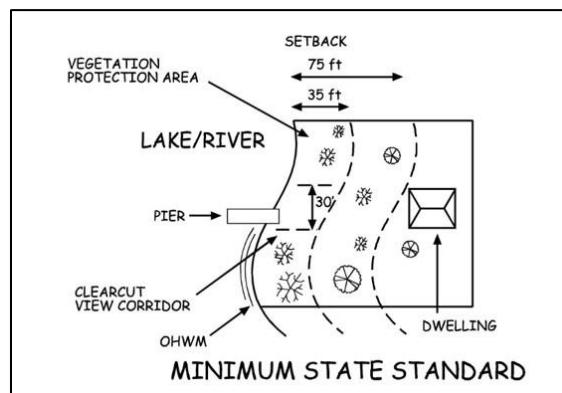
Shorelands

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.



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

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

Shorelands

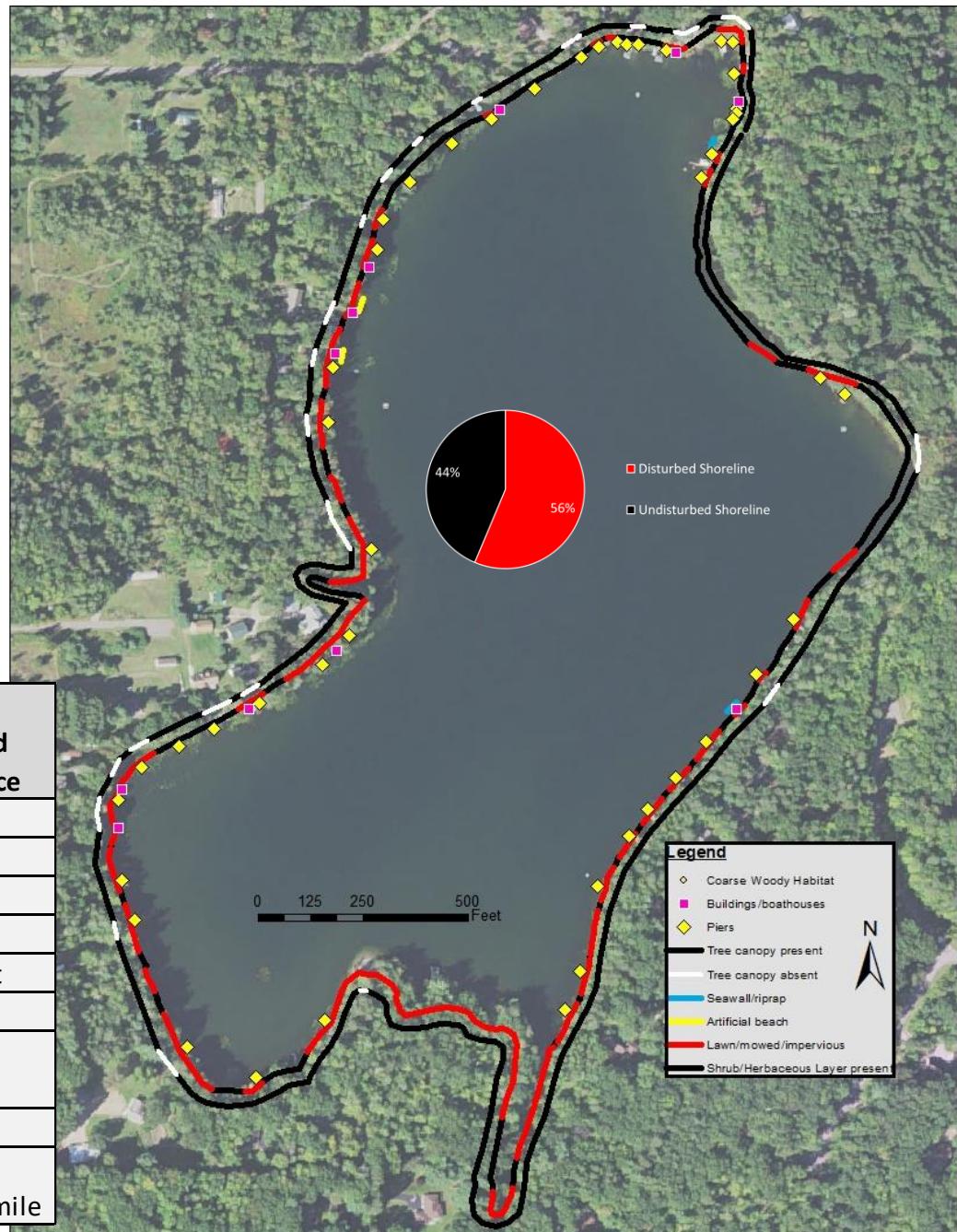
Star Lake's Shorelands

To better understand the health of Star Lake, shorelands were evaluated. The survey inventoried shoreland vegetation, erosion, riprap, barren ground, seawalls, structures, and docks. More than half of the 1.6 miles of shoreline is developed as homes and seasonal cottages. A total of 46 piers were counted during the survey (1/182 ft).

- With 53 lakefront lots, 1,590 feet (19%) of disturbed shoreland is permitted under NR115. Based on the 2018 shoreland inventory, 56% (4,712 feet) of Star Lake's shoreland was disturbed. Coarse woody habitat was measured at 64 logs/mile (250 logs/mile recommended.)
- Star Lake had below average shoreland health compared to other lakes in the study. Some stretches are in good shape, but many portions have challenges that should be addressed.



| Modifications, Structures, Erosion | Measured Occurrence |
|------------------------------------|---------------------|
| Artificial Beach | 20 ft |
| Rip Rap | 15 ft |
| Sea Wall | 30 ft |
| Impervious Surface | 64 ft |
| Mowed Lawn | 856 ft |
| Erosion | 30 ft |
| Nonconforming Buildings | 2 |
| Piers | 46 |
| Coarse Woody Habitat | 64 logs/mile |



Shorelands

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

Star Lake 2018 Shoreland Survey Results

| Total lakefront footage | # Riparian lots | Total allowable (NR115) disturbed shoreland | Measured disturbed shoreland |
|-------------------------|-----------------|---|------------------------------|
| 8,365 | 53 | 1,590 feet (19%) | 4,712 feet (56%) |

Goal 5. Shorelands around Star Lake will be healthy and protective of water quality and habitat. Over the next 5 years, 1,500 feet (15-20 properties) of mowed shoreline will be restored.

Objective 5.1 Shoreland property owners will be knowledgeable and make good decisions regarding shoreland practices.

| 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, native plants, coarse woody debris). Include information on cost share programs. | | OCLWA UWEX Lakes WDNR Healthy Lakes Grants | Ongoing |
| Encourage and support shoreland owners interested in shoreland restoration. Include information on how and why to create healthy shorelands in a welcome packet to new property owners. | | UWEX Lakes OCLCD WDNR Healthy Lakes Grants | Ongoing |
| Encourage those interested in shoreland restorations to contact OCLCD for available resources. | | OCLCD WDNR Healthy Lakes Grants | Ongoing |
| Consider restoring and showcasing a 'demonstration site' with a sign about shoreland protection. | | WDNR | 2022 |
| Work with landowners of large undeveloped shoreline areas to develop protections for these areas such as conservation easement, purchase, or other strategies. | | UWEX Lakes Knowles-Nelson Stewardship Fund | Ongoing |
| Identify willing property owners to install fish sticks to improve fish habitat (see Fish Community section). | | WDNR-Chip Long OCLCD | 2022 |
| Work with Town to design and install a water diversion structure at the boat ramp to keep runoff from flowing directly into lake. | | Town of Doty WDNR OCLCD | 2022 |

Water Quality

Water Quality

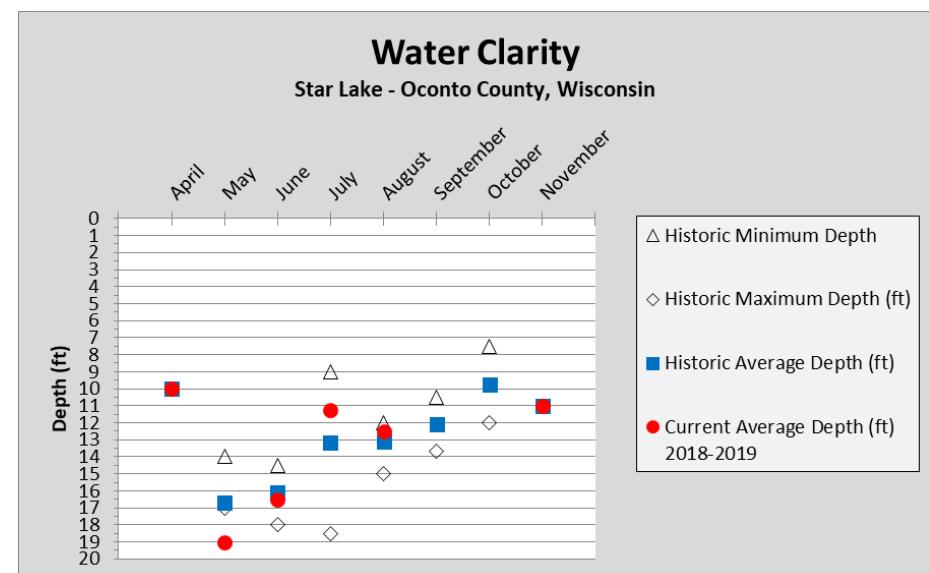
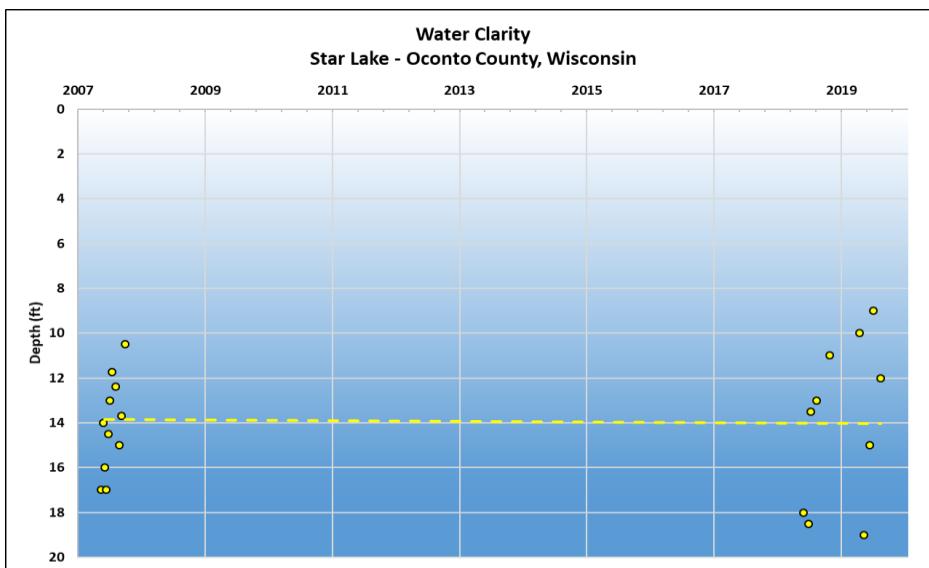
A variety of water chemistry measurements were used to characterize the water quality in Star Lake. Water quality was assessed during the 2018-2019 lake study and involved a number of measures including temperature, dissolved oxygen, water chemistry, and nutrients (phosphorus and nitrogen). Nutrients 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 Star 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.

Star Lake's Water Quality Summary

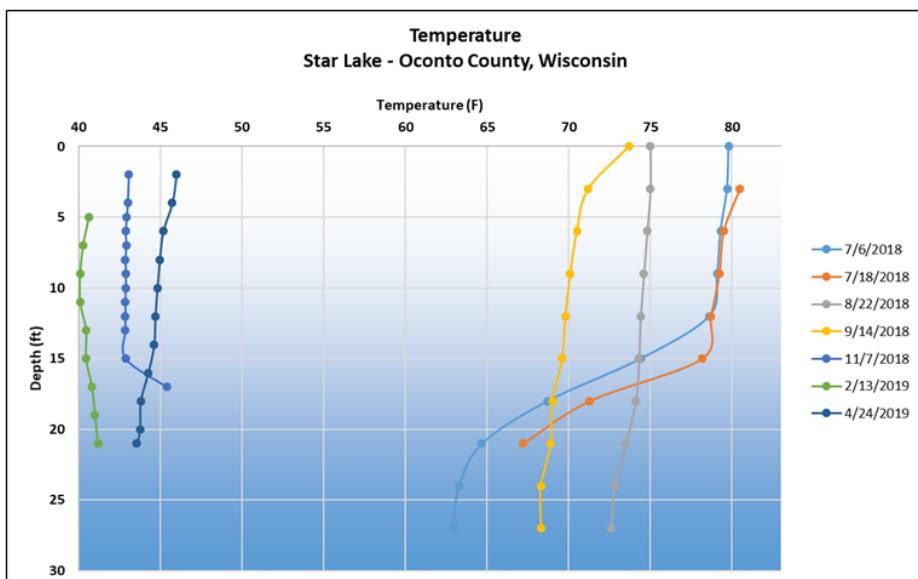
- ✓ **Water clarity** ranged from 9-19 feet (considered very good), which is similar to historic measurements and suggests a very stable trend.
- ✓ Sufficient **dissolved oxygen** was present in at least the upper 12 feet of water at all times during the study.
- ✓ Concentrations of **contaminants** were all low during the study. Atrazine was not detected.
- ✓ **Phosphorus** concentrations remained well below the standard of 40 ug/L throughout the study. Inorganic nitrogen remained below concentrations that spur algal blooms.
- ✓ Water in Star Lake is **moderately hard** (73 mg/L CaCO₃), having a slightly elevated level of dissolved minerals. This mineral enriched can water help buffer the impacts of phosphorus.



Water Quality

Temperature and Dissolved oxygen

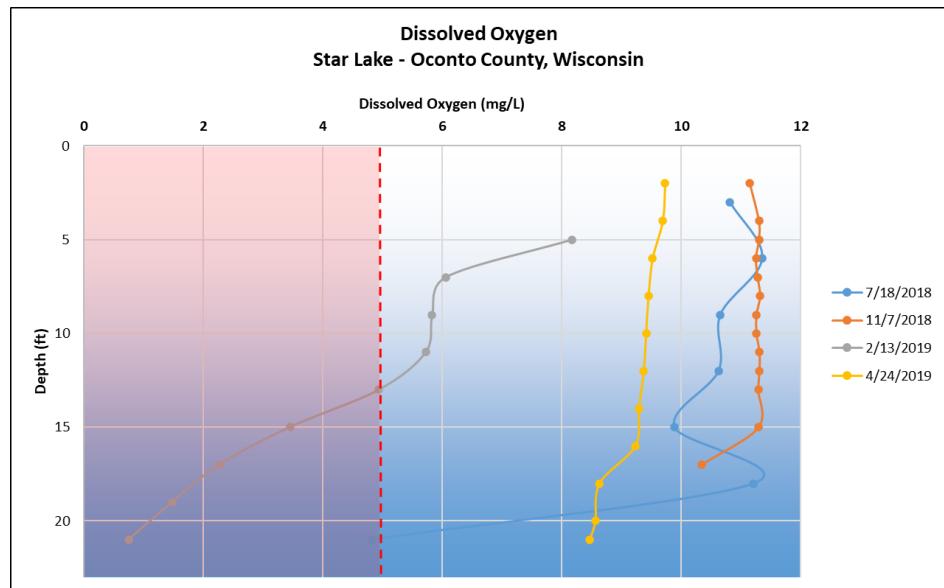
Temperature profiles for Star Lake show a slight thermocline at depth between 15 and 20 feet in mid-summer, but remains relatively mixed the rest of the year. This phenomenon separates warmer water nearer the surface from colder, groundwater-fed water at depth. In the spring and fall, temperatures at depth and near the surface become similar, allowing all the water within the lake to mix.



