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# Mille Lacs Lake Management Plan

2021-2026

**Public review draft** – March 2021

*Draft plan for public review includes core plan narrative.  
Some graphics and images will be added in final plan.*

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## I. Introduction

### Purpose

The Minnesota Department of Natural Resources (MN DNR) produces plans for many of the resources it manages, including the state's ten-largest lakes. Mille Lacs Lake is the state's second-largest lake wholly within Minnesota. This plan guides the State of Minnesota's fisheries management on Mille Lacs Lake from 2021-2026. The plan's approach to fisheries management synthesizes ecological, economic, political and sociocultural information to determine actions (e.g., regulations, population monitoring) to achieve fish resource goals, within biological and legal bounds. Its goals, objectives and strategies will also guide effective and efficient allocation of staff and fiscal resources to protect and enhance the fish community. Finally, the plan describes how information is to be shared by the MN DNR, and collected from interested stakeholders by the MN DNR. This ongoing engagement will guide future management planning.

### Scope

Management plans focus on work within the MN DNR's authority, and when appropriate, consider cooperative management contexts. On Mille Lacs Lake, harvest of several species is shared between tribes signatory to the 1837 Treaty and the state, based on legal agreements. The State of Minnesota respects tribes' self-regulation and will continue to cooperatively manage the Mille Lacs fishery into the future. This plan primarily directs the work of the MN DNR's Fish and Wildlife Division and complements planning by the 1837 Treaty Fisheries Technical Committee (FTC), the court stipulated venue for the MN DNR's cooperative management with 1837 Treaty bands. The plan acknowledges the important work of tribal governments and the MN DNR's state, local, business, and nonprofit partners and stakeholders.

### Plan development

#### *Public input*

The MN DNR used a variety of methods to gather input from individuals and groups to inform this plan. Almost 1,300 individuals participated, including some organizational leaders representing their constituents, through an online survey, public meetings and other in-person opportunities. These options, detailed in Appendix A, were advertised through the MN DNR website, social media and online newsletters; flyers and business cards; and local media. The Mille Lacs Fisheries Advisory Committee (MLFAC) advised on and reviewed plan content.

#### *Tribal coordination*

Mille Lacs Band of Ojibwe and Fond du Lac Band of Lake Superior Chippewa fisheries staff were consulted in-person by MN DNR fisheries staff during plan scoping. The FTC reviewed elements of the plan concerning management objectives and potential regulation changes. The MN DNR consulted 1837 Treaty tribal partners on the draft plan and incorporated their feedback prior to releasing the plan for public review. The plan is now undergoing a 30-day public review period to yield input the MN DNR will consider in developing the final plan.

## II. Background and current conditions

This section summarizes background on the social, historical, biological and legal influences on Mille Lacs Lake management. A glossary is included in Appendix B.

### Cultural history

The Mille Lacs Lake area is rich in natural resources, with a long history of different communities using these resources for socially, culturally and economically important reasons. The lake has undergone a variety of human and ecological changes since Euro-American settlement. Knowledge of these changes throughout history is important in order to understand current issues surrounding management of the lake today.

The Mille Lacs Lake region has been home to indigenous communities for hundreds of years. Long before Europeans arrived, the Dakota and shortly thereafter the Ojibwe (Anishinaabe) lived here. Despite initial peace and cooperation between the Dakota and the Ojibwe, competition for resources led to decades of conflict that gradually displaced the Dakota from the region. In 1837, before Minnesota was a state, the Mille Lacs Band of Ojibwe and several other tribes signed a treaty that ceded lands, including Lake Mille Lacs, to the United States government and opened the area to Euro-American immigration and economic development. The tribes signed the Treaty of 1837 on the condition that they would still have the right to hunt, fish, and gather in the ceded territory – rights that have been upheld by the Supreme Court of the United States. Exercising these rights remains important to the Ojibwe people as they pass these traditions onto future generations. In the late 1800s, many Ojibwe in Minnesota were moved by government forces to the White Earth reservation, but some, including the Non-Removable Mille Lacs Band of Ojibwe, resisted relocation and remained.

Utilization of the fish resources on Mille Lacs Lake evolved through time. Native Americans inhabiting the area used the resources for subsistence. With Euro-American colonization, commercial fisheries were established through the late 1800s. In 1895, the first regulations limiting harvest were enacted due to overharvest concerns. When railroads expanded to the area, access opened to sport anglers from Minneapolis and St. Paul, and industry expanded to serve this clientele. The commercial fishery closed in the 1920s, at least partially due to competition with the developing sport fishery. Initially the sport fishery was very oriented to consumptive uses, but today much of the sport fishery is catch-and-release. However, there is still a desire among some sport anglers to harvest fish. Cultural differences continue to influence how the fishery is used and viewed.

### Visitors and angler pressure

Mille Lacs Lake remains a popular recreational destination, largely due to its location within easy driving of the Minneapolis-St. Paul metropolitan area. Many anglers from around the state make multiple trips to the area each year, and 10% of Mille Lacs Lake anglers come from out-of-state. About one half of out-of-state anglers come from Wisconsin or Iowa, though the proportion of anglers coming from southern states, where bass fishing is very popular, has been increasing steadily.

Summer angling pressure peaked at 2.3 million angler hours in 1992, but has remained under 1 million hours since 2012, when more restrictive walleye regulations were introduced. Winter angling pressure peaked at 2.8

million hours in 1990, and has exceeded 2 million hours each winter since 2017-2018. The combination of summer and winter angling pressure consistently places Mille Lacs Lake as the first or second most heavily fished lake in Minnesota. Weather and ice conditions on Mille Lacs Lake and other popular fishing destinations can greatly influence winter angling pressure.

## **Stakeholder interests**

In making management decisions about the Mille Lacs fishery, the MN DNR considers an array of stakeholder interests, including lakeshore property owners, other community members, area and statewide businesses, visitors, government agencies and non-governmental organizations. The MN DNR uses multiple communication tools to reach these audiences (e.g., websites, press releases, e-newsletters, social media, brochures, signage). Historically, the MN DNR has also relied on advisory groups to provide public input on Mille Lacs Lake.

The MN DNR's current advisory group is MLFAC, which was convened in 2015 following that season's unplanned walleye fishing closure. MLFAC was formed to provide a forum for discussion and understanding of data and information related to the walleye fishery, and to provide input on management options. The committee comprises representatives from resorts, guides and other businesses; property owners; county government; representatives of MN DNR's Walleye, Bass, and Northern Pike-Muskellunge Working Groups; and other members of the public. MLFAC is similar in composition and function to advisory committees the MN DNR has established to inform its management of other Minnesota resources.

## **Current data collection**

The MN DNR uses a variety of annual and intermittent sampling programs (see Appendix C) to monitor fish populations and the fishery, and to guide management decisions. External reviews by university and federal agency institutions (see Appendix C) have found these sampling techniques to be sound, and the MN DNR has adopted improvements identified by these reviews. Additional surveys focus on monitoring water quality parameters, zebra mussels and zooplankton. Data collected through these programs shed light on the drivers of change in the lake.

## **Water clarity**

Mille Lacs Lake is the state's second largest lake but lies in a relatively small watershed. Lakes and rivers are influenced by changes in their watersheds, and for reasons that are not well understood, water clarity in Mille Lacs Lake improved dramatically in the mid-1990s. Clearing water suggests reduced nutrient availability, potentially due to improved sewage treatment or land use practices (Hansen et al. 2019). Fewer nutrients result in lower phytoplankton abundance, meaning less food for organisms higher up the food chain. Water clarity also reduces walleye production (Lester et al. 2004, Hansen et al. 2019), since walleye prefer darker waters.