Dissolved oxygen is an important measure in Star 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 Star Lake are typically sufficient to support fish through most of the year, but a late winter profile shows that



concentrations sufficient to support fish (>5 mg/L) remain in as little as 5-8 feet of water after a long winter. Bumps in concentrations at depth, around 15 feet, suggest some algal activity during the growing season.

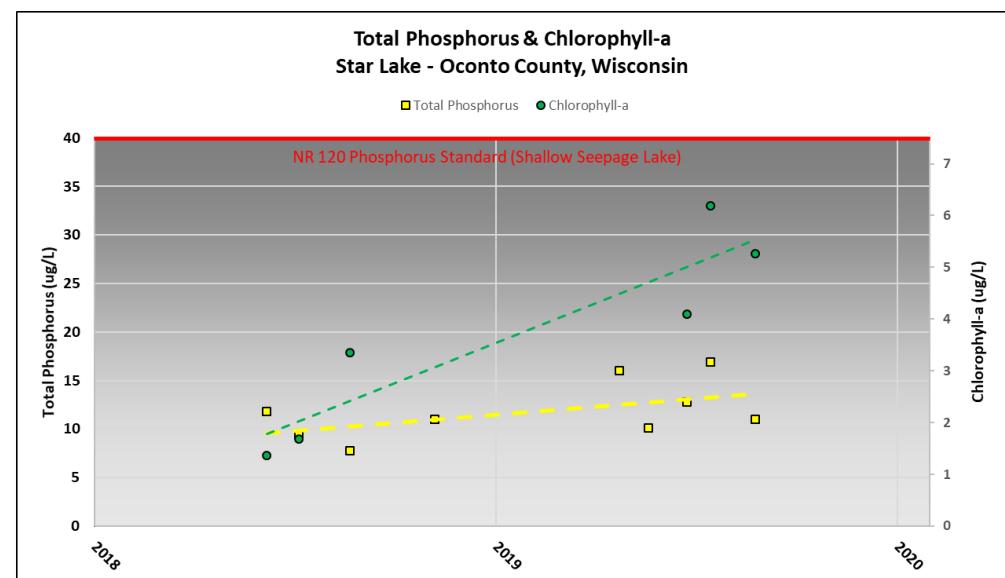
Contaminants

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 all low, suggesting minimal impacts from human activity.

Water Quality

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. Shallow seepage lakes such as Star have a standard of 40 ug/L they must remain stay to remain healthy. The very limited data available show concentrations in Star to be well below this standard. Continued monitoring is necessary to verify this and establish reliable 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 Star Lake, phosphorus concentrations remained well below the threshold of 40 ug/L throughout the study. Chlorophyll-a approached its threshold of 6 ug/L and exceeded it in one sample. Based on limited data collected during the two-year study, an increasing trend in concentrations is suggested. Continued monitoring is recommended.

Be part of the solution!

Managing nitrogen, phosphorus and soil erosion throughout the Star 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.

Water Quality

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

Objective 6.1 *Maintain median summer total phosphorus concentrations below 40 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 a newsletter and/or hosting a guest speaker. | | OCLWA WDNR UWEX Lakes | Ongoing |
| Refrain from the use of fertilizers. Encourage soil testing to determine if amendments are necessary. | | OC UWEX | Ongoing |
| Encourage the restoration of unmowed vegetation to slow and absorb runoff and pollutants (see Shorelands section). | | UWEX Lakes | Ongoing |

Objective 6.2 *Continue to develop an ongoing, robust water quality dataset for Star Lake to monitor trends and declines or improvements over time.*

| Actions | Lead person/group | Resources | Timeline |
|---|--------------------------|----------------------------|-----------------------------|
| Support volunteers collecting water quality data. Offer help or backup to those efforts. Continue participation in the Citizen Lake Monitoring Network. | | CLMN WDNR-Brenda Nordin | 3+ times annually in summer |
| Submit all collected data to WDNR for archival and use by scientists and resource managers. | | WDNR | Ongoing |



Recreation

Wisconsin has more than 500,000 registered boats—one for every 10 residents.

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 community and suite of lake users are essential to maximize the effects of plan implementation.

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

Objective 7.1 Promote an atmosphere of respect 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. | | Town of Doty OCLWA OC UWEX | Ongoing |
| Work with Town to upkeep/repair boat ramp, as appropriate. Boat ramps in disrepair can be unhealthy to the lake if it results in spinning tires, power loading, etc. A well-kept boat launch also sends a message to visitors about the attention and care a lake is receiving. | | Town of Doty WDNR | Ongoing |
| Update signage at boat launch with an interpretive kiosk. | | UWEX Lakes | TBD |



Communication & Organization

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 Town of Doty, 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.

Goal 8. Increase participation in lake stewardship.

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

| Actions | Lead person/group | Resources | Timeline |
|--|--------------------------|------------------------|-----------------|
| Maintain a website or Facebook page to provide a commons source of communication. | | LakeKit.net OC UWEX | Ongoing |
| Maintain an email list of shoreland property owners and others interested in Star Lake. | | OC UWEX | Ongoing |
| Distribute welcome packet/mailing to all new shoreland property owners with basic lake stewardship information. | | OCLWA UWEX Lakes | As needed |
| Communicate updates to lake management plan and management activities to residents and users of the lake via email list and/or newsletter. | | | As needed |
| Host gatherings to learn about topics identified in this plan. Invite speakers or conduct demonstrations. | | UWEX Lakes WDNR | Ongoing |

Objective 8.2. Organize stewards of Star Lake to maximize and access resources. Communicate with municipalities, agencies and organizations to leverage resources and opportunities.

| Actions | Lead person/group | Resources | Timeline |
|---|--------------------------|------------------|-----------------|
| Explore formation of Star Lake Association. | Interested citizens | UWEX Lakes | Ongoing |
| Network with other lake groups by having Green Lake represented at OCLWA. | | OCLWA | |
| Attend Wisconsin Lakes Convention or Lake Leaders Institute. | | UWEX Lakes | April |



LakeKit.net is a network of lake groups helping others to build and maintain websites.

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 Star 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.

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 compiled. 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 regularly and update as needed.

Objective 9.1 Communicate updates with lake community, Oconto County and WDNR.

| Actions | Lead person/group | Resources | Timeline |
|---|-------------------|-------------------------------|----------|
| Review plan regularly (annually) and discuss/document accomplishments and identification of goals/objectives for coming year. | | | Annually |
| Formally update this plan every 5 years. | | OC UWEX UWEX Lakes WDNR | 2026 |



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Appendices

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 & Water 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: Chip Long
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.long@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: 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/dsfn/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@wisc.edu
Website: <http://oconto.uwex.edu>

Fisheries Biologist (management, habitat)

Contact: Chip Long
Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.long@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 & Water 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 & Water 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@wisc.edu
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 & Water 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 & Water 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 & Water 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

Soil Fertility Testing

Contact: Dale Mohr

Appendix A

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>

Wisconsin Department of Natural Resources
101 N. Ogden Road, Peshtigo, WI 54157
Phone: 715-582-5017
E-mail: Christopher.long@wisconsin.gov
Website: <http://dnr.wi.gov/fish/>

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: Chip Long

Appendix B

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)

Appendix B

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

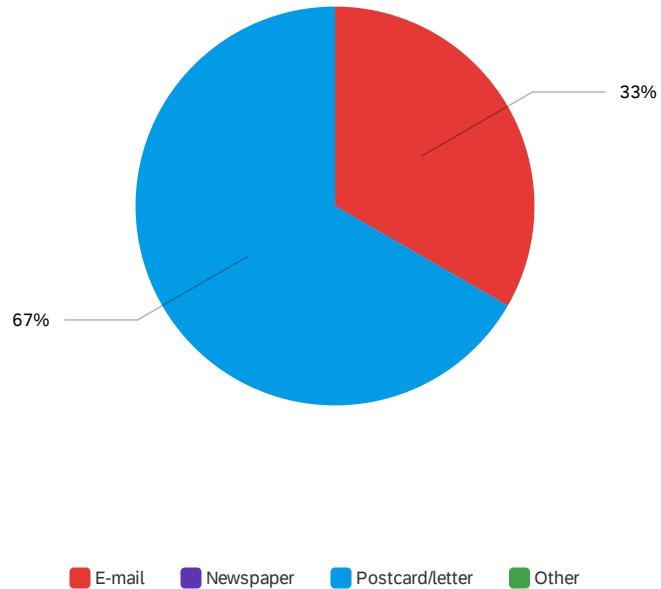
Appendix C. Lake User Survey Results

Default Report

Star Lake Survey - Oconto County Lakes Project

March 25, 2021 1:31 PM MDT

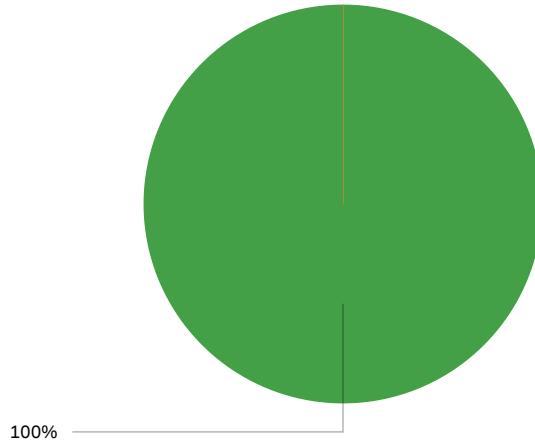
Q2 - How did you hear about this survey?



| # | Field | Choice Count |
|---|-----------------|--------------|
| 1 | E-mail | 33% 2 |
| 2 | Newspaper | 0% 0 |
| 3 | Postcard/letter | 67% 4 |
| 4 | Other | 0% 0 |
| | | 6 |

Showing rows 1 - 5 of 5

Q3 - Do you own or rent property...

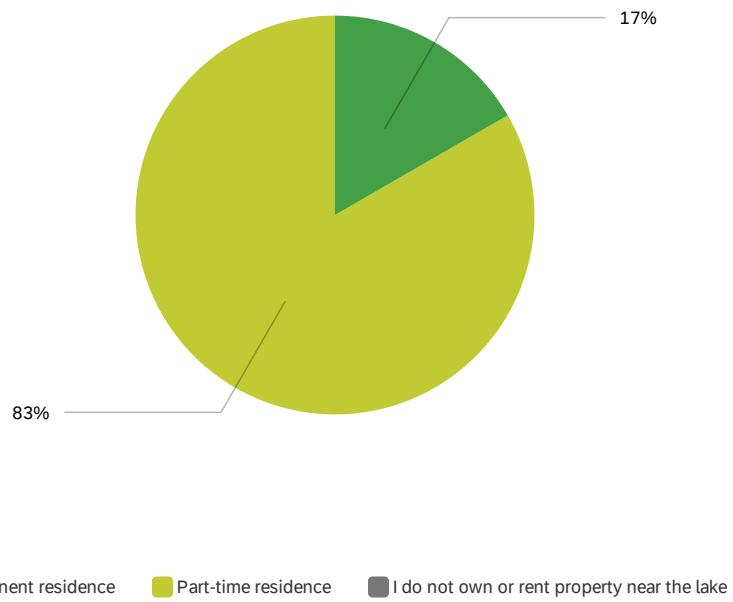


█ Around the lake █ Less than 1/2 mile from the lake █ Near the lake, but more than 1/2 mile away █ I do not own or rent property near the lake

| # | Field | Choice Count |
|---|---|--------------|
| 1 | Around the lake | 100% 6 |
| 2 | Less than 1/2 mile from the lake | 0% 0 |
| 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 |
| | | 6 |

Showing rows 1 - 5 of 5

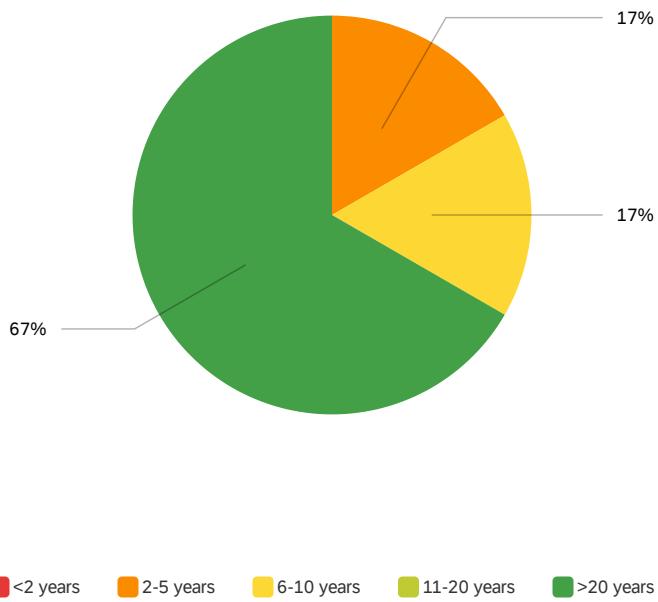
Q4 - If you own or rent property near the lake, is this property your...



| # | Field | Choice Count |
|---|---|--------------|
| 1 | Permanent residence | 17% 1 |
| 2 | Part-time residence | 83% 5 |
| 3 | I do not own or rent property near the lake | 0% 0 |
| | | 6 |

Showing rows 1 - 4 of 4

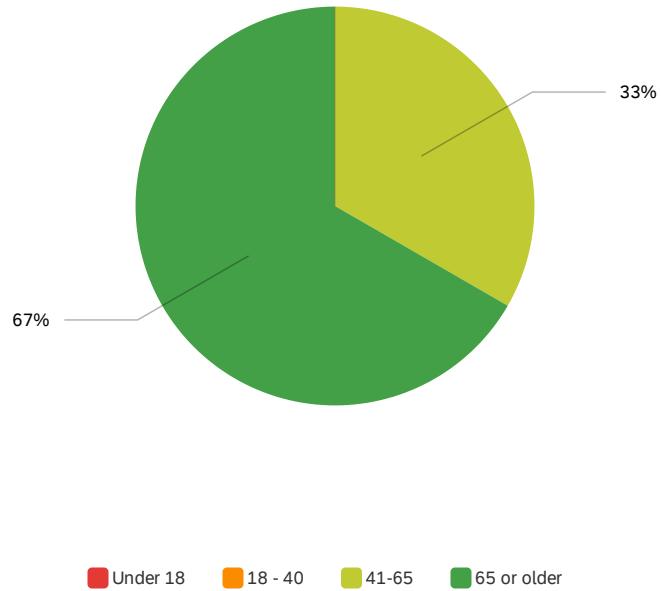
Q5 - How long have you lived on, visited or recreated on the lake?



| # | Field | Choice Count |
|---|-------------|--------------|
| 1 | <2 years | 0% 0 |
| 2 | 2-5 years | 17% 1 |
| 3 | 6-10 years | 17% 1 |
| 4 | 11-20 years | 0% 0 |
| 5 | >20 years | 67% 4 |
| | | 6 |

Showing rows 1 - 6 of 6

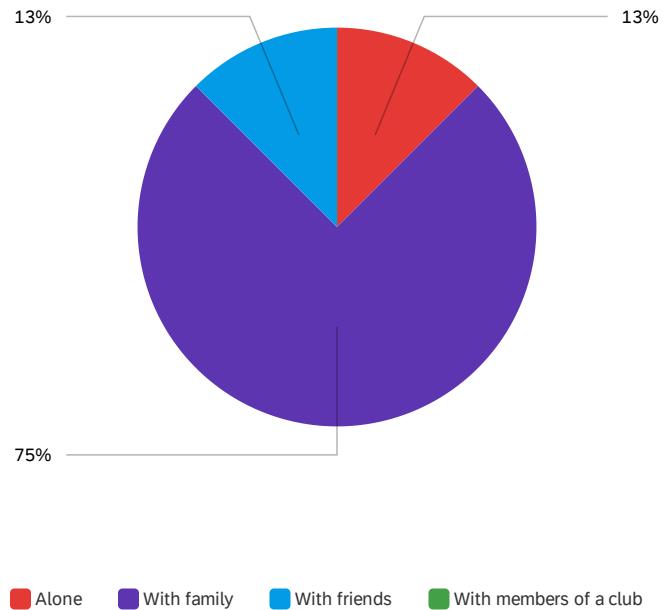
Q8 - Which category below includes your age?



| # | Field | Choice Count |
|---|-------------|--------------|
| 1 | Under 18 | 0% 0 |
| 2 | 18 - 40 | 0% 0 |
| 3 | 41-65 | 33% 2 |
| 4 | 65 or older | 67% 4 |
| | | 6 |

Showing rows 1 - 5 of 5

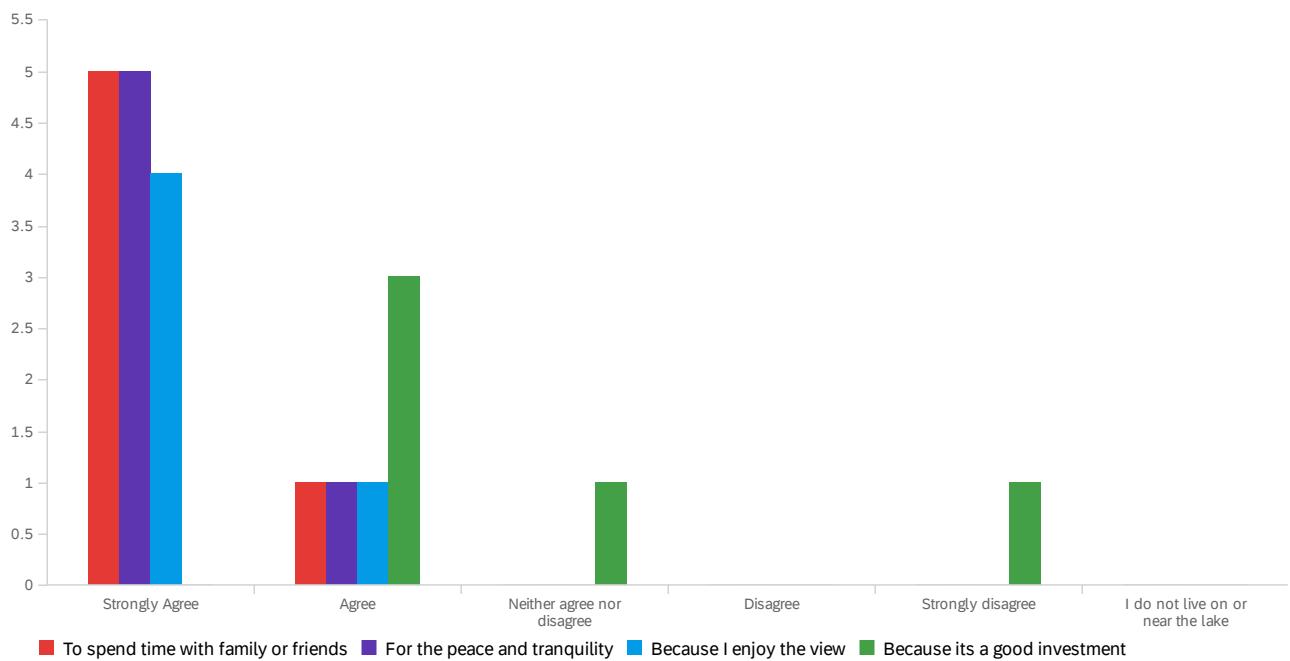
Q9 - When you visit Star Lake, are you typically ...(check all that apply)



| # | Field | Choice Count |
|---|------------------------|--------------|
| 1 | Alone | 13% 1 |
| 2 | With family | 75% 6 |
| 3 | With friends | 13% 1 |
| 4 | With members of a club | 0% 0 |
| | | 8 |

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 | 83% 5 | 17% 1 | 0% 0 | 0% 0 | 0% 0 | 0% 0 | 6 |
| 2 | For the peace and tranquility | 83% 5 | 17% 1 | 0% 0 | 0% 0 | 0% 0 | 0% 0 | 6 |
| 3 | Because I enjoy the view | 80% 4 | 20% 1 | 0% 0 | 0% 0 | 0% 0 | 0% 0 | 5 |
| 4 | Because its a good investment | 0% 0 | 60% 3 | 20% 1 | 0% 0 | 20% 1 | 0% 0 | 5 |

Showing rows 1 - 4 of 4

Q11 - What do you value most about Star Lake?

What do you value most about Star Lake?

Swimming in the lake

Peaceful lake.

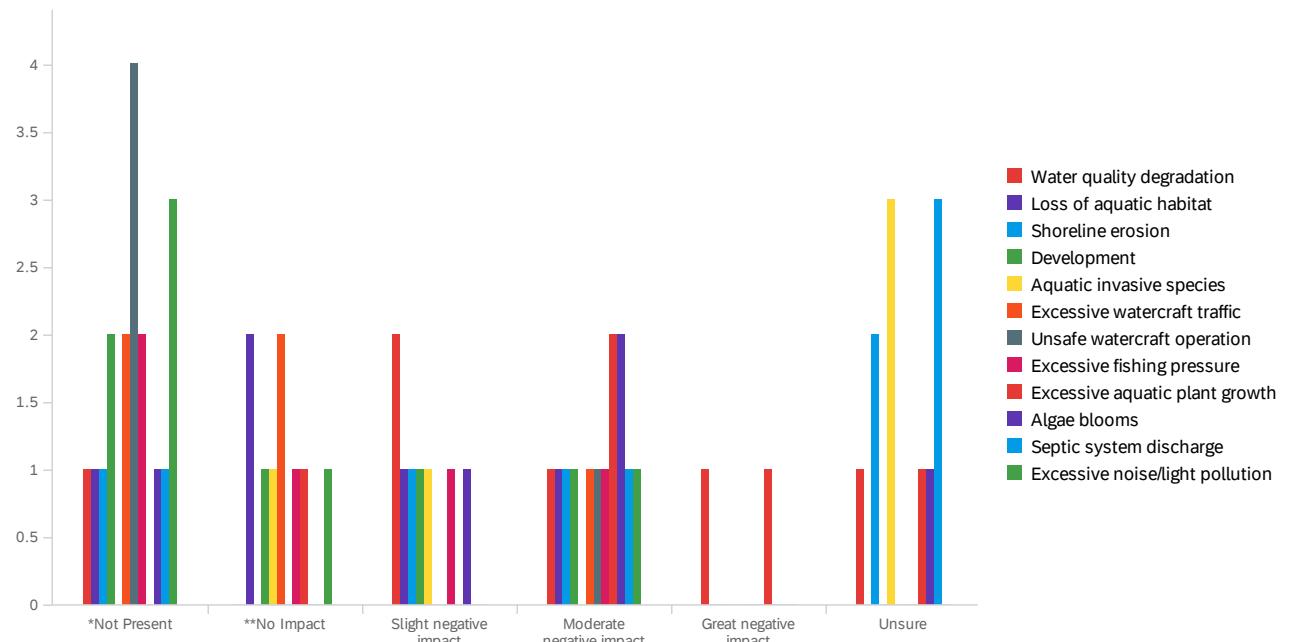
Peace and quiet

It's where I grew up! My Parents owned quite a bit of the lake frontage at one time and it just feels like home.. I love that you can fish, take a boat rides and just enjoy nature.

Fairly clear lake

Clean water, serenity

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 Star Lake? *Not Present means that you believe the issue does not exist on Star Lake**No Impact means that the issue may exist, but is not negatively impacting Star Lake

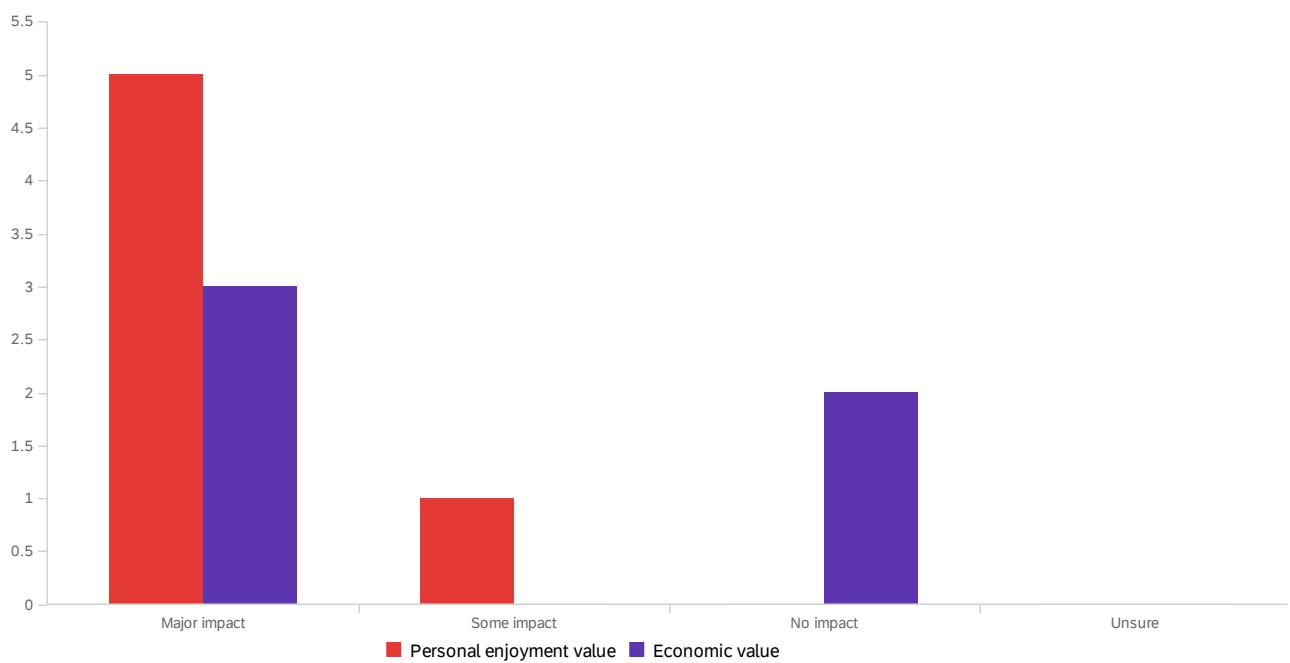


| # | Field | *Not Present | **No Impact | Slight negative impact | Moderate negative impact | Great negative impact | Unsure | Total |
|---|------------------------------|--------------|-------------|------------------------|--------------------------|-----------------------|--------|-------|
| 1 | Water quality degradation | 17% 1 | 0% 0 | 33% 2 | 17% 1 | 17% 1 | 17% 1 | 6 |
| 2 | Loss of aquatic habitat | 20% 1 | 40% 2 | 20% 1 | 20% 1 | 0% 0 | 0% 0 | 5 |
| 3 | Shoreline erosion | 20% 1 | 0% 0 | 20% 1 | 20% 1 | 0% 0 | 40% 2 | 5 |
| 4 | Development | 40% 2 | 20% 1 | 20% 1 | 20% 1 | 0% 0 | 0% 0 | 5 |
| 5 | Aquatic invasive species | 0% 0 | 20% 1 | 20% 1 | 0% 0 | 0% 0 | 60% 3 | 5 |
| 6 | Excessive watercraft traffic | 40% 2 | 40% 2 | 0% 0 | 20% 1 | 0% 0 | 0% 0 | 5 |
| 7 | Unsafe watercraft operation | 80% 4 | 0% 0 | 0% 0 | 20% 1 | 0% 0 | 0% 0 | 5 |
| 8 | Excessive fishing pressure | 40% 2 | 20% 1 | 20% 1 | 20% 1 | 0% 0 | 0% 0 | 5 |

| # | Field | *Not Present | **No Impact | Slight negative impact | Moderate negative impact | Great negative impact | Unsure | Total |
|----|---------------------------------|--------------|-------------|------------------------|--------------------------|-----------------------|--------|-------|
| 9 | Excessive aquatic plant growth | 0% 0 | 20% 1 | 0% 0 | 40% 2 | 20% 1 | 20% 1 | 5 |
| 10 | Algae blooms | 20% 1 | 0% 0 | 20% 1 | 40% 2 | 0% 0 | 20% 1 | 5 |
| 11 | Septic system discharge | 20% 1 | 0% 0 | 0% 0 | 20% 1 | 0% 0 | 60% 3 | 5 |
| 12 | Excessive noise/light pollution | 60% 3 | 20% 1 | 0% 0 | 20% 1 | 0% 0 | 0% 0 | 5 |

Showing rows 1 - 12 of 12

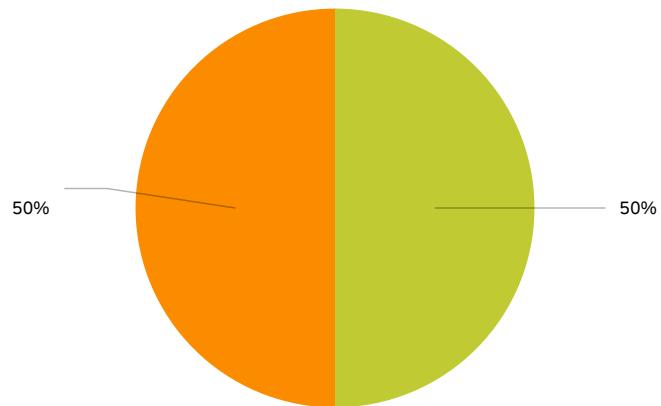
Q16 - How much impact does the water quality of Star Lake have on the following?