## **Aquatic invasive species**

Aquatic invasive species can change fish productivity. When a species invades a lake, it first has a period of relatively slow population growth, before numbers dramatically increase to a population level often exceeding

the water body's carrying capacity. Invasive species abundance then drops, and remains stable at a lower level. Zebra mussels and spiny water-fleas have both invaded Mille Lacs Lake, altering the zooplankton community structure and reducing zooplankton abundance. Zooplankton are an important food source for the juveniles of all fish species, including for some fish species (e.g., minnows and tullibee) that serve as forage for predator species (e.g., walleye).

- Zebra mussels were first detected in Mille Lacs Lake in 2005, peaked in 2012, and in recent years have stabilized at about one half of their highest level (Jensen 2020). Zebra mussels filter feed on plankton and expel wastes on the lake bottom, leaving less food for fish that feed on plankton in the water column, but creating more food for bottom-dwelling insects and crayfish that are preferred by smallmouth bass. Evidence from other lakes suggests that walleye and yellow perch decline after zebra mussel invasions, while bass tend to increase.
- Spiny water-fleas invaded Mille Lacs Lake in 2009. They prey on and reduce overall zooplankton abundance, and can virtually eliminate some native zooplankton species. Some adult fish species feed on spiny water-fleas, but their long spiny tail makes it difficult for small fish to eat them.

Due to the introduction of invasive species, Mille Lacs Lake no longer sustains the level of walleye harvest it did through the 1980s and early 1990s (Hansen et al. 2019). In order to minimize the risk of additional invasions, invasive species inspectors have been placed at high-use public boat access sites. These inspectors are funded by the state and counties, and have varying levels of enforcement authority. Additionally, some inspectors are equipped with portable cleaning stations to clean boats entering or exiting the water. To minimize risk of aquatic invasive species being transported by participants in fishing tournaments, boat inspections are required through the tournament permitting process.

## **Climate change and habitat alteration**

The warming climate has reduced the length of the ice-cover period and increased peak summer water temperatures. Climatic changes have reduced the abundance of cisco and burbot in the lake, as both of these species are intolerant of warm water. It is anticipated that the climate will continue to warm, and this will impact lake productivity, favoring some species over others. As these changes occur, management options will be developed in collaboration with management partners and stakeholders.

Shoreline alterations and aquatic plant removal can significantly alter fisheries habitat through direct destruction, or through erosion and sedimentation. Activities below the ordinary high water level are controlled through a permitting process that includes assessment for potential fisheries impacts. The MN DNR's shoreline habitat program exists to assist landowners with habitat restoration and improvement projects.

Watershed development and climate change can have a significant effect on aquatic life. The Midwest Glacial Lakes Partnership has developed a database and tool summarizing the degree of past changes and the potential for future changes in the condition of Midwest lakes ([ifrshiny.seas.umich.edu/mglp](http://ifrshiny.seas.umich.edu/mglp)). The tool classifies the Mille Lacs Lake watershed as one of low (8%) disturbance, defined as land that has been converted to urban or agricultural uses. However, the shoreline is classified as highly (39%) disturbed, with a recommendation for rehabilitation or mitigation for the disturbed areas. The lake is also classified as having medium vulnerability to

climate change impacts, with coldwater species (cisco and burbot) likely to persist through 2050, based on current climate change projections.

## Cooperative management

In the 1990s, eight Ojibwe Bands, signatories to the 1837 Treaty, sought to reaffirm their preexisting rights to hunt and fish in the territory they ceded to the U.S. The 1837 Treaty bands reestablished exercise of their treaty rights to fish for walleye in 1997. In 1999, the U.S. Supreme Court affirmed that members of the signatory bands to the 1837 Treaty retained their rights to hunt, fish, and gather in the area of the ceded territory. A stipulated agreement incorporated into the court order includes five protocols that govern the working relationship between the bands and the state. These protocols are available at [mndnr.gov/millelacslake](http://mndnr.gov/millelacslake), under “Court decisions & legal information.”

Walleye, yellow perch, northern pike, cisco and burbot are all treaty-managed species, and the protocols guide the process used to estimate harvestable surplus for these species. The harvestable surplus is then distributed based on agreement between the state and bands. Harvestable surplus levels, along with a state and band share of the harvestable surplus, were first set for treaty managed species in 1998.

- Yellow perch and northern pike currently have a stationary harvestable surplus of 270,000 and 100,000 pounds respectively, shared equally between the state-licensed and band fisheries.
- A harvestable surplus has not been determined for cisco and burbot, as interest in harvesting these species is generally low, though cisco harvests do occasionally increase in occasional years.
- The primary species of interest to both the state-licensed and tribal fisheries is walleye. From 2017 through 2020, management was guided by the Consensus: Mille Lacs Fishery Harvest Plan, 2017-2020 (consensus agreement). The consensus agreement came about when the state exceeded its share of the harvestable surplus for walleye in 2016. The 1837 Treaty bands initiated the dispute resolution process outlined in the protocols. State and band fisheries managers arrived at consensus goals to restore the walleye population and to protect the 2013 walleye year class by setting harvestable surplus goals and strategies. The consensus agreement also defined how overages and underages from the respective band and state shares are to be utilized. Under the consensus agreement, 70% of the first 64,000 pounds went to the state-licensed fishery, and 30% to the band fishery. Above 64,000 pounds, the harvest level was shared equally. The state and bands monitored and regulated their fisheries to operate within their shares. The consensus agreement expired at the end of the 2020 fishing season, allowing cooperative management between the state and tribes to revert to previously agreed upon protocols.

## Regulatory background

Mille Lacs Lake was under statewide walleye regulations until 1983, when a night fishing ban was imposed based on public input to reduce the harvest of large walleye. More restrictive walleye harvest limits were imposed, beginning in the late 1990s, to remain within the state’s share of the harvestable surplus. Since 2015, walleye fishing has been regulated very restrictively, including narrow two-inch harvest slots combined with possession limits of one walleye during some periods of the year, catch-and-release fishing only during other periods, and

planned and unplanned fishing closures when necessary to remain within the state's share of the harvestable surplus. These regulations were imposed due to a reduced walleye population, which resulted in decreased harvest levels and respective band/state shares. The history of regulation changes on Mille Lacs Lake, from 1962 through 2019, is presented in Appendix D (history of fishing regulation changes) and Appendix E (history of night closures).

More restrictive regulations require anglers to release more fish. Some of these released fish die due to stress associated with being captured (post-release hooking mortality). Under very restrictive fishing regulations, hooking mortality is a significant source of overall mortality. The state accounts for walleye killed through hooking mortality in calculating its take of the state's share of the harvestable surplus. Methods for estimating hooking mortality have been refined over time to reflect best available science. The hooking mortality estimate has consistently constituted the majority of the state's harvest since 2015.

A significant finding of the 1999 Supreme Court ruling affirming treaty rights is that the state may not impose its own regulations on band members if the bands can effectively self-regulate, and if regulations under which band members are fishing are adequate to meet conservation, public health and public safety needs. The state cannot regulate the time, place nor manner of the exercise of these rights, meaning the state cannot dictate when, where or how band members choose to fish. Until the series of court cases reaffirming treaty rights, the state interpreted that it had the ability to regulate band member harvest under state regulations.

### **III. Strategic issues**

This section summarizes the current strategic issues that frame the plan's goals, objectives and strategies.