| # | Field | Major impact | Some impact | No impact | Unsure | Total |
|---|--------------------------|--------------|-------------|-----------|--------|-------|
| 1 | Personal enjoyment value | 83% 5 | 17% 1 | 0% 0 | 0% 0 | 6 |
| 2 | Economic value | 60% 3 | 0% 0 | 40% 2 | 0% 0 | 5 |

Showing rows 1 - 2 of 2

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

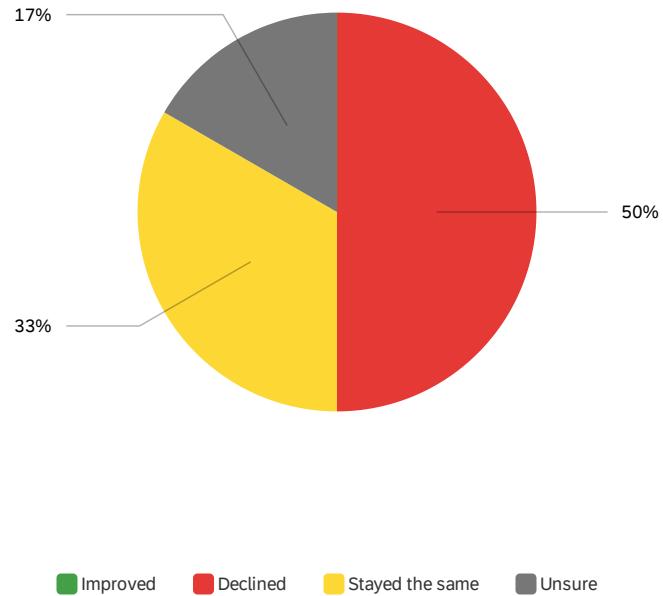


- █ Beautiful, could not be any nicer █ Very minor aesthetic problems; excellent for swimming and boating enjoyment
- █ Enjoyment of the lake is moderately impaired because of algae or other water quality problems
- █ Enjoyment of the lake is substantially impaired because of algae or other water quality problems

| # | Field | Choice Count |
|---|--|--------------|
| 1 | Beautiful, could not be any nicer | 0% 0 |
| 2 | Very minor aesthetic problems; excellent for swimming and boating enjoyment | 50% 3 |
| 3 | Enjoyment of the lake is moderately impaired because of algae or other water quality problems | 50% 3 |
| 4 | Enjoyment of the lake is substantially impaired because of algae or other water quality problems | 0% 0 |
| | | 6 |

Showing rows 1 - 5 of 5

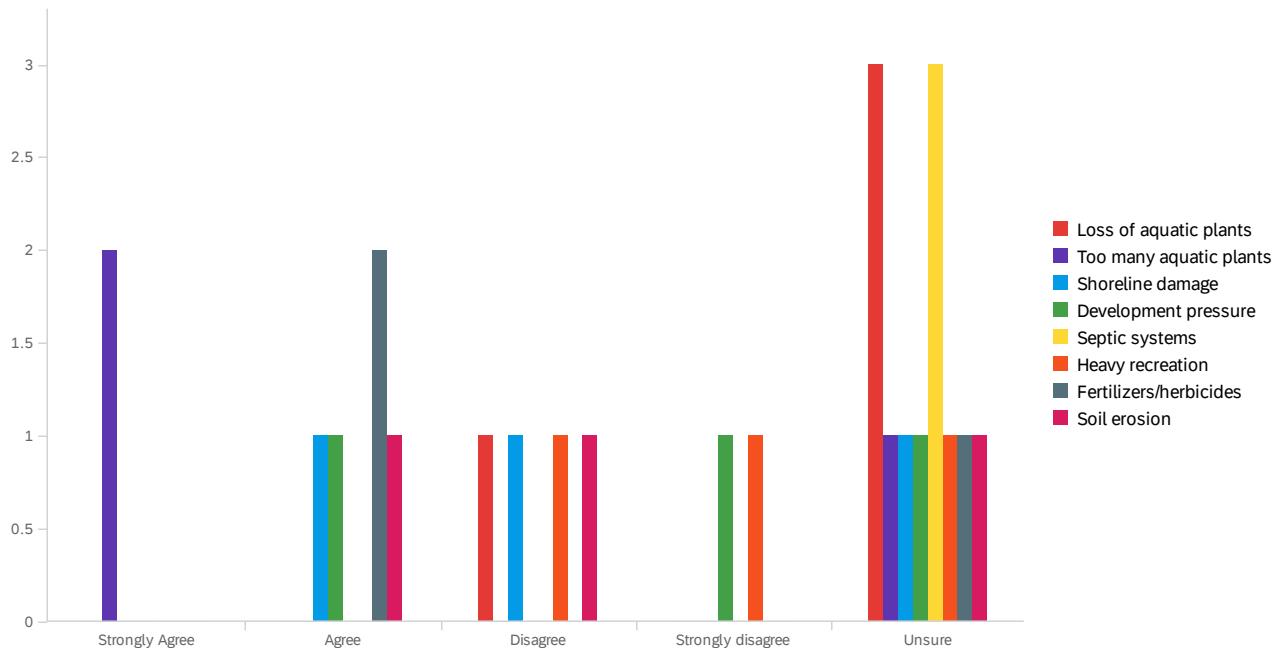
Q18 - During the time that you have lived on, visited or recreated on the lake, how would you say the water quality has changed?



| # | Field | Choice Count |
|---|-----------------|--------------|
| 1 | Improved | 0% 0 |
| 2 | Declined | 50% 3 |
| 3 | Stayed the same | 33% 2 |
| 4 | Unsure | 17% 1 |
| | | 6 |

Showing rows 1 - 5 of 5

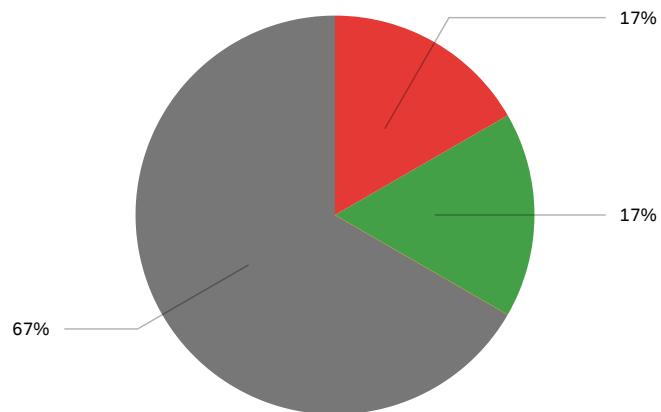
Q19 - If you think it has declined, what, in your opinion, are the primary causes?



| # | Field | Strongly Agree | Agree | Disagree | Strongly disagree | Unsure | Total |
|---|-------------------------|----------------|-------|----------|-------------------|--------|-------|
| 1 | Loss of aquatic plants | 0% 0 | 0% 0 | 25% 1 | 0% 0 | 75% 3 | 4 |
| 2 | Too many aquatic plants | 67% 2 | 0% 0 | 0% 0 | 0% 0 | 33% 1 | 3 |
| 3 | Shoreline damage | 0% 0 | 33% 1 | 33% 1 | 0% 0 | 33% 1 | 3 |
| 4 | Development pressure | 0% 0 | 33% 1 | 0% 0 | 33% 1 | 33% 1 | 3 |
| 5 | Septic systems | 0% 0 | 0% 0 | 0% 0 | 0% 0 | 100% 3 | 3 |
| 6 | Heavy recreation | 0% 0 | 0% 0 | 33% 1 | 33% 1 | 33% 1 | 3 |
| 7 | Fertilizers/herbicides | 0% 0 | 67% 2 | 0% 0 | 0% 0 | 33% 1 | 3 |
| 8 | Soil erosion | 0% 0 | 33% 1 | 33% 1 | 0% 0 | 33% 1 | 3 |

Showing rows 1 - 8 of 8

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

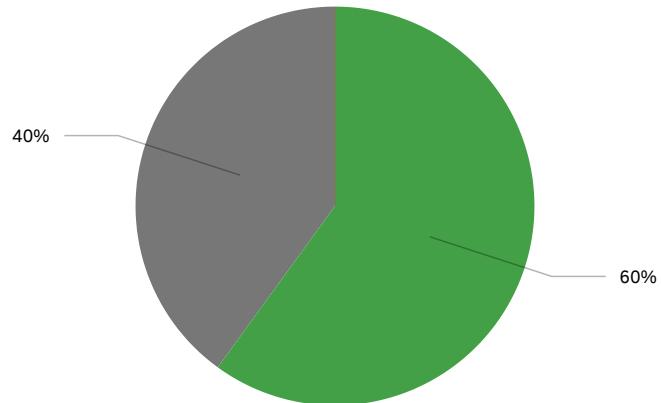


■ Lawn ■ Garden ■ Agricultural fields ■ Other ■ I do not use fertilizers or herbicides on my land

| # | Field | Choice | Count |
|---|---|--------|-------|
| 1 | Lawn | 17% | 1 |
| 2 | Garden | 17% | 1 |
| 3 | Agricultural fields | 0% | 0 |
| 4 | Other | 0% | 0 |
| 5 | I do not use fertilizers or herbicides on my land | 67% | 4 |
| | | | 6 |

Showing rows 1 - 6 of 6

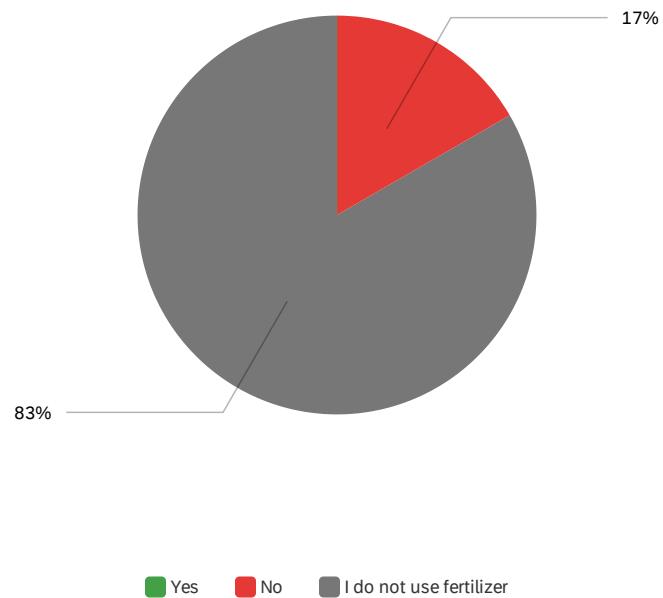
Q21 - Do you use fertilizer that contains phosphorus?



■ Yes ■ No ■ I do not use fertilizer on my land

| # | Field | Choice | Count |
|-------------------------|------------------------------------|--------|-------|
| 1 | Yes | 0% | 0 |
| 2 | No | 60% | 3 |
| 4 | I do not use fertilizer on my land | 40% | 2 |
| Showing rows 1 - 4 of 4 | | | 5 |

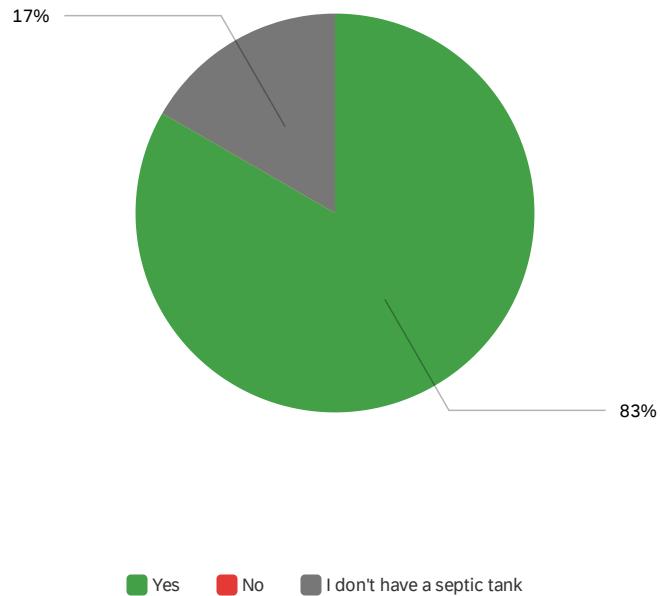
Q23 - Have you had your soil tested before using fertilizer?



| # | Field | Choice | Count |
|---|-------------------------|--------|-------|
| 1 | Yes | 0% | 0 |
| 2 | No | 17% | 1 |
| 3 | I do not use fertilizer | 83% | 5 |
| 6 | | | |

Showing rows 1 - 4 of 4

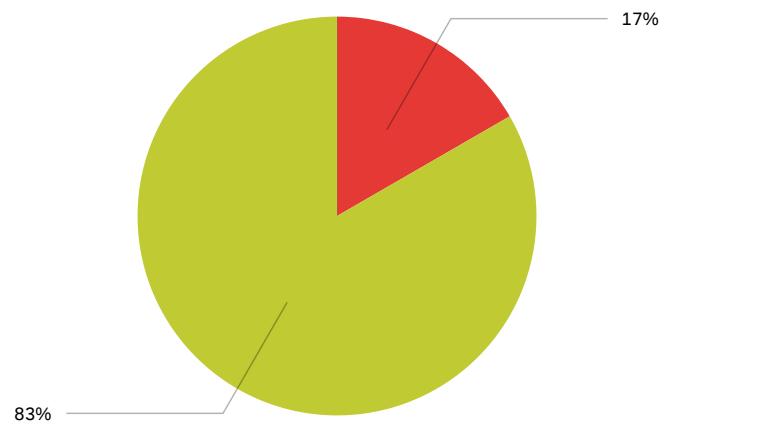
Q22 - Do you have your septic tank pumped regularly (at least every 3 years)?



| # | Field | Choice | Count |
|---|----------------------------|--------|-------|
| 1 | Yes | 83% | 5 |
| 2 | No | 0% | 0 |
| 3 | I don't have a septic tank | 17% | 1 |
| | | | 6 |

Showing rows 1 - 4 of 4

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

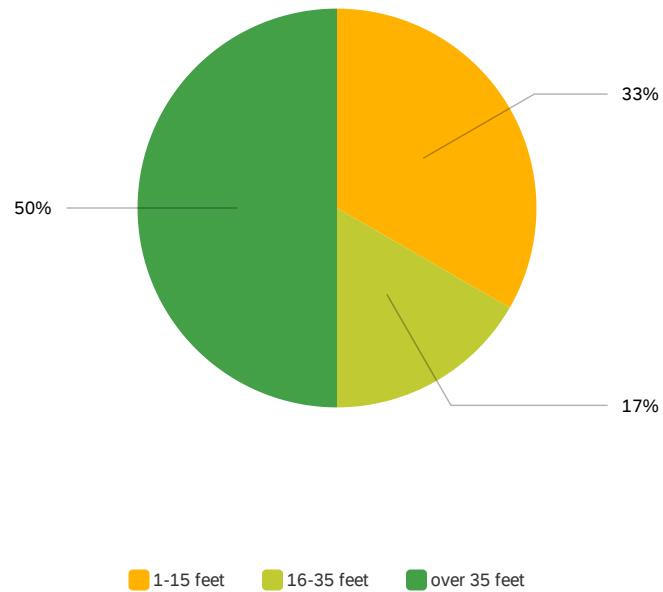


■ Mowed or weed-whacked ■ Natural except for access path ■ Restored shoreland/planted/landscaped

| # | Field | Choice Count |
|---|---------------------------------------|--------------|
| 1 | Mowed or weed-whacked | 17% 1 |
| 2 | Natural except for access path | 83% 5 |
| 3 | Restored shoreland/planted/landscaped | 0% 0 |
| | | 6 |

Showing rows 1 - 4 of 4

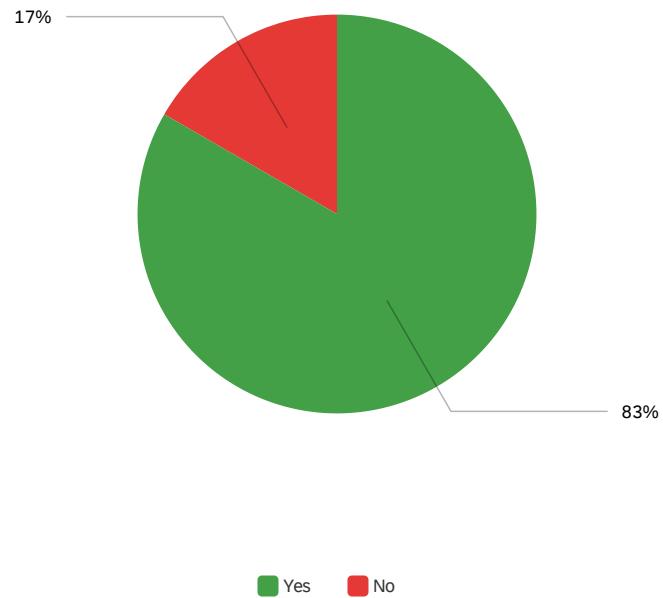
Q26 - If you have unmowed shoreland vegetation, how far inland from the water's edge does it extend?



| # | Field | Choice | Count |
|---|--------------|--------|-------|
| 1 | 1-15 feet | 33% | 2 |
| 2 | 16-35 feet | 17% | 1 |
| 3 | over 35 feet | 50% | 3 |
| | | | 6 |

Showing rows 1 - 4 of 4

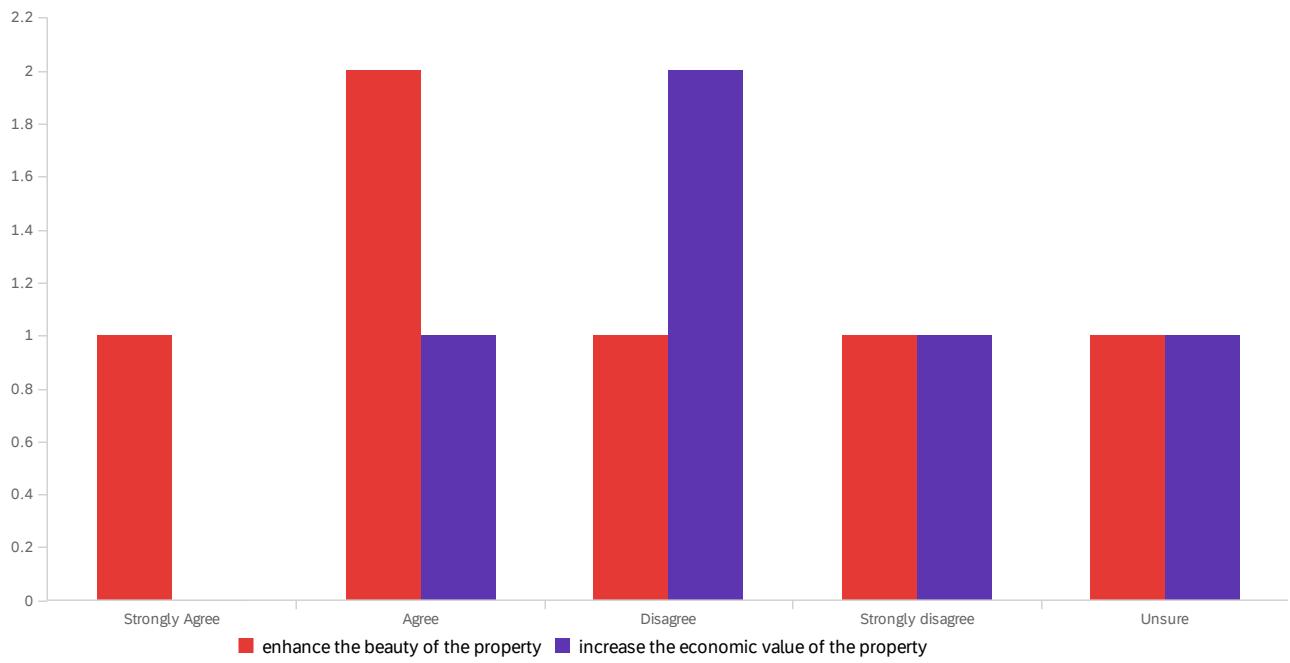
Q31 - Do you have woody structure such as fallen trees or large branches in the shallow water along your property?



| # | Field | Choice Count |
|---|-------|--------------|
| 1 | Yes | 83% 5 |
| 2 | No | 17% 1 |
| | | 6 |

Showing rows 1 - 3 of 3

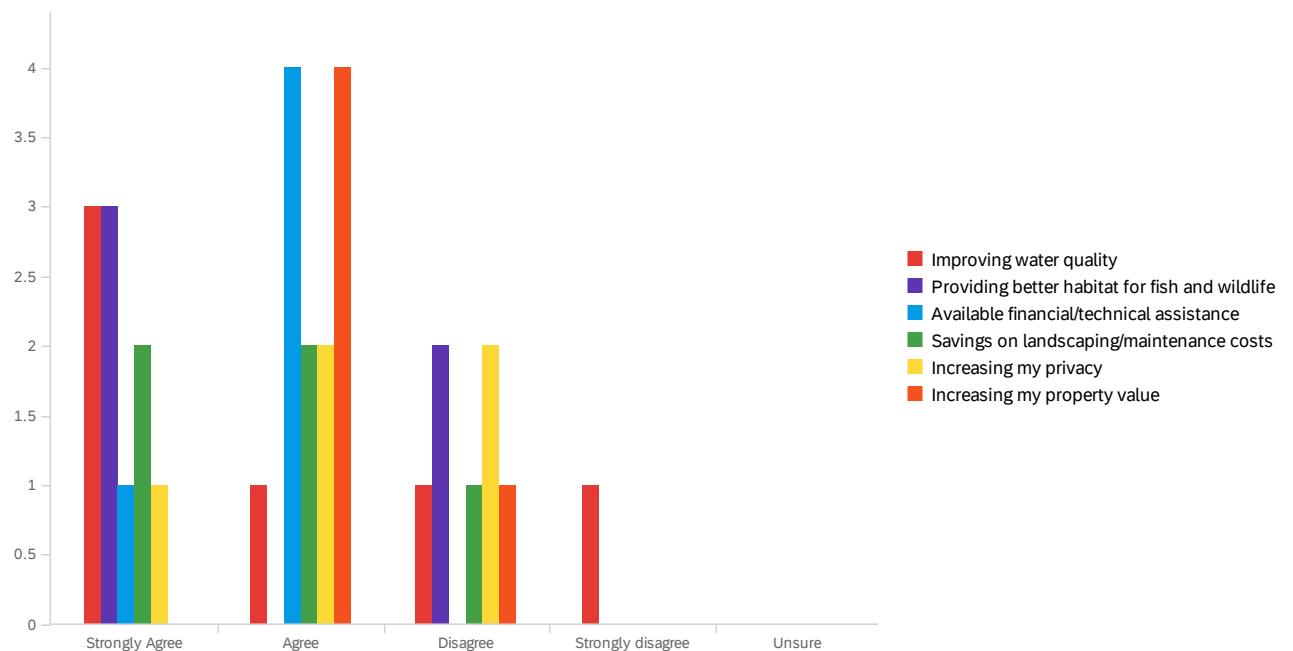
Q27 - In your opinion, does shoreland vegetation...



| # | Field | Strongly Agree | Agree | Disagree | Strongly disagree | Unsure | Total |
|---|---|----------------|-------|----------|-------------------|--------|-------|
| 1 | enhance the beauty of the property | 17% 1 | 33% 2 | 17% 1 | 17% 1 | 17% 1 | 6 |
| 2 | increase the economic value of the property | 0% 0 | 20% 1 | 40% 2 | 20% 1 | 20% 1 | 5 |

Showing rows 1 - 2 of 2

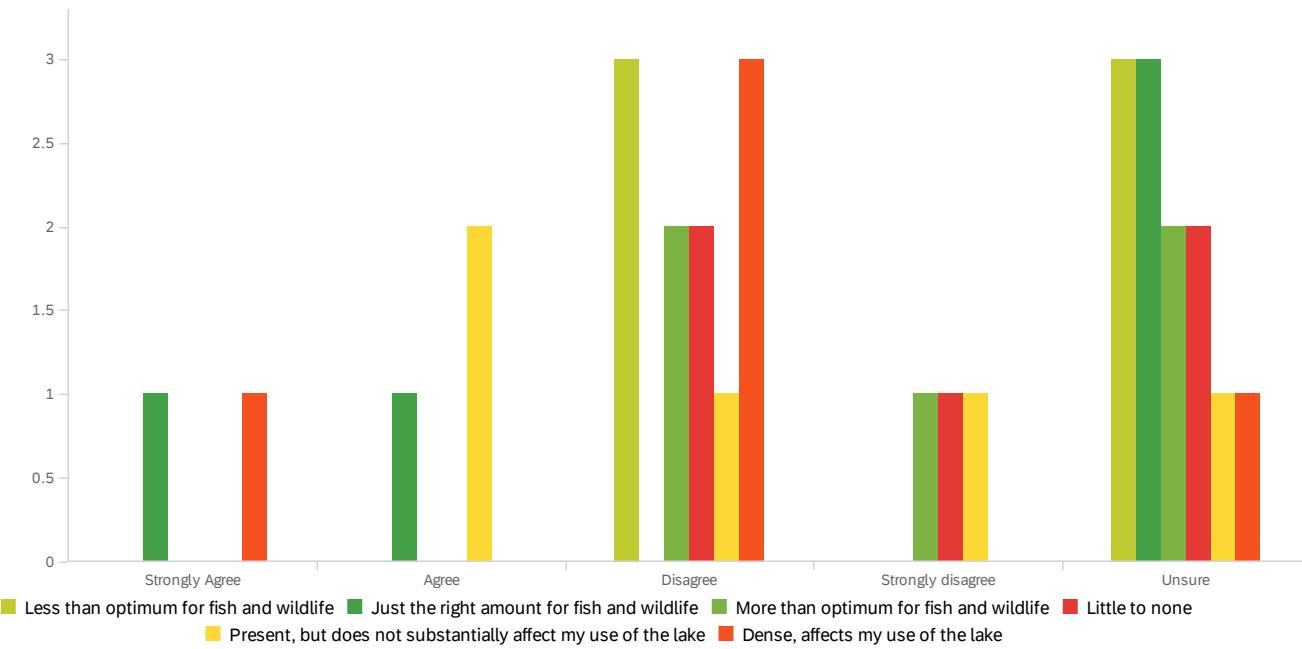
Q28 - What might motivate you to change how you manage your shoreland?



| # | Field | Strongly Agree | Agree | Disagree | Strongly disagree | Unsure | Total |
|---|--|----------------|-------|----------|-------------------|--------|-------|
| 1 | Improving water quality | 50% 3 | 17% 1 | 17% 1 | 17% 1 | 0% 0 | 6 |
| 2 | Providing better habitat for fish and wildlife | 60% 3 | 0% 0 | 40% 2 | 0% 0 | 0% 0 | 5 |
| 3 | Available financial/technical assistance | 20% 1 | 80% 4 | 0% 0 | 0% 0 | 0% 0 | 5 |
| 4 | Savings on landscaping/maintenance costs | 40% 2 | 40% 2 | 20% 1 | 0% 0 | 0% 0 | 5 |
| 5 | Increasing my privacy | 20% 1 | 40% 2 | 40% 2 | 0% 0 | 0% 0 | 5 |
| 6 | Increasing my property value | 0% 0 | 80% 4 | 20% 1 | 0% 0 | 0% 0 | 5 |

Showing rows 1 - 6 of 6

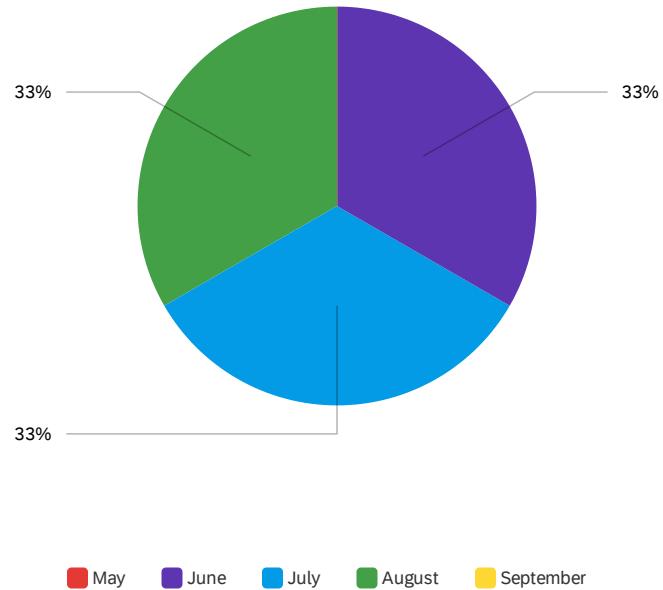
Q32 - In your opinion, which statement best describes the amount of aquatic plant growth in Star Lake?



| # | Field | Strongly Agree | Agree | Disagree | Strongly disagree | Unsure | Total |
|---|---|----------------|-------|----------|-------------------|--------|-------|
| 1 | Less than optimum for fish and wildlife | 0% 0 | 0% 0 | 50% 3 | 0% 0 | 50% 3 | 6 |
| 2 | Just the right amount for fish and wildlife | 20% 1 | 20% 1 | 0% 0 | 0% 0 | 60% 3 | 5 |
| 3 | More than optimum for fish and wildlife | 0% 0 | 0% 0 | 40% 2 | 20% 1 | 40% 2 | 5 |
| 4 | Little to none | 0% 0 | 0% 0 | 40% 2 | 20% 1 | 40% 2 | 5 |
| 5 | Present, but does not substantially affect my use of the lake | 0% 0 | 40% 2 | 20% 1 | 20% 1 | 20% 1 | 5 |
| 6 | Dense, affects my use of the lake | 20% 1 | 0% 0 | 60% 3 | 0% 0 | 20% 1 | 5 |