#### **Multiple interests**

Mille Lacs Lake stakeholders have diverse values, including recreational, economic opportunity (e.g., guides, resorts, launches, support industries), cultural and historical values, environmental protection, and community relations. The MN DNR incorporates these values into its management actions, and the agency works separately through government-to-government relations to incorporate tribal perspectives and treaty obligations into decision-making.

#### **Systems change**

As described previously, Mille Lacs Lake has experienced significant ecological changes since the mid-1990s, including increased water clarity, reduced nutrient availability and aquatic invasive species invasions. Due to these changes, walleye production is lower than it was prior to 1995, while smallmouth bass and northern pike production is higher. The MN DNR's approach to management of fish resources in Mille Lacs Lake takes social, cultural and economic needs into consideration, but these needs are ultimately constrained by biological limits. Additionally, continued climatic change will influence management options in the future.



## IV. Goals, objectives and strategies

The goals in this plan are long-term, outcome-oriented purpose statements, complementing the MN DNR's treaty management. Public and other stakeholder input was instrumental in formulating these goals.

- Goal 1. Serve a diversity of lake interests
- Goal 2. Provide a predictable management process
- Goal 3. Maintain healthy, self-sustaining fish populations that support recreation and harvest

Below each of the goals, this plan lists objectives and strategies:

- Objectives are activities or outputs that support plan goals that can be tracked to determine progress through the life of the plan.
- Strategies are specific, actionable statements describing how the MN DNR will achieve its goals and objectives. Harvest regulations are the primary strategies involved in management of the fishery.

### Goal 1. Serve a diversity of lake interests

#### *Objective 1A. Improve tribal coordination*

The MN DNR fulfills treaty obligations as stipulated by protocols stemming from Mille Lacs Band of Chippewa Indians vs. State of Minnesota (1996): "The State has a trust responsibility and authority to manage natural resources for the benefit of all current and future users consistent with the treaty harvest rights of the Bands." The protocols establish the 1837 Treaty Fisheries Technical Committee, with responsibilities to coordinate fisheries surveys, sampling and research; recommend harvestable surplus levels; and discuss proposed state or band fisheries laws and regulations.

More generally, as stated in Executive Order 19-24, the state and Minnesota's tribal nations significantly benefit from working together, learning from one another and partnering when possible. Similarly, the state collaborates with Wisconsin bands party to the 1837 Treaty through the Great Lakes Indian Fish and Wildlife Commission. Therefore, to supplement Fisheries Technical Committee coordination, the MN DNR will proactively engage with tribal governments and members on fisheries management issues.

#### **Strategies:**

- Annually, the MN DNR commissioner will communicate regarding Mille Lacs Lake fisheries issues individually with all 1837 bands in Minnesota, and with GLIFWC in its role as a representative of the Wisconsin bands, to ensure open exchange. If a tribal government prefers, the fisheries section manager, regional director or regional fisheries manager can be responsible for this communication.
- Annually, the regional fisheries manager and area supervisor will offer to attend, and if desired, present at, a tribal community meeting with band members, for each 1837 band.

- Offer 1837 band members the opportunity for representation on the current fisheries advisory committee, as a community-level effort to supplement government-to-government coordination, and encourage tribal staff-level involvement at meetings.

*Objective 1B. Improve communication and public engagement processes*

Exchange between the MN DNR and stakeholders leads to improved mutual understanding, greater public involvement in natural resources stewardship and ultimately higher-quality agency decisions. The MN DNR uses a variety of methods to involve the public, ranging from one-way communication efforts that inform, to basic involvement where the MN DNR shares information and takes input, to full public consultation and collaboration on complex decisions.

The MN DNR will work to strengthen and expand upon its standard public communication and engagement practices – including developing newsletters, news releases, web content updates, brochures and signage – and informal and formal coordination with members of the public. In addition, the MN DNR will expand efforts to engage with more Minnesotans and out-of-state visitors, through improved public education and involvement and expanded partnerships and social science efforts.

**Strategies:**

- Develop statewide educational and interpretive materials (online and print) for use by MN DNR’s Mille Lacs Lake staff, to explain the history of the lake’s fishery, current ecological and social trends, and how these issues influence current management.
- Expand public communication practices to keep stakeholders informed about public engagement opportunities, fisheries monitoring and research findings, and season regulation setting.
- Strengthen local partnerships to support formal and informal education and interpretation for residents and visitors to learn about and engage in Mille Lacs Lake fisheries management. In addition to working with state parks and others MN DNR programs, consider partnerships with:
  - Local government bodies – school districts, cities, libraries, etc
  - 4-H, scouts and other youth development organizations
  - University Extension
  - Watershed and other nongovernmental organization conservation groups
  - Resorts, launch companies, local sport shops and bait shops
- Continue to improve information developed and disseminated, focused on online content and e-news.
- Implement online public involvement tools like discussion forums or mapping to involve the public in MN DNR’s work, incorporate local knowledge of the lake, and better understand public interests.
- Annually, prior to walleye season opener, hold a public open house on Mille Lacs Lake fisheries issues that presents information on the state of the fishery and allows for both dialogue and an adequate public comment opportunity. This annual open house will involve partner agencies and organizations.
- Continue a fishery advisory committee, and appropriately inform the public of committee work.
- Conduct a statewide representative human dimensions survey, to better understand all Minnesotans’ fishing and related recreational values and incorporate them into decision-making.

## Goal 2. Provide a predictable management process

### *Objective 2A. Improve communication and understanding of regulatory options*

Effective long-term management relies on a sound process that incorporates biological and fishery data to assess fish population status and to evaluate the implications among regulatory options. Detailed information has been shared with MLFAC, but it has not been documented consistently, or formatted in a manner that makes it easy to share with the public. Efforts under Objective 1B to improve public engagement will also support improving stakeholders' involvement and their understanding of goals and impacts of regulation options. The MN DNR will develop additional tools and approaches that support effectively involving diverse stakeholders in articulating their values and preferences, to inform the MN DNR's regulation setting.

#### **Strategies:**

- Develop and post online plain language versions of explanatory materials covering various management topics (e.g., creel survey, hooking mortality, etc.).
- Improve the public's understanding of Mille Lacs Lake management in the context of similar lake systems in Minnesota and elsewhere, through continuing to involve internal and external fisheries science and policy subject matter experts and sharing technical and non-technical information.
- Improve the MN DNR's communication of its long-term fish community and fishery objectives (see Goal 3) to our FTC partners, and adapt this information and make it available through public channels.
- In general, leverage public engagement strategies under Objective 1B to support improved stakeholder understanding of goals and implications for regulation options.

### *Objective 2B. Develop and present to the public regulation options in a more consistent, predictable, and timely manner*

In recent years, walleye regulation options have been limited, due to a relatively low harvestable surplus and the resulting low state share of the harvestable surplus. MLFAC and other stakeholders, notably resort operators, have requested more options, more predictable regulations and earlier determination of regulations.

- **Options:** The overall harvestable surplus and state/tribal shares are determined annually, based on the walleye population status. The higher the state's share, the more regulation options there are available. For the duration of this plan, catch and release angling for walleye will likely be in place for much of the open water season, in order to minimize the risk of an unplanned fishing closure, and thereby maintain angling opportunity.
- **Predictability:** The MN DNR models potential regulations to estimate harvest and the risk of exceeding the state's share of the harvestable surplus. There is more risk of exceeding the state's share with higher angler pressure, catch rates and water temperature (which increases hooking mortality). It is not possible to precisely predict these variables. However, the MN DNR can work with stakeholders to determine how much risk of an unplanned walleye closure (to ensure the state does not exceed its share) stakeholders are willing to accept, recognizing that different regulation options carry different

levels of this risk. This would make selecting a regulation more predictable and consistent. In addition, the MN DNR can improve the predictability of how it sets and communicates regulations.