Showing rows 1 - 6 of 6

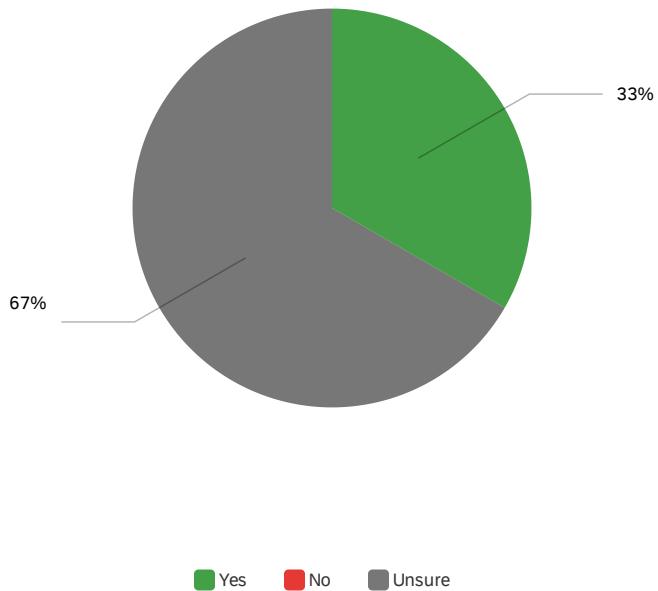
Q33 - If you think the plant growth in Star Lake is dense, what month(s) do the problems occur? Check all that apply.



| # | Field | Choice Count |
|---|-----------|--------------|
| 1 | May | 0% 0 |
| 2 | June | 33% 2 |
| 3 | July | 33% 2 |
| 4 | August | 33% 2 |
| 5 | September | 0% 0 |
| | | 6 |

Showing rows 1 - 6 of 6

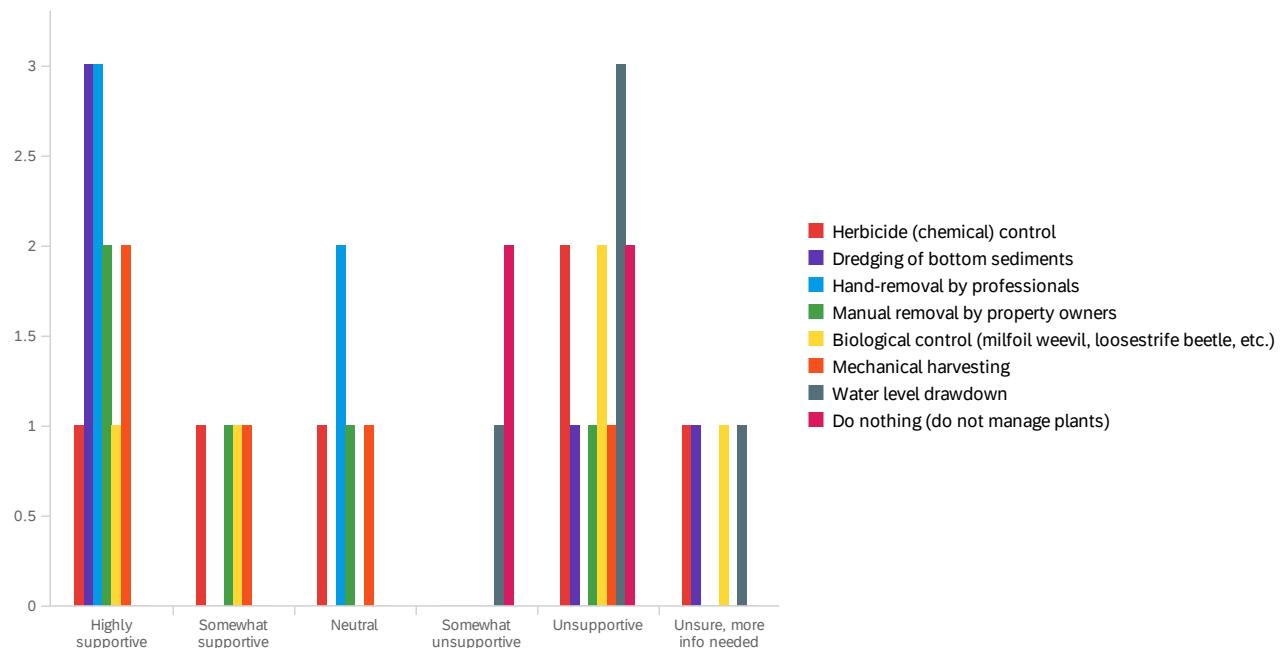
Q34 - Do you believe aquatic plant control is needed on Star Lake?



| # | Field | Choice | Count |
|---|--------|--------|-------|
| 1 | Yes | 33% | 2 |
| 2 | No | 0% | 0 |
| 3 | Unsure | 67% | 4 |
| | | | 6 |

Showing rows 1 - 4 of 4

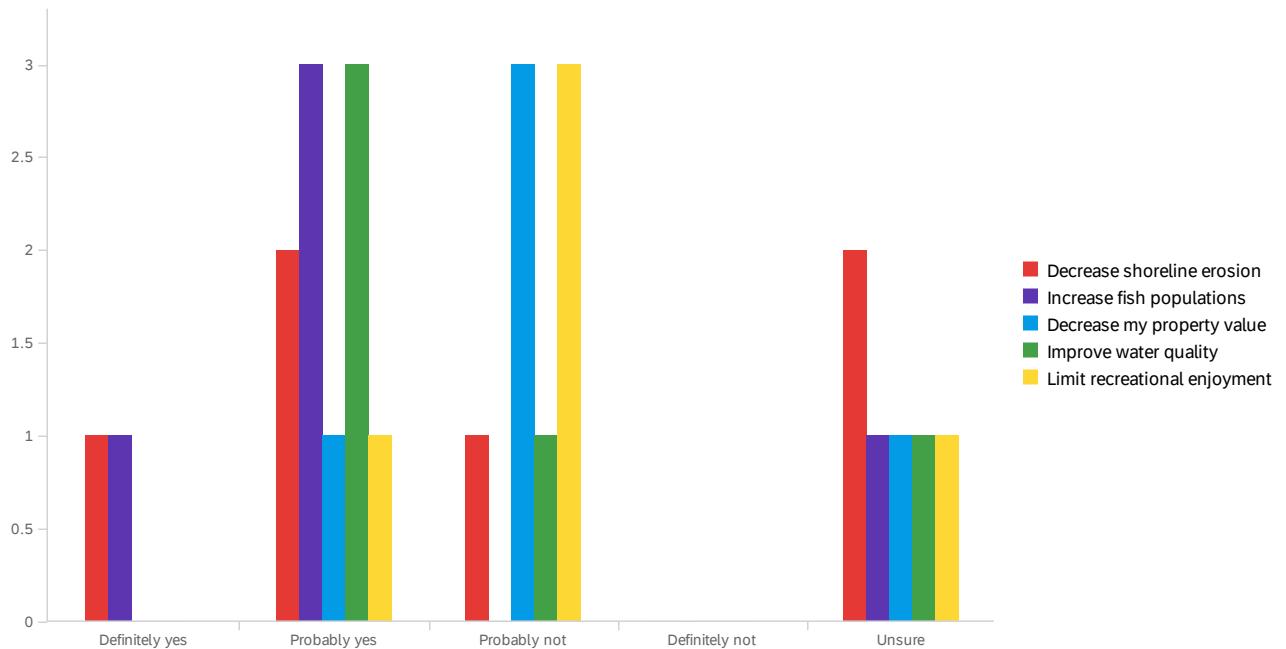
Q35 - What is your level of support for the responsible use of the following techniques to manage aquatic plants on Star Lake?



| # | Field | Highly supportive | Somewhat supportive | Neutral | Somewhat unsupportive | Unsupportive | Unsure, more info needed | Total |
|---|---|-------------------|---------------------|---------|-----------------------|--------------|--------------------------|-------|
| 1 | Herbicide (chemical) control | 17% 1 | 17% 1 | 17% 1 | 0% 0 | 33% 2 | 17% 1 | 6 |
| 2 | Dredging of bottom sediments | 60% 3 | 0% 0 | 0% 0 | 0% 0 | 20% 1 | 20% 1 | 5 |
| 3 | Hand-removal by professionals | 60% 3 | 0% 0 | 40% 2 | 0% 0 | 0% 0 | 0% 0 | 5 |
| 4 | Manual removal by property owners | 40% 2 | 20% 1 | 20% 1 | 0% 0 | 20% 1 | 0% 0 | 5 |
| 5 | Biological control (milfoil weevil, loosestrife beetle, etc.) | 20% 1 | 20% 1 | 0% 0 | 0% 0 | 40% 2 | 20% 1 | 5 |
| 6 | Mechanical harvesting | 40% 2 | 20% 1 | 20% 1 | 0% 0 | 20% 1 | 0% 0 | 5 |
| 7 | Water level drawdown | 0% 0 | 0% 0 | 0% 0 | 20% 1 | 60% 3 | 20% 1 | 5 |
| 8 | Do nothing (do not manage plants) | 0% 0 | 0% 0 | 0% 0 | 50% 2 | 50% 2 | 0% 0 | 4 |

Showing rows 1 - 8 of 8

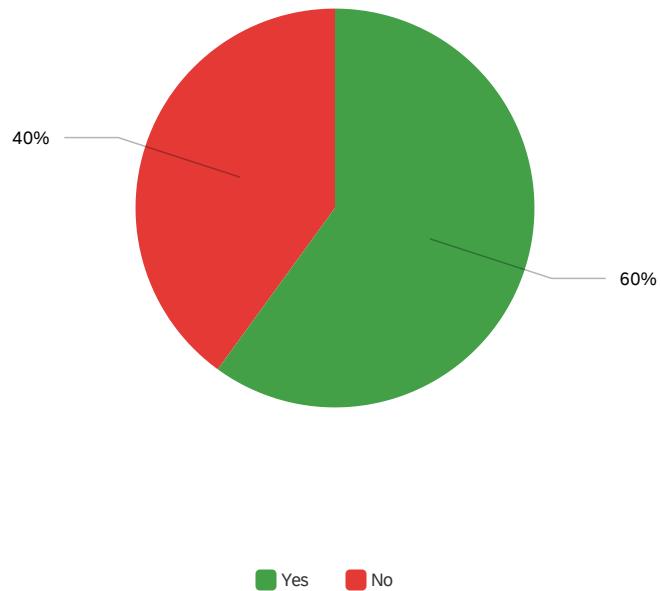
Q36 - In your opinion, does establishing or maintaining native vegetation in the water in the near-shore area...



| # | Field | Definitely yes | Probably yes | Probably not | Definitely not | Unsure | Total |
|---|------------------------------|----------------|--------------|--------------|----------------|--------|-------|
| 1 | Decrease shoreline erosion | 17% 1 | 33% 2 | 17% 1 | 0% 0 | 33% 2 | 6 |
| 2 | Increase fish populations | 20% 1 | 60% 3 | 0% 0 | 0% 0 | 20% 1 | 5 |
| 3 | Decrease my property value | 0% 0 | 20% 1 | 60% 3 | 0% 0 | 20% 1 | 5 |
| 4 | Improve water quality | 0% 0 | 60% 3 | 20% 1 | 0% 0 | 20% 1 | 5 |
| 5 | Limit recreational enjoyment | 0% 0 | 20% 1 | 60% 3 | 0% 0 | 20% 1 | 5 |

Showing rows 1 - 5 of 5

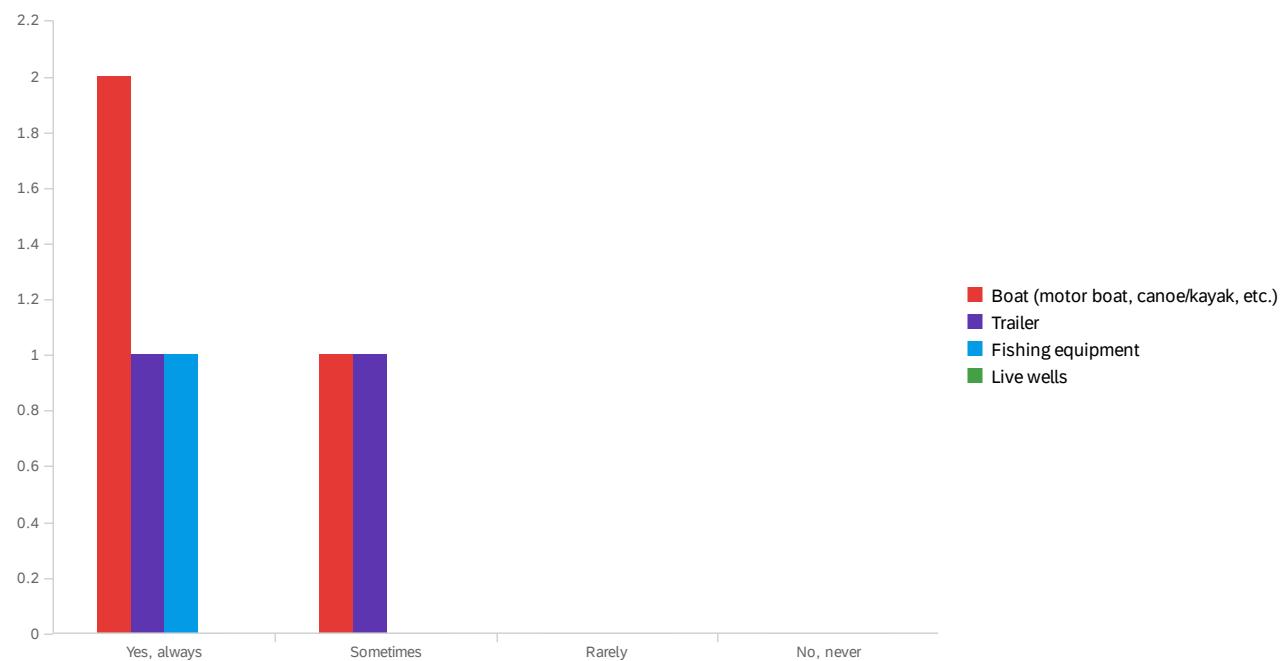
Q37 - Are you aware of invasive species (in general)?



| # | Field | Choice Count |
|---|-------|--------------|
| 1 | Yes | 60% 3 |
| 2 | No | 40% 2 |
| | | 5 |

Showing rows 1 - 3 of 3

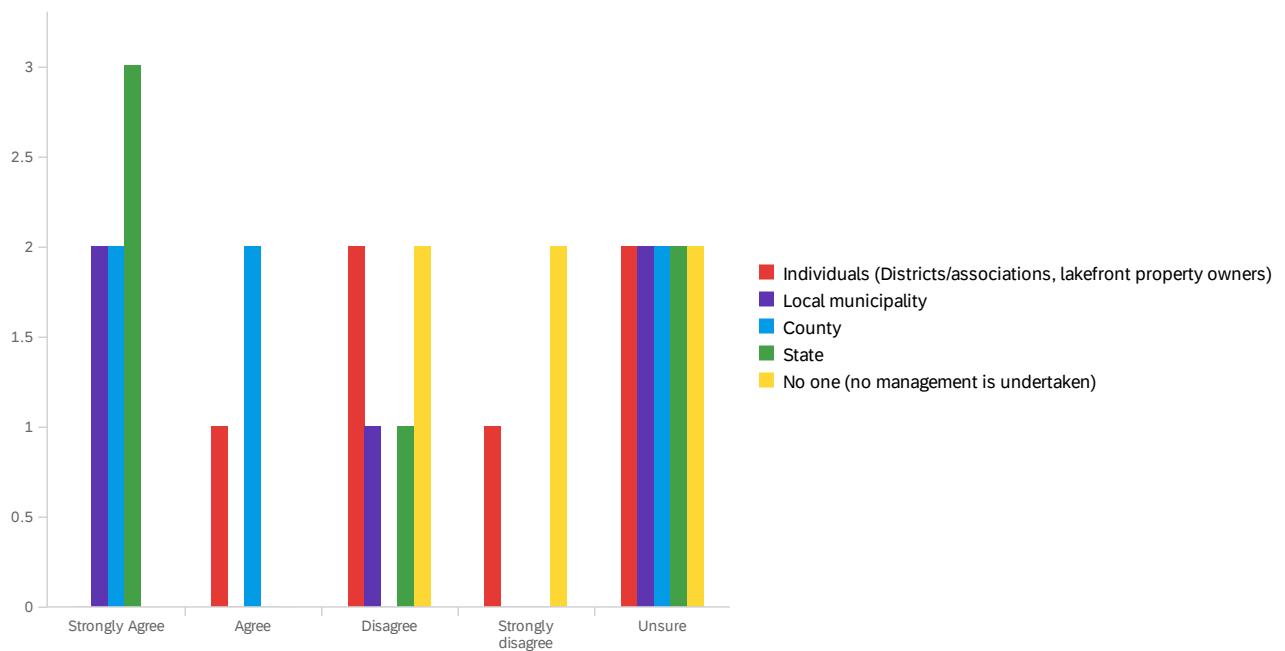
Q39 - After you have been to another lake, do you clean your.... before bringing it back to Star Lake?



| # | Field | Yes, always | Sometimes | Rarely | No, never | Total |
|---|--------------------------------------|-------------|-----------|--------|-----------|-------|
| 1 | Boat (motor boat, canoe/kayak, etc.) | 67% 2 | 33% 1 | 0% 0 | 0% 0 | 3 |
| 2 | Trailer | 50% 1 | 50% 1 | 0% 0 | 0% 0 | 2 |
| 3 | Fishing equipment | 100% 1 | 0% 0 | 0% 0 | 0% 0 | 1 |
| 4 | Live wells | 0% 0 | 0% 0 | 0% 0 | 0% 0 | 0 |

Showing rows 1 - 4 of 4

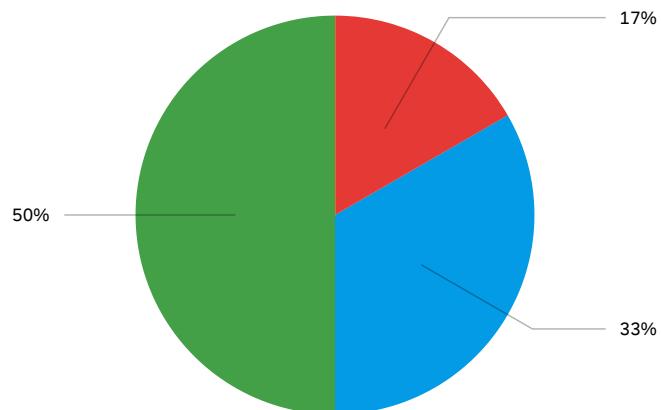
Q40 - Who should pay the cost of managing invasive aquatic plants?



| # | Field | Strongly Agree | Agree | Disagree | Strongly disagree | Unsure | Total |
|---|---|----------------|-------|----------|-------------------|--------|-------|
| 1 | Individuals (Districts/associations, lakefront property owners) | 0% 0 | 17% 1 | 33% 2 | 17% 1 | 33% 2 | 6 |
| 2 | Local municipality | 40% 2 | 0% 0 | 20% 1 | 0% 0 | 40% 2 | 5 |
| 3 | County | 33% 2 | 33% 2 | 0% 0 | 0% 0 | 33% 2 | 6 |
| 4 | State | 50% 3 | 0% 0 | 17% 1 | 0% 0 | 33% 2 | 6 |
| 5 | No one (no management is undertaken) | 0% 0 | 0% 0 | 33% 2 | 33% 2 | 33% 2 | 6 |

Showing rows 1 - 5 of 5

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



■ Newspaper ■ Billboard ■ Info pamphlets ■ Lakeside signs/kiosks ■ Volunteer staff at boat launch ■ Other

| # | Field | Choice Count |
|---|--------------------------------|--------------|
| 1 | Newspaper | 17% 1 |
| 2 | Billboard | 0% 0 |
| 3 | Info pamphlets | 33% 2 |
| 4 | Lakeside signs/kiosks | 50% 3 |
| 5 | Volunteer staff at boat launch | 0% 0 |
| 6 | Other | 0% 0 |
| | | 6 |

Showing rows 1 - 7 of 7

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

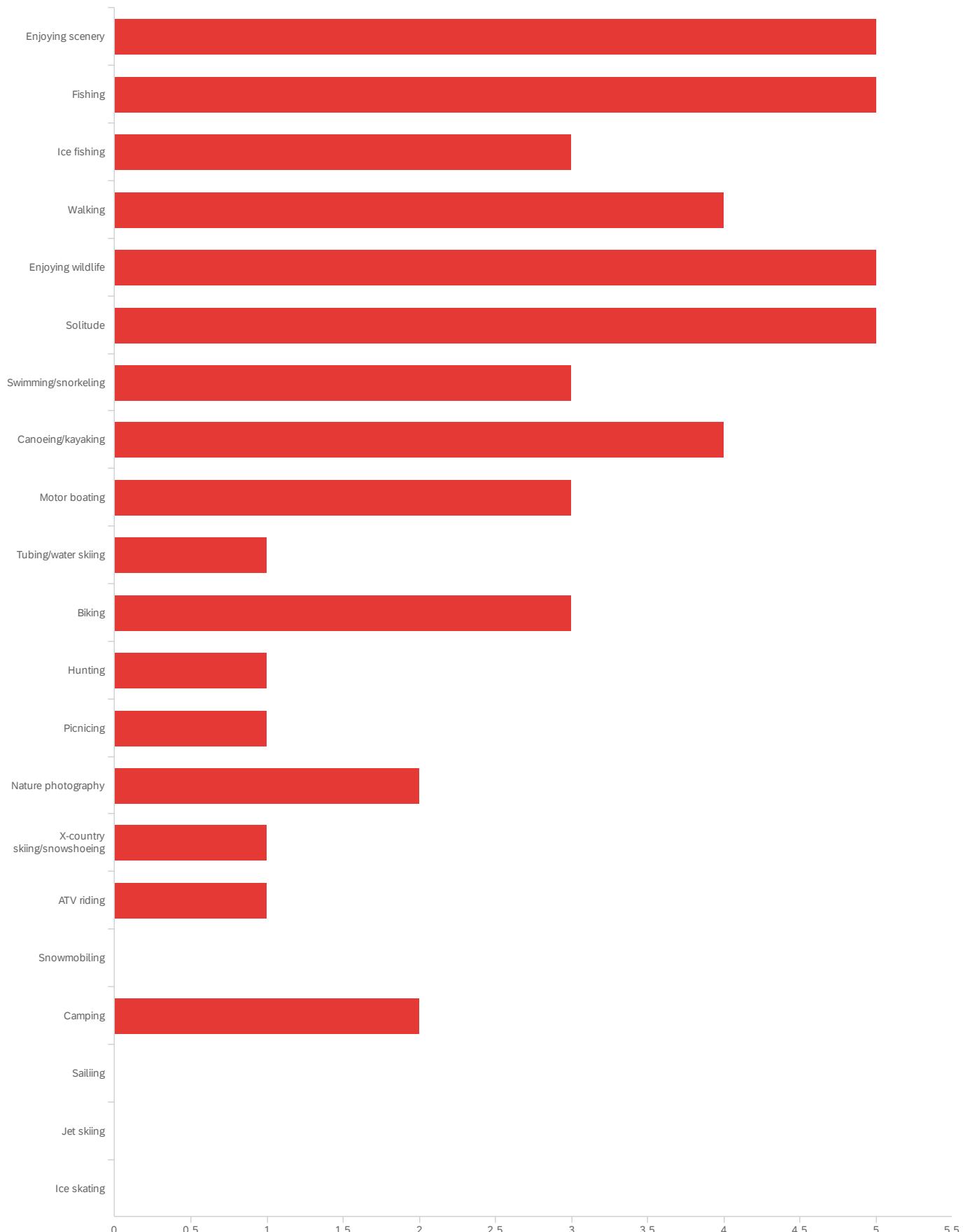
In your opinion, what should be done to restore, maintain or improve Star L...

Nothing! I love the lake just like it is

Take a lot of sediment out.

Cleaner water/ remove muck

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



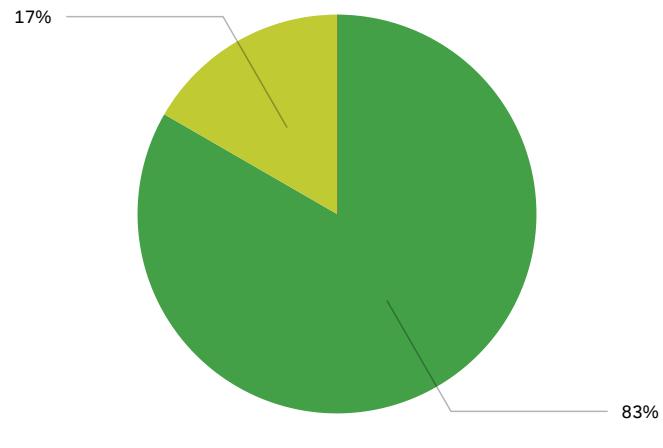
| # | Field | Choice Count |
|----|------------------------------|--------------|
| 1 | Enjoying scenery | 10% 5 |
| 2 | Fishing | 10% 5 |
| 3 | Ice fishing | 6% 3 |
| 4 | Walking | 8% 4 |
| 5 | Enjoying wildlife | 10% 5 |
| 6 | Solitude | 10% 5 |
| 7 | Swimming/snorkeling | 6% 3 |
| 8 | Canoeing/kayaking | 8% 4 |
| 9 | Motor boating | 6% 3 |
| 10 | Tubing/water skiing | 2% 1 |
| 11 | Biking | 6% 3 |
| 12 | Hunting | 2% 1 |
| 13 | Picnicing | 2% 1 |
| 14 | Nature photography | 4% 2 |
| 15 | X-country skiing/snowshoeing | 2% 1 |
| 16 | ATV riding | 2% 1 |
| 17 | Snowmobiling | 0% 0 |
| 18 | Camping | 4% 2 |
| 19 | Sailing | 0% 0 |
| 20 | Jet skiing | 0% 0 |
| 21 | Ice skating | 0% 0 |

Showing rows 1 - 22 of 22

Q46 - Other recreational activities not included above:

Other recreational activities not included above:

Q47 - "No Wake" is allowed on Star Lake at any time. Do you like the current "No Wake" rules as they are?



Definitely Yes Yes, most of the time No, not most of the time Definitely No Unsure

| # | Field | Choice | Count |
|---|--------------------------|--------|-------|
| 1 | Definitely Yes | 83% | 5 |
| 2 | Yes, most of the time | 17% | 1 |
| 3 | No, not most of the time | 0% | 0 |
| 4 | Definitely No | 0% | 0 |
| 5 | Unsure | 0% | 0 |
| | | | 6 |

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?

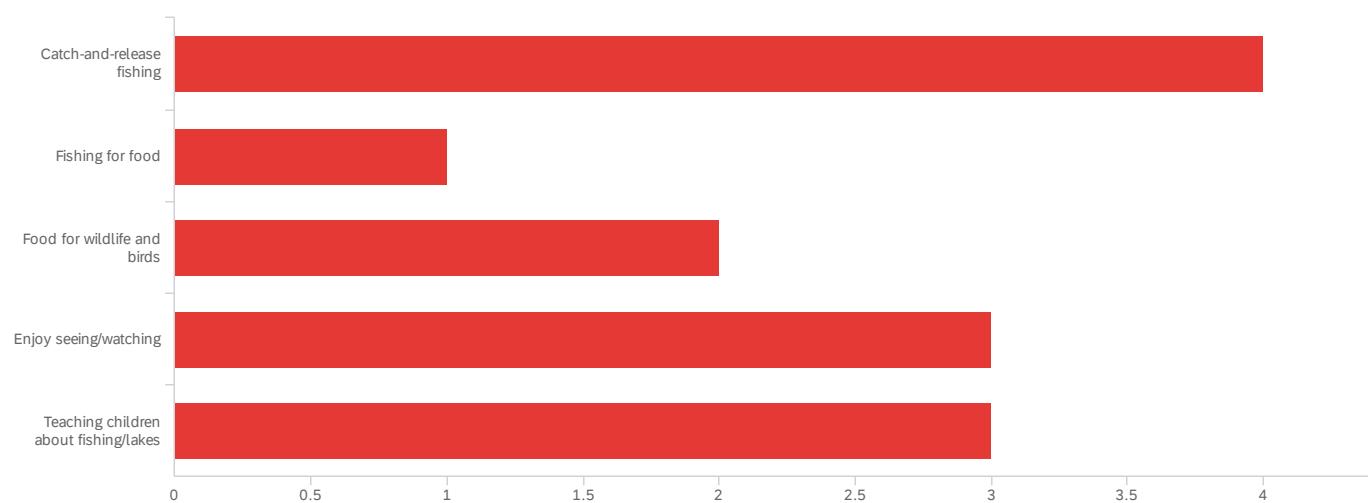
Q49 - What could be done to improve your recreation experience on Star Lake?

What could be done to improve your recreation experience on Star Lake?

Nothing really, the boat landing by the "old swimming hole" isn't very handy but people own the land on each side. So it is what it is!