- Timing: The FTC relies on “control rules” to set the harvestable surplus based on the population estimate. The MN DNR is working through the FTC on updated control rules that could expedite generating regulation options.

#### **Strategies:**

- Develop a communication template and an earlier schedule for consulting with an advisory committee on each season’s regulations, including on options when they exist, and make available to the public the process and rationale used to determine regulations.
- Consult with the public, including an advisory committee, to identify preferences for balancing fishing and harvest opportunity with risk of an unplanned closure.

### **Goal 3. Maintain healthy, self-sustaining fish populations that support recreation and harvest**

*Objective 3A. For walleye, maximize angling opportunity, and when population status allows, provide harvest opportunity while maintaining high quality size structure and high catch rates*

Walleye are the most complex species to plan for on Mille Lacs, as the species most targeted by both 1837 Treaty bands and state anglers. Generally, it is advantageous to spread harvest across as many age and size groups as possible, while avoiding immature and old, large individuals (SPOF 12 1984, Gwinn et al 2015). Band harvest, primarily through spring gill nets and spearing, targets 14 to 18-inch fish, and state harvest targets walleye longer than 18-inches. In recent years with more restrictive regulations, the majority of the state’s take of walleye is due to hooking mortality rather than harvest, which spreads kill across a broad size range of fish.

Much of the public input received on the plan (described in the plan introduction and detailed in Appendix A) focused on how the walleye fishery should be managed. Stakeholders were most interested in managing the state walleye fishery to maintain angling opportunity (no unplanned closures), and secondarily to allow some opportunity for harvest. Walleye regulations are determined after an annual harvestable surplus is determined.

When the harvestable surplus is relatively low, the state’s fishing regulations must be very restrictive, and will be limited to catch-and-release fishing only. Planned closures during warm water (high post-release hooking mortality) periods will be considered if maintaining a fall (cooler water period) fishery is a high priority for stakeholders. When the harvestable surplus is higher, regulations may include harvest opportunity, expanding the time period harvest is available, or expanding the harvest slot.

When the state’s share of the harvestable surplus can support some harvest, the decision of when to allow that harvest involves tradeoffs. Early season harvest increases the chance that high harvest (including hooking mortality) requires an unplanned closure later in the open water season to stay within the state’s share. Offering harvest later in the season may mean harvesting less of the state’s share if fishing success is low.

Potential walleye regulations are evaluated based on expected harvest levels calculated from models that use past fishery and environmental variables to predict the range of future pounds of walleye killed. When fishery or environmental conditions exceed the modeled inputs (e.g., unusually high catch rates, unusually warm water temperature, or a combination), this increases the likelihood of an unplanned closure. To meet the goals of maximizing angling opportunity and no unplanned closures, the MN DNR will set conservative regulations.

**Strategies:**

- Through the FTC, use modeling to determine the walleye population level and harvestable surplus.
- Use modeling to evaluate the effect of specific harvest options.
- Consult with stakeholders to select a regulation minimizing the chance of an unplanned fishing closure.
- Set regulations conservatively for the early season, and assign harvest opportunity later in the season. This will allow the potential to change to a more conservative regulation if an unplanned closure seems likely based on higher than expected hooking mortality during the catch-and-release part of the season.
- Monitor harvest, and close the walleye fishery if harvest is projected to exceed the state's share of the harvestable surplus.
- Limit walleye focused angling tournaments to cool water periods in May, June, September and October.
- Continue annual sampling programs.

*Objective 3B. For smallmouth bass, maintain harvest opportunity while maintaining a high quality/trophy size structure with high catch rates*

Current smallmouth bass regulations allow for some harvest of smaller fish but protect larger fish with potential to grow to “trophy” size (20-inches or greater). There is currently minimal interest in harvesting smallmouth bass, with approximately 98% of legal-to-harvest fish voluntarily released. However, past harvest levels have been higher. Despite the popularity of fishing for smallmouth bass, there was very little input regarding smallmouth bass management during this plan’s public input process.

In order to gather input relating to smallmouth bass management, the Mille Lacs Smallmouth Alliance (MLSA) was contacted. The MLSA expressed strong interest in maintaining the trophy component of the population by reducing the possession limit and broadening the protected slot limit from 17 to 21-inches to 15 to 21-inches. Under current regulations, approximately 98% of all smallmouth bass that are legal to harvest are voluntarily released. Because such a high proportion of angled bass are voluntarily released, the proposed lowering of the bottom end of the protected slot would not have much effect toward the goal of maintaining the trophy size structure of the smallmouth bass population. However, this change would reduce a harvest opportunity for the few anglers that choose to harvest smallmouth bass to eat. The MN DNR feels that the current level of harvest on smallmouth bass less than 17-inches long is not limiting the abundance of the trophy-sized bass. Few smallmouth bass have the genetic ability to grow larger than 20 to 21-inches, so producing significantly more trophy fish is likely not feasible. However, fish of this size already in the population may benefit from additional protection.

MLFAC provided input that the protected slot allows anglers to harvest rare, truly large smallmouth bass, but that these trophy fish have greater value in being recaptured than in being harvested. Therefore, the MN DNR

plans to replace the 17 to 21-inch protected slot limit with a 17-inch maximum size limit. If annual monitoring shows harvest is limiting trophy fish abundance, the MN DNR will consider more restrictive regulations.

Smallmouth bass will be managed with the goal that approximately 10% of fish in the electrofishing survey sample are 20-inches or longer (based on a three-year running average) and some individuals sampled are at least 21-inches in length.

**Strategies:**

- Create regulations for the following:
  - Open season following statewide regulations, with spring and fall catch-and-release seasons.
  - 17-inch maximum size limit.
  - Three bass in possession.
  - No tournaments permitted during the spawning period of June 1-21.
- Annually sample smallmouth bass to monitor size structure.

*Objective 3C. For muskellunge, maintain a high-quality/trophy size structure*

Mille Lacs Lake supports a trophy muskellunge population (50-inches or greater) that is maintained by stocking, though natural reproduction has been documented. Current statewide regulations, combined with very little interest in harvest, are adequate to protect the trophy aspects of this population. The MN DNR received little input about muskellunge during the input process, suggesting general satisfaction with the status quo.

**Strategies:**

- Maintain current statewide regulations:
  - Statewide open season.
  - Minimum size of 54-inches.
  - One muskellunge in possession.
- Continue to stock muskellunge at the current rate (3,000 fall fingerlings every other year).

*Objective 3D. For northern pike, maintain harvest opportunity while maintaining a high quality/trophy size structure*

The MN DNR received significant input on northern pike. Many anglers were dissatisfied with the winter regulation of harvesting two pike less than 30-inches long before one longer than 30-inches could be harvested. Public input showed support for maintaining the trophy size structure of the northern pike population in Mille Lacs Lake, with little support for harvesting a trophy fish. However, there was support for the opportunity to harvest smaller northern pike. The MN DNR considered three regulation options:

- 30-40 inch protected slot limit for all anglers (hook-and-line and darkhouse).
- 30-40 inch protected slot limit for hook-and-line, and one-fish-over-26-inch limit for darkhouse anglers.
- 30-inch maximum size limit for all anglers.

Public input demonstrated general support for the current 30-40 inch protected slot limit; however, following consultation with MLFAC and the Minnesota Darkhouse and Angling Association, the 30-inch maximum size limit was selected. This regulation will continue to allow harvest of smaller fish and protect the high-quality size structure of the northern pike population. Additionally, it balances the needs of spear fishers and hook-and-line anglers. The current open season ending on March 31 will be maintained.

The MN DNR will continue to assess realistic management goals for northern pike size structure. Intermittent spring sampling from the mid-1990s to 2013 showed few northern pike longer than 40 inches. In 2019, northern pike longer than 40-inches rose to 4%. Since spring spawning run sampling was conducted only intermittently, and the percentage of trophy-size fish can be highly influenced by the recruitment of a single strong year class, it is difficult to determine realistic size structure management goals at this point. Spring spawning run sampling should have some fish longer than 40 inches, but this metric will be refined as more data are collected.

**Strategies:**

- Create regulations for the following:
  - Continue current open season (ends March 31).
  - 30-inch maximum.
  - Three northern pike in possession.
- Continue to monitor size structure through annual spring sampling using trap nets.

*Objective 3E. For yellow perch, focus research efforts to determine what is limiting abundance*

The MN DNR received significant public input on yellow perch, including concerns about low population. This perceived decline in abundance is also reflected in sampling data. The cause of the decline in abundance is not clear, but may include natural fluctuations, predation by walleye and the impacts of zebra mussel and spiny water-flea. Based on creel survey data, angler harvest is not the likely cause.

Yellow perch are an important sport fish, and early life stages of yellow perch are the most important prey item for walleye. Forage abundance, primarily yellow perch, is correlated with survival of age-0 and age-1 walleye. Higher forage abundance reduces predation on young walleye, thereby increasing their survival rate. When age-0 yellow perch are abundant, age-0 walleye grow more quickly, are larger going into the winter, and have a greater chance of surviving through the winter.

The MN DNR will undertake a multi-year project to develop sampling methods, monitor abundance of age-0 and age-1 yellow perch through the summer, and attempt to identify factors limiting abundance.

**Strategies:**

- Review available data and literature to identify yellow perch information needs.
- Develop a study design to address the most relevant information needs.
- Maintain current angling regulations at statewide regulations:
  - 20 yellow perch daily, 40 in possession.
  - Continuous open season.

## V. Performance Measures

The MN DNR will develop performance measures for select objectives once goals, objectives and strategies are finalized following partner and public review processes.

Goal	Objective	Measure
Goal 1. Serve a diversity of lake interests		
Goal 2. Provide a predictable management process		
Goal 3. Maintain healthy, self-sustaining fish populations that support recreation and harvest		



## VI. Appendices

### Appendix A. Input Methods

#### *Public input*

To inform this plan, the MN DNR requested input to identify the interests of various stakeholders of the fishery. In total, almost 1,300 individuals provided input, including some organizational leaders representing their constituents. Opportunities to provide input on the plan were communicated in a variety of ways, including the MN DNR website, social media and GovDelivery newsletters; flyers and business cards; and local media.

- Creel survey: Through the annual creel survey, anglers had the opportunity to answer additional questions to inform management planning. Two sets of questions were developed, one for walleye anglers, and the second for northern pike anglers. Prior to the closure of the walleye harvest season at the end of May 2019, surveys focused on gathering perspectives only on walleye management from these potentially more harvest-oriented anglers. After the walleye harvest closure, the walleye and northern pike questions were alternated between interviews.
- Public meetings: Three meetings were held to provide stakeholders background on the planning process and issues the plan would address, an opportunity to ask questions and discuss their perspectives, and options to provide input. Meetings were in Brainerd, the closest urban area; Mille Lacs-Kathio State Park, local to the lake; and Indian Mounds Regional Park, in St. Paul, to accommodate metro residents who might fish or own property on the lake. Each meeting started with a presentation from MN DNR, followed by small-group discussions. Staff assigned to each group took notes and answered questions.
- Online survey: A survey was developed to gather input on preferences for Mille Lacs Lake management. This survey was open from July 11 through Aug. 1, 2019. Through the MN DNR website, press releases, flyers and business cards, social media, e-newsletters and tribal community announcements, individuals with an interest in the management of Mille Lacs Lake were encouraged to participate and provide input.
- Tailored outreach: MN DNR staff attended events throughout the state to talk to community members about the plan. Staff attended the Hmong Freedom Festival in St. Paul, Aitkin and Crow Wing County Fairs, and Minnesota State Fair; met with representatives of the Mille Lacs Smallmouth Alliance and Minnesota Darkhouse Association; and held a number of informal conversations in the community, at businesses and the Garrison Fisheries Office. Finally, as management goals were developed, they were presented to the Walleye, Bass and Northern Pike-Muskellunge Work Groups for comment.

#### *Tribal coordination*

- Tribal community coordination: MN DNR staff met with fisheries and planning staff from the Mille Lacs and Fond du Lac bands. Tribal staff shared MN DNR's online survey link with band-member anglers, and shared tribal staff and member perspectives on lake management.

## Appendix B. Glossary

- **Abundance:** The quantity of fish in a population. Abundance is usually expressed as a catch rate from standardized assessment gear when actual population size is unknown.
- **AIS:** see Aquatic invasive species.
- **Age-0:** A fish that has not reached its first birthday (January 1), also called young-of-year (YOY).
- **Angler catch rate:** The number of fish caught by anglers per hour of fishing. Catch rates can be based on fish that are harvested or released, and is expressed as fish/angler hour.
- **Angler-hour:** One hour of fishing by a single angler. For example, if two people in a boat each fished for three hours, they expended 6 angler hours. Angler-hours are the units used to describe pressure.
- **Aquatic invasive species:** A species of plant or animal that is not native to a body of water. Aquatic invasive species can also include pathogens.
- **Benthic:** Plants or animals that live on the bottom of a water body. Contrast to planktonic.
- **Biomass:** The aggregate weight of a given group of organisms (e.g., pounds in a system).
- **Carrying capacity:** The average maximum number, or weight, of an organism that an environment can sustain.
- **Catch per Unit Effort (CPUE, catch rate):** The number of fish caught per unit of effort spent fishing. For anglers it is expressed as fish/angler hour (e.g. 0.25 walleye per angler hour). For sampling nets this would be the number of fish caught per net (e.g., 13.7 walleye per gill net lift). In standardized assessments changes in CPUE correlate to changes in abundance.
- **Condition factor:** A relationship between fish length and weight, which measures the relative plumpness of a fish, similar to the Body Mass Index (BMI) for humans. On Mille Lacs Lake, condition factor is often expressed as the percent deviation from what a fish of standard weight (based on its length) would be expected to weigh.
- **Control rules/harvest control rules:** Agreed upon guidelines that determine how much fishing can take place (the harvestable surplus), based on indicators of the fish population's status.
- **Creel survey:** A survey used to estimate fish harvest and kill, angler catch rates and pressure. Annual ice and open-water creel surveys are conducted on Mille Lacs Lake. Creel surveys used on Mille Lacs Lake count and interview anglers returning to access sites.
- **Detritus:** Nonliving material.
- **Electrofishing:** The use of electricity to capture fish. Fish are temporarily stunned, dip netted, and held in a livewell. Electrofishing is limited in its effectiveness by depth, size of the fish within the shock field, and conductivity of the water. This gear is used to sample age-0 walleye and adult smallmouth bass. Age-0 walleye sampling is conducted in early September. Results provide an index of reproductive success and survival to the fall. Smallmouth bass are sampled to assess the size structure of the population.
- **Exploitation:** Removal of fish from a population. Often expressed as exploitation rate, which is the percentage of fish, by number or biomass, that is, or can be, removed.
- **Fishery:** A activity involving the capture of fish. It can be defined in terms of the people involved, fish species pursued, method of fishing, purpose of fishing, or area in which the fish are pursued. A lake can support multiple fisheries. Mille Lacs Lake supports subsistence gillnet and spear fisheries, as well as

recreational fisheries for walleye, northern pike, smallmouth bass, and yellow perch. More broadly, Mille Lacs Lake supports state (sport/recreational) and tribal (subsistence/cultural) fisheries.