Remove muck

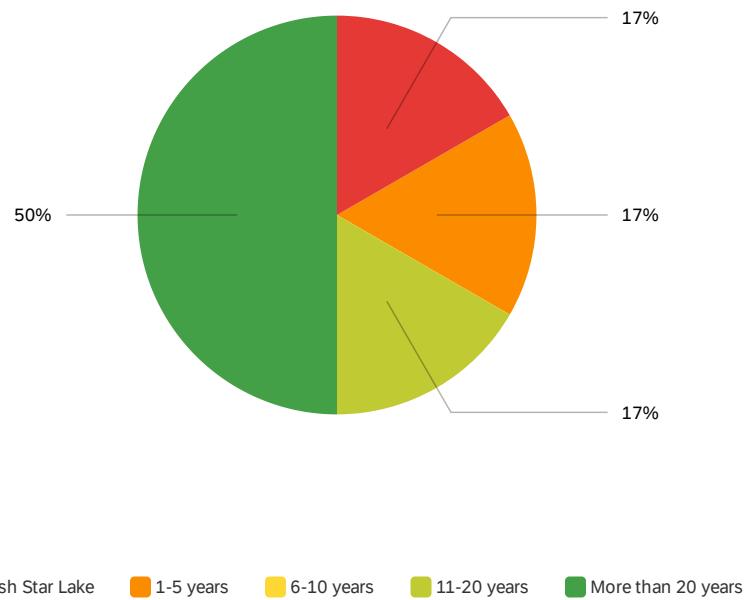
Q51 - For what purposes do you value the fishery in Star Lake? (Check all that apply)



| # | Field | Choice Count |
|---|---------------------------------------|--------------|
| 1 | Catch-and-release fishing | 31% 4 |
| 2 | Fishing for food | 8% 1 |
| 3 | Food for wildlife and birds | 15% 2 |
| 4 | Enjoy seeing/watching | 23% 3 |
| 5 | Teaching children about fishing/lakes | 23% 3 |
| | | 13 |

Showing rows 1 - 6 of 6

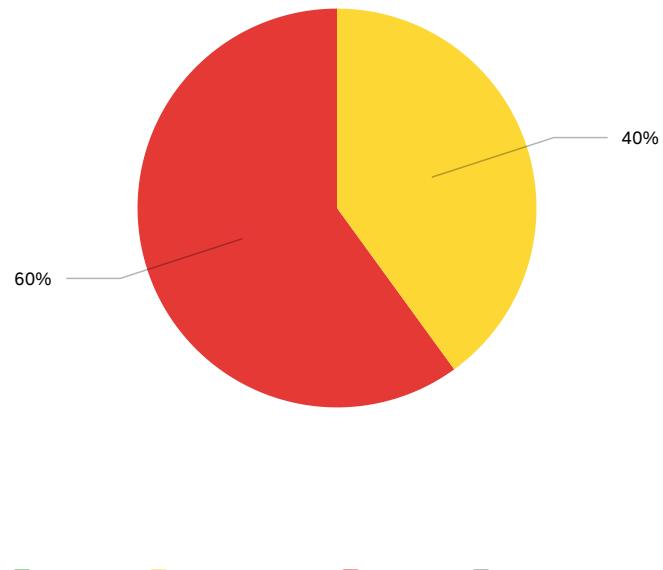
Q52 - How many years experience do you have fishing Star Lake?



| # | Field | Choice | Count |
|---|------------------------|--------|-------|
| 1 | I don't fish Star Lake | 17% | 1 |
| 2 | 1-5 years | 17% | 1 |
| 3 | 6-10 years | 0% | 0 |
| 4 | 11-20 years | 17% | 1 |
| 5 | More than 20 years | 50% | 3 |
| | | | 6 |

Showing rows 1 - 6 of 6

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



| # | Field | Choice | Count |
|---|---------------------|--------|-------|
| 1 | Improved | 0% | 0 |
| 2 | Stayed the same | 40% | 2 |
| 3 | Declined | 60% | 3 |
| 4 | Not sure/don't fish | 0% | 0 |
| | | | 5 |

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?

Lots of bass

Not sure.

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



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

What type of fish do you catch on Star Lake?

Northern, Bass, Pan Fish

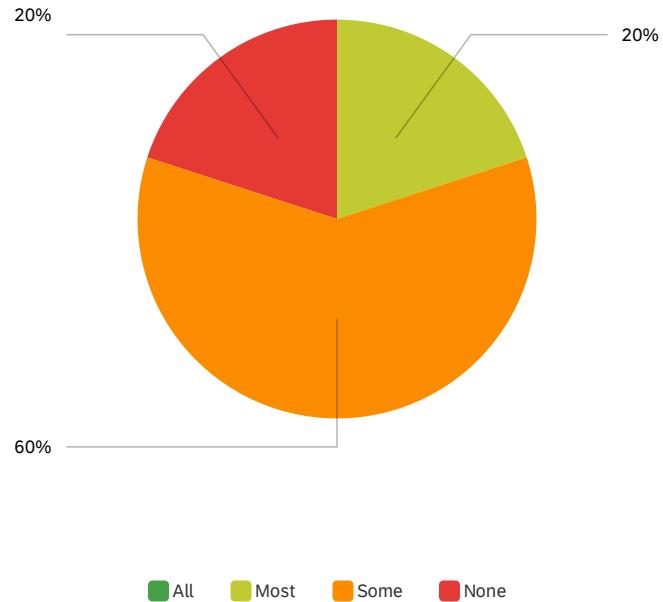
Bass

Bass bluegills

Bass Perch bluegill

Blu gill rock bass

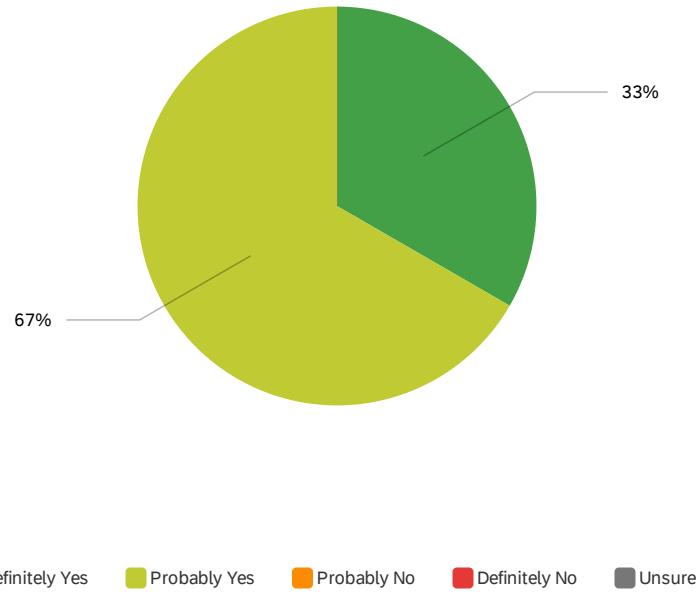
Q57 - In general, how many of the fish you catch are big enough to keep?



| # | Field | Choice Count |
|---|-------|--------------|
| 1 | All | 0% 0 |
| 2 | Most | 20% 1 |
| 3 | Some | 60% 3 |
| 4 | None | 20% 1 |
| | | 5 |

Showing rows 1 - 5 of 5

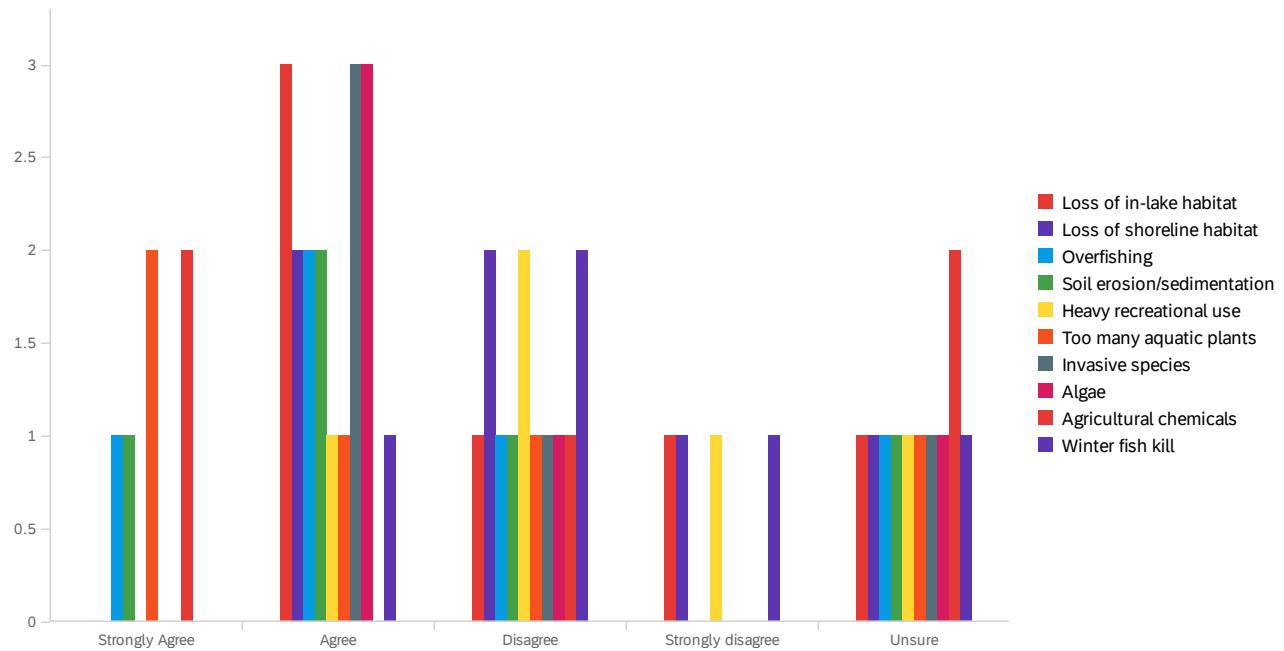
Q58 - Do you believe fish from Star Lake are safe to eat?



| # | Field | Choice Count |
|---|----------------|--------------|
| 1 | Definitely Yes | 33% 2 |
| 2 | Probably Yes | 67% 4 |
| 3 | Probably No | 0% 0 |
| 4 | Definitely No | 0% 0 |
| 5 | Unsure | 0% 0 |
| | | 6 |

Showing rows 1 - 6 of 6

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



| # | Field | Strongly Agree | Agree | Disagree | Strongly disagree | Unsure | Total |
|----|----------------------------|----------------|-------|----------|-------------------|--------|-------|
| 1 | Loss of in-lake habitat | 0% 0 | 50% 3 | 17% 1 | 17% 1 | 17% 1 | 6 |
| 2 | Loss of shoreline habitat | 0% 0 | 33% 2 | 33% 2 | 17% 1 | 17% 1 | 6 |
| 3 | Overfishing | 20% 1 | 40% 2 | 20% 1 | 0% 0 | 20% 1 | 5 |
| 4 | Soil erosion/sedimentation | 20% 1 | 40% 2 | 20% 1 | 0% 0 | 20% 1 | 5 |
| 5 | Heavy recreational use | 0% 0 | 20% 1 | 40% 2 | 20% 1 | 20% 1 | 5 |
| 6 | Too many aquatic plants | 40% 2 | 20% 1 | 20% 1 | 0% 0 | 20% 1 | 5 |
| 7 | Invasive species | 0% 0 | 60% 3 | 20% 1 | 0% 0 | 20% 1 | 5 |
| 8 | Algae | 0% 0 | 60% 3 | 20% 1 | 0% 0 | 20% 1 | 5 |
| 9 | Agricultural chemicals | 40% 2 | 0% 0 | 20% 1 | 0% 0 | 40% 2 | 5 |
| 10 | Winter fish kill | 0% 0 | 20% 1 | 40% 2 | 20% 1 | 20% 1 | 5 |

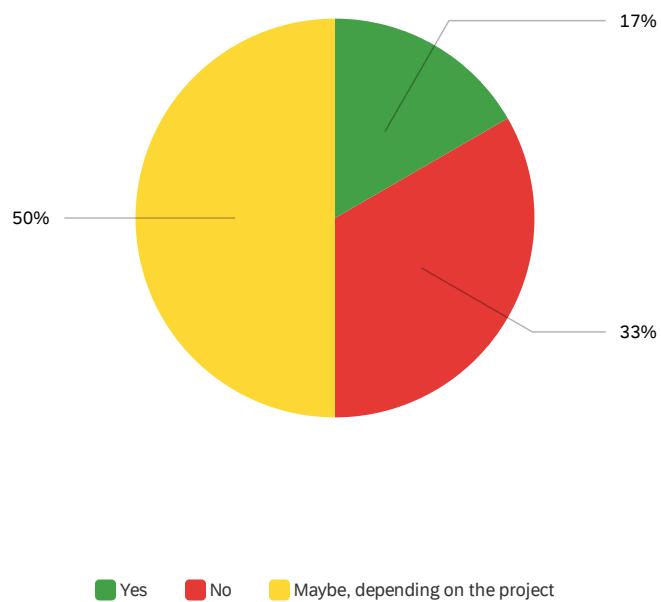
Showing rows 1 - 10 of 10

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

Do you have any additional comments regarding Star Lake?

Please remove muck

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.)?



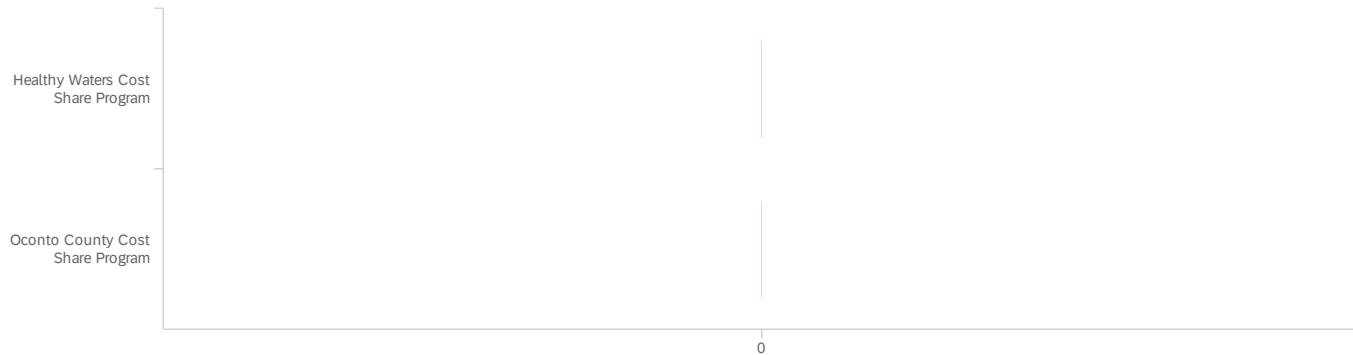
| # | Field | Minimum | Maximum | Mean | Std Deviation | Variance | Count |
|---|---|---------|---------|------|---------------|----------|-------|
| 1 | Would you be interested in volunteering on a project on your lake (such as shoreland restoration planting, invasive species monitoring/removal, water quality monitoring, highway cleanup, etc.)? | 1 | 3 | 2 | 1 | 1 | 6 |

| # | Field | Choice Count |
|---|---------------------------------|--------------|
| 1 | Yes | 17% 1 |
| 2 | No | 33% 2 |
| 3 | Maybe, depending on the project | 50% 3 |
| | | 6 |

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 | 0% 0 |
| 2 | Oconto County Cost Share Program | 0% 0 |
| | | 0 |

Showing rows 1 - 3 of 3

End of Report