- **Fishing pressure:** see Pressure.
- **Fingerling:** A generic term used to describe small fish. Muskellunge are stocked in Mille Lacs Lake as fall fingerlings, meaning the size they attain at the end of their first summer.
- **Food web:** The manner in which energy (in terms of food) moves through organisms.
- **Fry:** The larval stage of fish. Walleye are typically referred to as fry until they absorb their yolk sack and start to feed.
- **Gill net:** A net that forms a vertical wall in the water. Meshes are made of multi-filament or monofilament threads suspended in the water column between a float line and lead line. Gill nets are an entanglement gear where fish of the correct size pass partway into the mesh, become entangled, and are unable to escape. Individuals that are too small will pass through the mesh, while individuals that are too large cannot enter the mesh, and will “bounce off”. Gill nets can be used for a variety of assessments, including population estimates and index sampling. The fall gill net survey is an index survey using experimental nets that are comprised of five different mesh sizes, allowing a broad size range of fish to be sampled. This survey has been completed annually during the last two weeks of September since 1983. Gillnets are the most effective gear for assessing walleye and yellow perch populations; however, information on other species is also collected.
- **Growth rate:** The increase in size per unit of time, usually length (inches/year). Change in growth rate can indicate change in the abundance of a species, or change in lake productivity. Change in growth rate can be monitored through length at age across a period of years, for example, the average length of age-3 walleye from the gill net sample, from 1983 to 2019.
- **Harvest:** Fish that are caught and taken home by anglers.
- **Harvestable surplus:** The number of individuals or pounds that can be harvested from a fish population without affecting the long-term stability of that population.
- **Hooking mortality:** The portion of fish that die, due to the stress of being captured by angling gear, after they are released. The rate of hooking mortality varies by water temperature, with higher temperatures experiencing a higher rate of hooking mortality. Fish that die due to hooking mortality are included in the state’s share of the harvestable surplus. The rate of hooking mortality used to determine total walleye kill on Mille Lacs Lake was developed through experiments conducted on the lake.
- **Index sampling:** Sampling to determine a relative value or quantity. Since conducting a direct population estimate on a large lake is very expensive, catch rates (e.g., gillnet catch rates) are used to index the relative abundance of the population. That is, a change in the relative abundance (catch rate) is assumed to be proportional to a change in the actual abundance of the population.
- **Juvenile:** Fish are not sexually mature (i.e., have not spawned yet).
- **Kill:** Fish that are caught and taken home, as well as those that are released, but are estimated to have died from hooking mortality.
- **Littoral Area:** The area of the lake where water depth is less than 15 feet. This is a surrogate measure of lake productivity; this is where vegetation, insects, and small fish (prey) are most abundant in lakes.

- **Mille Lacs Fisheries Advisory Committee (MLFAC):** The citizen input group that was formed to represent a broad range of interests around the Mille Lacs Lake fishery. MLFAC provides input on management options being considered by the Department of Natural Resources.
- **Mortality:** The rate at which fish die. Can also be expressed as a percentage of the fish that were in the population at the beginning of a time period. Mortality is typically divided into natural mortality (e.g. disease or being eaten by a predator) and fishing mortality (removed by harvest or hooking mortality).
- **Population:** All individuals of the same species within a defined geographic location (e.g., a lake) at a given time.
- **Pressure:** Total number of angler-hours spent fishing over a specified time period (e.g., during the last winter creel survey, pressure was over 2 million angler-hours).
- **Otolith:** Bony inner ear structures of fish formed from layers of calcium carbonate that are used for balance and orientation. These structures are removed from sampled fish and used to determine age.
- **Oxytetracycline (OTC):** An antibiotic chemical that is absorbed by bone, and fluoresces when exposed to certain wavelengths of light. Walleye fry have been marked with OTC for specific experimental purposes. Otoliths can be examined for absorption of OTC, which would indicate if that fish was stocked. OTC-marked fish have been used on Mille Lacs Lake to estimate the number of wild walleye fry produced in a given year.
- **Planktonic/plankton:** Referring to plants (phytoplankton) or animals (zooplankton) that are suspended, or primarily move through, the water column, rather than residing on the bottom. Zooplankton are planktonic animals, while phytoplankton are planktonic plants. Contrast to benthic.
- **Population dynamics:** The interactions of recruitment, growth, and mortality that determine the abundance, age structure, and sizes of individuals in a population. Because recruitment, growth, and mortality are constantly occurring, populations are constantly changing.
- **Population estimate:** An estimate of the actual number of fish in a population. On Mille Lacs Lake population estimates are generated in two different ways. Periodically, a direct population estimate is made through a mark-recapture experiment. Since direct population estimates are very expensive, a statistical catch-at-age (SCAA) model is used between direct population estimates. The periodic direct population estimates are incorporated into the SCAA model.
- **Population structure:** The distribution of sizes, ages, or sexes in a population resulting from the processes of recruitment, growth, natural mortality, and selective removal (fishing).
- **Production:** The amount of total biomass, or fish, that can be produced in a body of water, typically expressed in weight.
- **Protocol:** A series of mutually agreed upon rules dictating how entities interact, or an agreement that modifies or supplants a treaty. Both definitions are used in interactions between The State of Minnesota and The 1837 Treaty Bands.
- **Pseudofeces:** Indigestible material that is taken into an animal, but is expelled prior to passage through the digestive tract. Pseudofeces are produced as a by-product of filter feeding by zebra mussels.
- **Recruitment:** The number of fish surviving to a defined size or age. Commonly defined recruitment to size- or age-classes are when they first become vulnerable to the predominant fishing gear (e.g., the size at which they can be caught in a gill net or the size at which anglers begin to harvest them).

- **Secchi depth:** A measure of water clarity using a Secchi disk. Secchi depth is measured by lowering a Secchi disk into the water and observing when it is no longer visible. It is an indication of how deep light can penetrate into the water.
- **Secchi disk:** A 20 cm (8-inch) diameter disk that is divided into quadrants, with the quadrants painted alternately painted black and white.
- **Seining:** A method of sampling small fish in near-shore areas. Historically, shoreline seining was conducted in Mille Lacs Lake to sample age-0 game fish and forage species at several sites around the lake. Seining was discontinued in the early 2000s.
- **Selectivity:** The ability of a gear to catch a certain size or species of fish relative to its ability to catch other sizes or species. For example, gill nets are more selective for 17-inch walleye than they are for 11-inch walleye, so catching more 17-inch fish does not necessarily mean they are more abundant in the population than 11-inch fish. Selectivity also refers to angler harvest, where angler preference, and regulations, determine what species and sizes are kept.
- **Share of the harvestable surplus:** The portion of the harvestable surplus that is assigned to the state or 1837 Treaty fisheries, respectively.
- **Spawning Stock Biomass (SSB):** The aggregate weight of the mature portion of a population usually expressed in pounds, or pounds per gill net lift. Mature female walleye SSB is most often used as a predictor of total egg and fry production (reproductive potential). On Mille Lacs Lake, total SSB goals (total of male and female) have been used to determine the SHL of walleye that can be killed in a year.
- **Stable/stability:** A population that is neither increasing nor decreasing over the long term. It does not mean the population is the same every year, just that there are no long-term trends in abundance.
- **Standardized sampling:** Sampling conducted in a rigidly prescribed manner that defines gear, methods of operation, timing, and location. Standardized sampling means replicating as closely as possible all sampling variables so that results are comparable over time.
- **Statistical-Catch-at-Age (SCAA) Model:** A population model that estimates number and biomass of fish by age and sex. On Mille Lacs Lake, inputs to the model include age and sex specific tribal kill and gill net survey data, sex-specific growth, maturity, angling selectivity, population estimates, and age-specific natural mortality.
- **Stipulation:** An agreement between two parties in a court proceeding. The stipulation defines issues that both parties agree to, and becomes part of the court record.
- **Trawl:** A funnel-shaped net that is towed through the water by a boat. Trawling is used primarily to sample small fish in deeper water than shoreline seining can sample. Older, larger fish are occasionally caught, but most are able to evade the trawl and avoid capture.
- **Year class:** A group of fish produced in a particular year (e.g., all the walleye hatched in 2018 comprise the 2018 year class).
- **Year class strength:** The relative abundance of a year class. An index value can be calculated by sampling an individual year class multiple times over consecutive years. Strong and weak year classes are relative terms based on the abundance of a year class relative to the abundance of others in the same lake. In general, strong year classes are defined as having a year class strength value greater than the 75<sup>th</sup> percentile, and weak year classes have a year class strength value lower than the 25<sup>th</sup> percentile.
- **YOY:** See Age-0.

## Appendix C. Mille Lacs Lake Sampling Programs

To monitor individual fish populations and the overall fishery, annual and intermittent sampling programs are utilized. Suggested survey programs and methods are outlined in the MN DNR's Large Lake Sampling Guide (Wingate and Schupp 1985). The sampling guide suggests that refinements to programs and methods be made as needs arise and more is learned about the strengths and weaknesses of sampling techniques.

### *Annual Programs*

- **Open-water and ice fishery creel surveys:** Annual monitoring ensures that harvest is within allocation, and to identify trends in harvest, pressure, and catch rates. Mille Lacs Lake's sport fisheries are monitored through non-uniform probability, access-based creel surveys (Pollock *et al* 1994). These surveys yield estimated angler pressure, estimated number and pounds of fish harvested, and estimated length distribution of fish that were harvested, released, and died from hooking mortality.
- **Young-of-year (YOY) walleye sampling:** The purpose of this survey is to monitor abundance of age-0 walleye, which is an indicator of reproductive success. Age-0 walleye are sampled using electrofishing at discrete areas of the lake, to monitor relative abundance, age, and size of age-0 and age-1 walleye.
- **Forage assessment:** Monitoring abundance of forage species gives insight into past and future angling success rates, and walleye recruitment. Small mesh vertical gill nets are used to sample forage species in the lake. Primary target species are age-0 and age-1 yellow perch, cisco, and spot-tail shiner. Relative abundance of these species is monitored. Additionally, the relative abundance of incidentally captured age-0 walleye is compared to results from age-0 walleye sampling and assessed for similarity in trends.
- **Fall gill net survey:** This program targets walleye, yellow perch, cisco and northern pike using standard experimental gill nets. Metrics monitored from these populations include age distribution, year class strength, growth rate, and rate of sexual maturity. Changes in these metrics relate to how fish populations compensate for changes in density (Gangl and Pereira 2003). Additionally, condition factor, the relative plumpness of a fish, is monitored. Condition factor is correlated with angler catch rates, and can be used to provide insight into future angling catch rate, or to explain past catch rates. The survey has been expanded beyond the original 32 near-shore netting locations to include 20 off-shore sites. Nets set in northern pike habitat have also been added to provide a larger sample of northern pike, using larger mesh sizes than the experimental nets.
- **Zooplankton sampling:** Zooplankton sampling monitors the abundance and species composition of the zooplankton community. Both of these metrics offer insight into changes in the productivity of the lake. Zebra mussel veliger abundance is also monitored through this program.
- **Water quality sampling:** Water is sampled and analyzed for a variety of chemical parameters and clarity (Secchi depth). The sampled parameters primarily relate to productivity.
- **Adult zebra mussel sampling:** Adult zebra mussels are sampled at standard stations around the lake in order to monitor trends in abundance.
- **Walleye Population Model:** A Statistical Catch at Age (SCAA) model is used to combine multiple types of data into a unified framework to estimate age and sex specific abundances and exploitation over time. The model uses data collected by the state creel, tribal census, fall electrofishing survey, and fall gillnetting survey. The state's SCAA model has been reviewed externally and found to be sound.

Both the creel survey and population assessments have been reviewed externally by subject matter experts and found to be reasonable and sound. The creel survey design was formally reviewed by Dr. James R. Bence, Quantitative Fisheries Center, Michigan State University, and informally by Dr. Chris Vandergoot, Great Lakes Science Center – USGS, Sandusky, Ohio. A review of walleye sampling techniques was undertaken by Dr. James R. Bence, Quantitative Fisheries Center, Michigan State University and Dr. Terrance Quinn, Juneau Center-School of Fisheries and Ocean Sciences, University of Alaska-Fairbanks. This review identified several areas where sampling could be improved, and these suggestions have been adopted.

### *Intermittent Programs*

Several sampling programs are conducted on a periodic or as-needed basis.

- **Walleye population estimate:** A direct walleye population estimate, using mark-recapture methodology, is conducted periodically in order to corroborate the trends in the gillnet survey and model derived abundance estimates. Population estimates were made in 2002, 2003, 2004, 2008, 2013, 2014, and 2018. This assessment is now scheduled to be conducted on a five-year rotation, with the next scheduled in 2023.
- **Smallmouth bass, northern pike, and muskellunge assessment:** All of these species are managed to provide a high quality, trophy fishing experience. These assessments are designed to monitor the size structure of these fish populations.

## Appendix D. History of fishing regulation changes

Note: “Bass” refers to largemouth and smallmouth bass. HSL is harvest slot limit, PSL is protected slot limit. Closed indicates a species cannot be targeted and possession limit is zero. Missing years indicate no regulation change from previous years, though open and close dates are statewide.

Year	Date	Species	Limit	Comments
1962		Northern Pike	---	No harvest
1963		Northern Pike		Statewide regulations
1983		Northern Pike	---	Spearing closure
1985		Walleye	6	One over 20-inches
1994	05/14/1994 – 02/19/1995	Northern Pike	3	One over 30-inches
1997	05/10/1997 – 05/10/1997	Walleye	6	15-inch minimum, one over 20-inches
1998	05/09/1998 – 02/14/1999	Northern Pike	3	26-36 inch PSL, one over 36-inches
1999	05/15/1999 – 02/20/2000	Walleye	6	14-20 inch HSL, one over 26-inches
2000	05/13/2000 – 02/18/2001	Walleye	6	14-18 inch HSL, one over 28-inches
	05/27/2000 – 09/10/2000	Smallmouth Bass	1	21-inch minimum
	09/11/2000 – 02/18/2001	Smallmouth Bass	0	Catch-and-release
2001	05/12/2001 – 06/04/2001	Walleye	6	16-20 inch HSL, one over 30-inches
	06/05/2001 – 11/30/2001	Walleye	6	16-18 inch HSL, one over 28-inches
	12/01/2001 – 02/17/2002	Walleye	6	14-18 inch HSL, one over 28-inches
2002	05/11/2002 – 02/16/2003	Walleye	4	14-16 inch HSL, one over 28-inches
	05/11/2002 – 02/16/2003	Northern Pike	3	24-36 inch PSL, one over 36-inches
2003	05/10/2003 – 02/15/2004	Walleye	4	17-28 inch PSL, one over 28-inches
	Continuous	Cisco	10	Closed to sport gill netting
2004	05/15/2004 – 07/15/2004	Walleye	4	20-28 inch PSL, one over 28-inches
	07/16/2004 – 11/30/2004	Walleye	4	22-28 inch PSL, one over 28-inches
	12/01/2004 – 02/20/2005	Walleye	4	20-28 inch PSL, one over 28-inches
2007	05/12/2007 – 07/08/2007	Walleye	4	20-28 inch PSL, one over 28-inches
	06/02/2007 – 02/24/2008	Muskellunge	1	48-inch minimum length
	07/09/2007 – 11/30/2007	Walleye	4	14-16 inch HSL, one over 28-inches
	12/01/2007 – 02/24/2008	Walleye	4	20-28 inch PSL, one over 28-inches
2008	05/10/2008 – 02/22/2009	Walleye	4	18-28 inch PSL, one over 28-inches
2010	05/15/2010 – 07/14/2010	Walleye	4	18-28 inch PSL, one over 28-inches
	07/15/2010 – 11/30/2010	Walleye	4	20-28 inch PSL, one over 28-inches
2011	05/14/2011 – 02/26/2012	Northern Pike	3	27-40 inch PSL, one over 40-inches
2012	05/12/2012 – 02/24/2013	Walleye	4	17-28 inch PSL, one over 28-inches
2013	05/11/2013 – 02/23/2014	Walleye	2	18-20 inch HSL, one over 28-inches
	05/11/2013 – 02/23/2014	Northern Pike	3	33-40 inch PSL, one over 40-inches
	05/25/2013 – 09/08/2013	Smallmouth Bass	6	17-20 inch PSL, one over 20-inches
	09/09/2013 – 02/23/2014	Smallmouth Bass	0	Catch-and-release
2014	05/10/2014 – 02/22/2015	Walleye	2	18-20 inch HSL, one over 28-inches
	05/10/2014 – 02/22/2015	Bass	6	One over 18-inches
	05/10/2014 – 03/30/2015	Northern Pike	10	One over 30-inches Spearing ban lifted
2015	12/01/2014 – 02/22/2015	Walleye	2	18-20 inch HSL, 1 over 28-inches
	12/01/2014 – 03/31/2015	Northern Pike	10	One over 30-inches



Year	Date	Species	Limit	Comments
	12/01/2014 – 11/30/2015	Bass	6	One over 18-inches
	05/09/2015 – 08/02/2015	Walleye	1	19-21 inch HSL
	08/03/2015 – 11/30/2015	Walleye	---	Closed
	05/09/2015 – 11/30/2015	Northern Pike	10	One over 30-inches, 2 smaller than 30-inches must be harvested before one over 30-inches can be harvested
2016	12/01/2015 – 02/28/2016	Walleye	1	18-20 inch HSL, or 1 over 28-inches
	12/01/2015 – 03/31/2016	Northern Pike	5	One over 30-inches, 2 smaller than 30-inches must be harvested before one over 30-inches can be harvested
	12/01/2015 – 02/28/2016	Bass	6	One over 18-inches
	05/14/2016 – 09/05/2016	Walleye	0	Catch-and-release
	09/06/2016 – 11/30/2016	Walleye	---	Closed
	05/14/2016 – 05/29/2016	Bass	0	Catch-and-release
	05/30/2016 – 02/26/2017	Bass	4	One over 18-inches
2017	12/01/2016 – 02/26/2017	Walleye	1	19-21 inch PSL, or 1 over 28-inches
	12/01/2016 – 03/31/2017	Northern Pike	5	One over 30-inches, 2 smaller than 30-inches must be harvested before one over 30-inches can be harvested
	05/13/2017 – 07/06/2017	Walleye	0	Catch-and-release
	07/07/2017 – 08/10/2017	Walleye	---	Closed
	08/11/2017 – 09/04/2017	Walleye	0	Catch-and -release
	09/05/2017 – 11/30/2017	Walleye	---	Closed
	05/13/2017 – 05/27/2017	Bass	0	Catch-and-release
	05/28/2017 – 02/25/2018	Bass	3	17-21 inch PSL, one over 21-inches
2018	12/01/2017 – 02/25/2018	Walleye	1	20-22 inch HSL, or 1 over 28-inches
	12/01/2017 – 03/31/2018	Northern Pike	5	One over 30-inches, 2 smaller than 30-inches must be harvested before one over 30-inches can be harvested
	05/12/2018 – 11/30/2018	Walleye	0	Catch-and-release
	05/12/2018 – 05/26/2018	Bass	0	Catch-and-release
	05/27/2018 – 02/24/2019	Bass	3	17-21 inch PSL, one over 21-inches
	12/01/2018	Smallmouth Bass	0	Catch-and-release
	05/12/2018 – 11/30/2018	Northern Pike	5	30-40 inch PSL, one over 40-inches
2019	12/01/2018 – 02/24/2019	Walleye	1	21-23 inch HSL, 1 over 28-inches
	05/11/2019 – 05/31/2019	Walleye	1	21-23 inch HSL, 1 over 28-inches
	06/01/2019 - 09/05/2019	Walleye	0	Catch-and-release
	09/06/2019 – 11/30/2019	Walleye	---	Closed, unplanned closure
	05/11/2019 – 05/24/2019	Bass	0	Catch-and-release
	05/25/2019 – 09/08/2019	Bass	3	17-21 inch PSL, one over 21-inches
	12/01/2018 – 03/31/2019	Northern Pike	5	One over 30-inches, 2 smaller than 30-inches must be harvested before one over 30-inches can be harvested
	05/11/2019 – 11/30/2019	Northern Pike	5	30-40 inch PSL, one over 40-inches
	09/09/2019 – 02/28/2020	Smallmouth Bass	0	Catch-and-Release

## Appendix E. History of night closures

### 1983

- From Monday following the general fishing opener, until Monday four weeks after the opener, no fishing from 10:00 pm until 6:00 am the following morning. You may not be on the water if in the possession of any fishing gear.
- Statute, at request of citizens, to limit harvest of large walleye.

### 2016

- Night fishing ban of 1983 extended through last day of November. Except during open season for muskellunge, anglers can target (and possess) muskellunge using baits and lures longer than 8-inches (from front of eye to the end of the trailing hook), and non-game species can be targeted with bow fishing gear, though no angling gear may be possessed while bow fishing. If not bow fishing, fishing gear may be possessed after 10:00 pm.
- MN DNR rule, to limit harvest of walleye.

### 2017

- Night fishing ban of 1983 extended through last day of November. Except during open season for muskellunge, anglers can target (and possess) muskellunge and northern pike using baits and lures longer than 8-inches (from front of eye to the end of the trailing hook), and non-game species can be targeted with bow fishing gear, no angling gear may be possessed while bow fishing. Fishing gear may be possessed after 10:00 pm.
- MN DNR rule, to limit harvest of walleye.

## Appendix F. References

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